

Kingbright

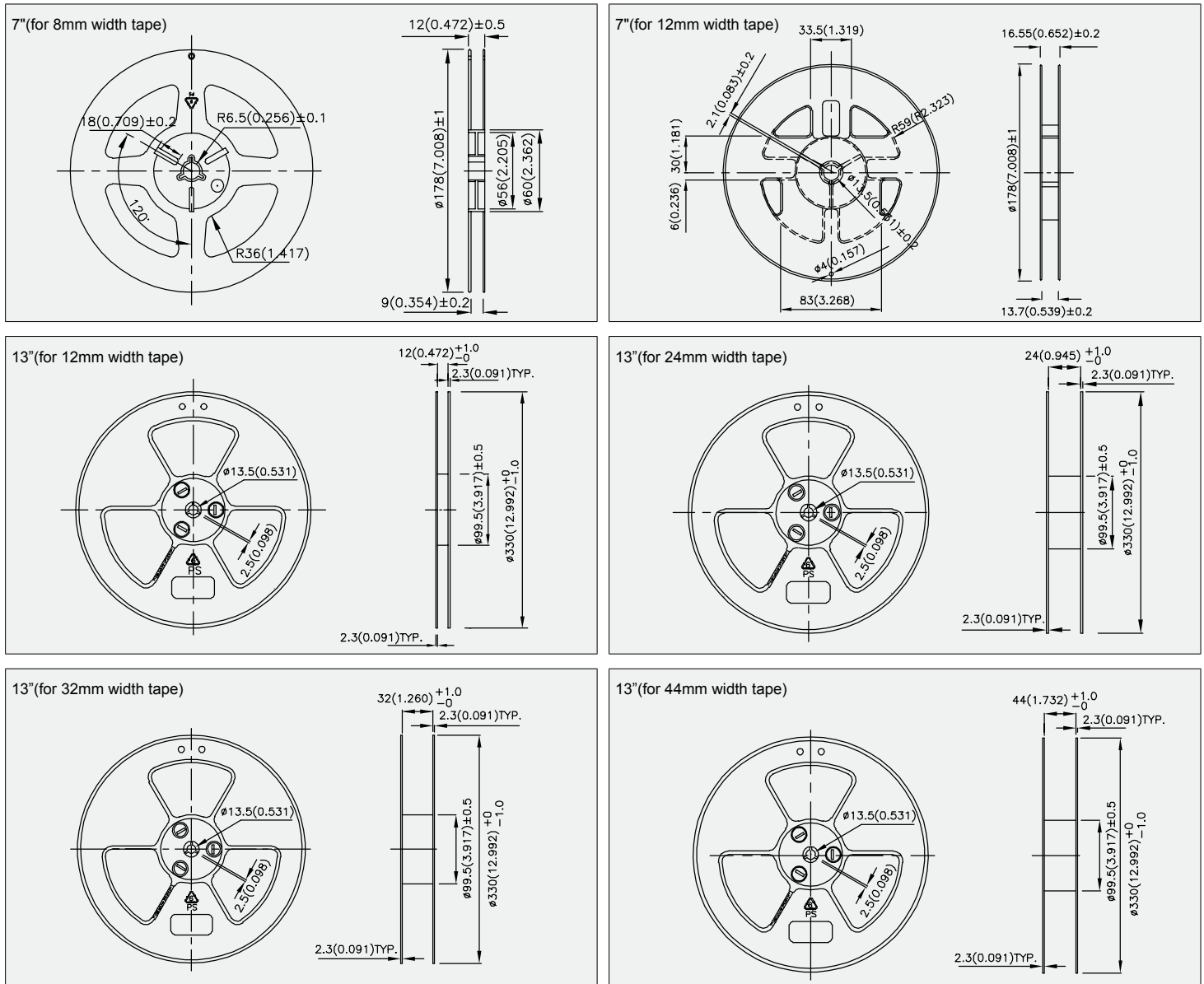
Optoelectronic Components

TECHNICAL NOTES

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SMD TAPE SPECIFICATIONS

Reel Dimensions	Part Number		Reel Dimensions	Part Number	Reel Dimensions	Part Number
7" (for 8mm width tape)	KA-2214	KPG-1608	7" (for 12mm width tape)	KA-2735	13" (for 12mm width tape)	KA-3535
	KA-2810A	KPH-1608		KA-3022-4.5SF		
	KA-3021	KPHBM-2012		KA-3528	13" (for 24mm width tape)	KCDX02
	KM-23-F	KPHCM-2012		KA-3529A		KCDX03
	KM-23xxx	KPHHS-1005		KA-4008		KCSX02
	KP-1608	KPJA-2107		KA-4040		KCSX03
	KP-2012	KPL-3015		KA-5630		KCSX04
	KP-23-F	KPS-3227SP1C		KAA-3528	13" (for 32mm width tape)	KT-1213
	KP-23xxx	KPT-1608		KAA-3528-11		
	KP-3216	KPT-2012		KAAF-3529-11-C3		
	KPA-1606	KPT-3216		KAAF-5050-13		KCDX04
	KPA-2106	KPTB-1612		KAAF-5052		KCDX39
	KPA-3010	KPTB-1615		KM2520xxx03		KCDX51
	KPA-3210	KPTD-1608		KM2520xxx08		KCPDX04
	KPB-3025	KPTD-3216		KM2520xxx09		KCPSX04
7" (for 8mm width tape)	KPBA-3010	KPTF-1616-13	7" (for 12mm width tape)	KM-27xxx-03	13" (for 44mm width tape)	KCSX39
	KPBD-3224	KPTL-3216		KM-27xxx-09		KCSX51
	KPBDA-3020-PF	KPTR-3216		KPED-3528	13" (for 44mm width tape)	KCSX56
	KPBL-3025			KPED-3820		
	KPD-3224			KPS-5130PD7C		
	KPFA-3010-11			KTDS-3535		KCDX56

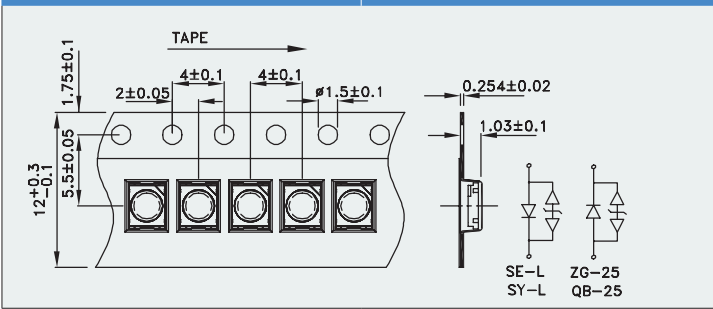


NOTE: 1. All dimensions are in millimeters(inches).

SMD TAPE SPECIFICATIONS

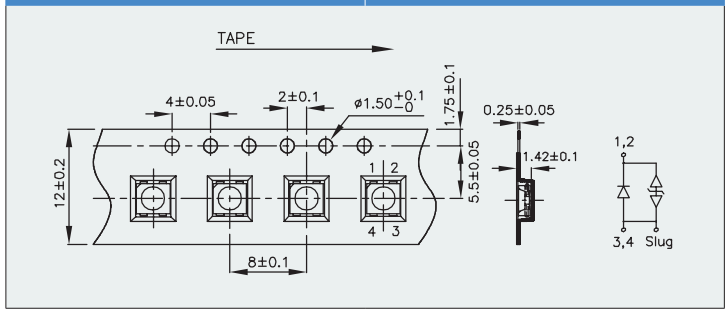
KA-3529A

PACKAGE: 2000PCS / REEL



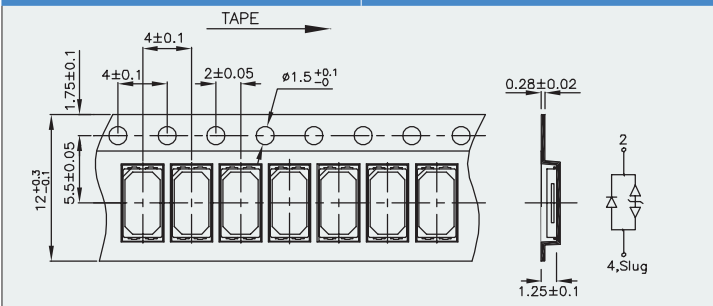
KA-3535

PACKAGE: 2000PCS / REEL



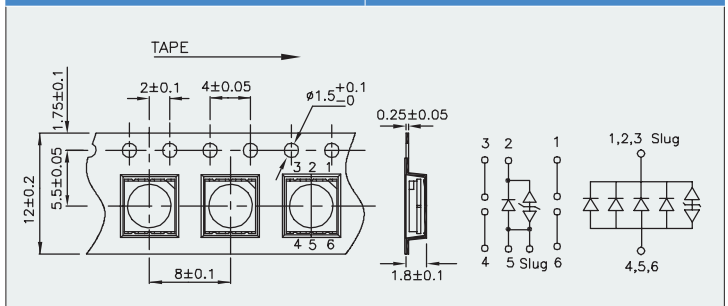
KA-5630

PACKAGE: 2000PCS / REEL



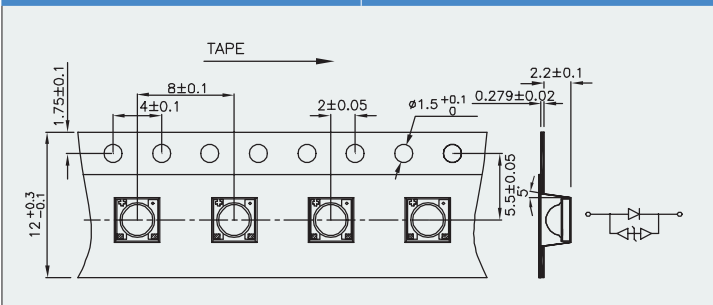
KAAF-5052

PACKAGE: 500PCS / REEL



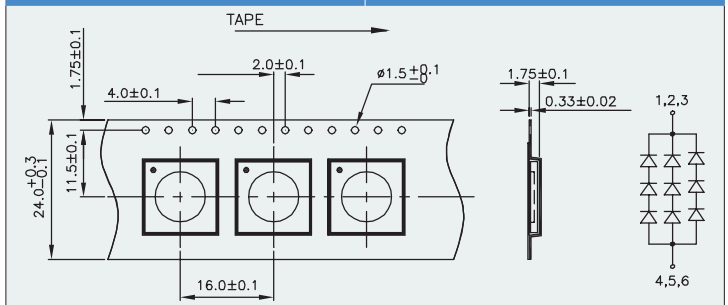
KTDS-3536

PACKAGE: 1000PCS / REEL



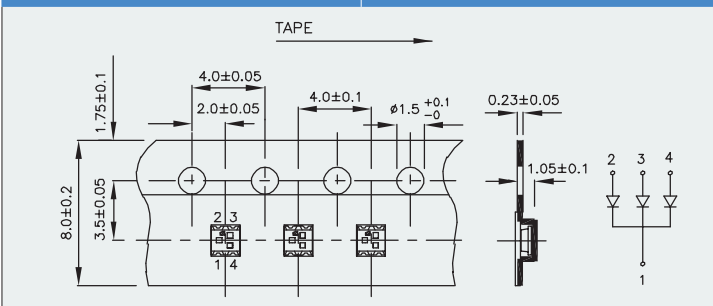
KT-1213

PACKAGE: 500PCS / REEL



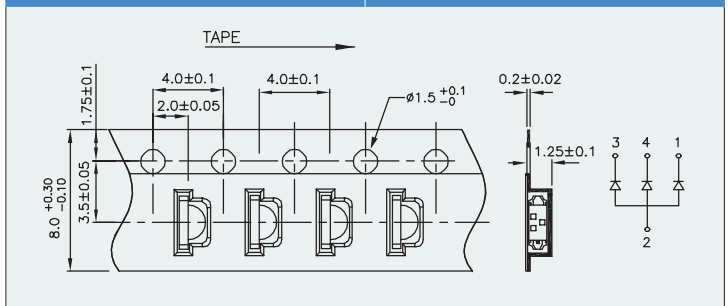
KPTF-1616RGB-13

PACKAGE: 2000PCS / REEL



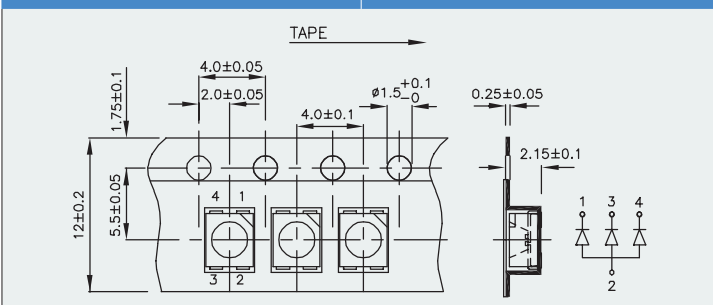
KPFA-3010RGB-11

PACKAGE: 2000PCS / REEL



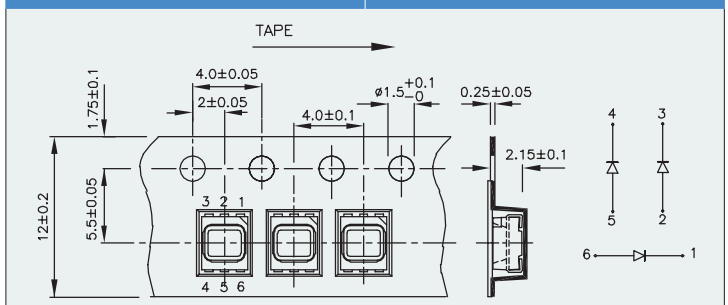
KAA-3528RGB-11

PACKAGE: 2000PCS / REEL

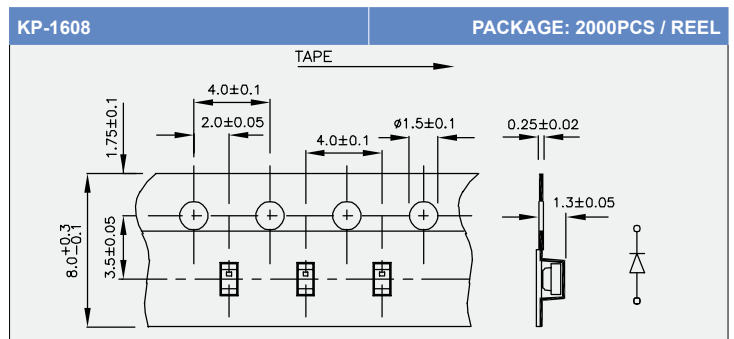
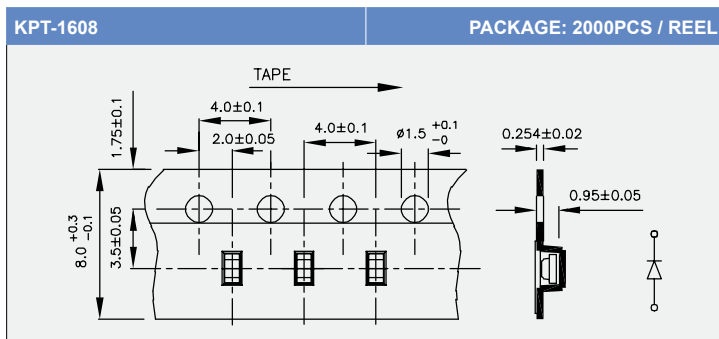
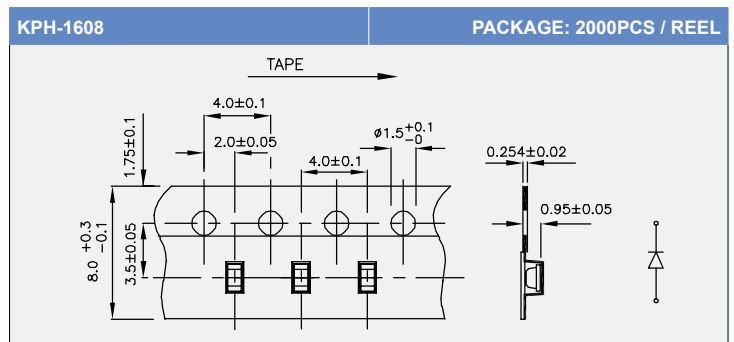
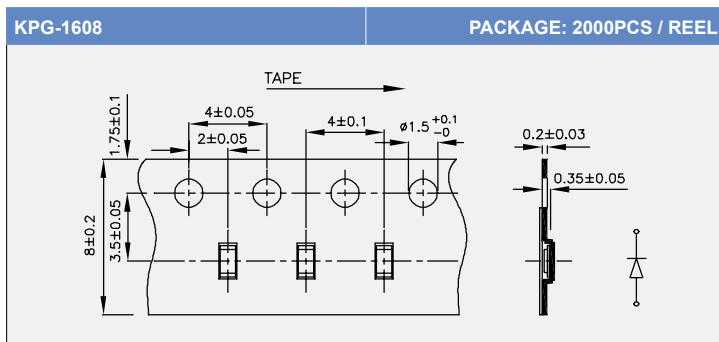
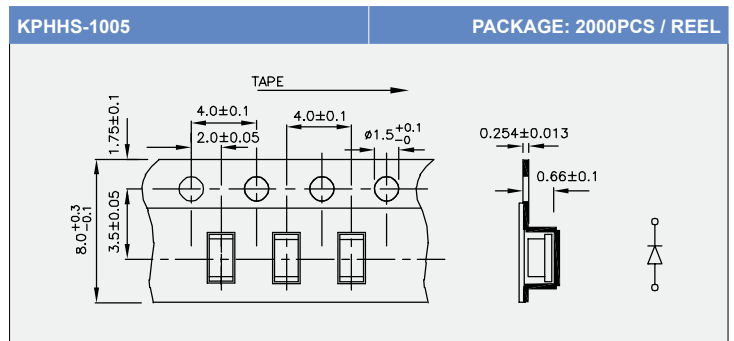
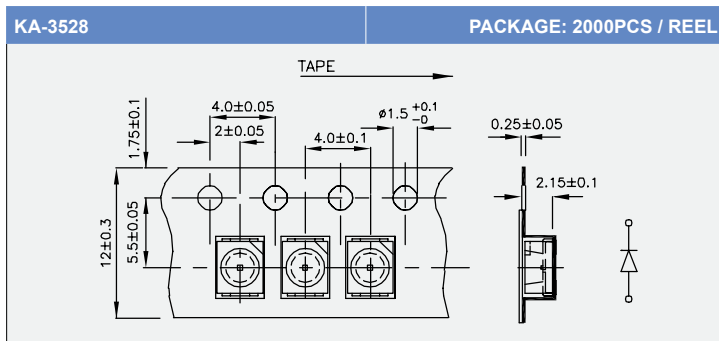
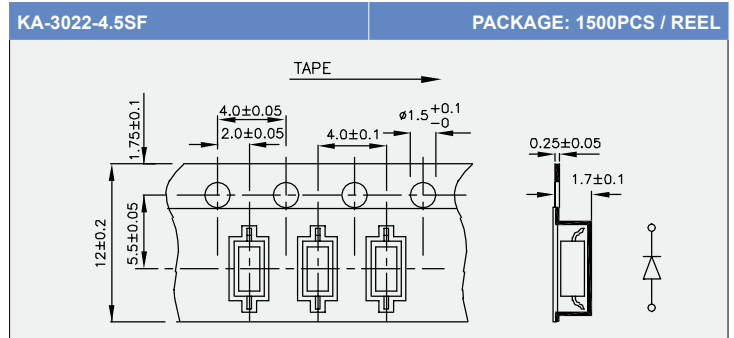
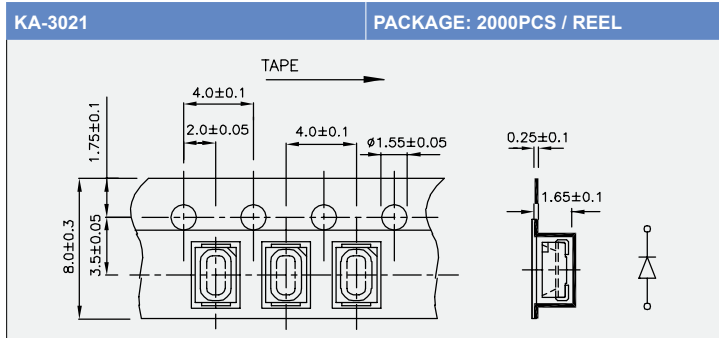
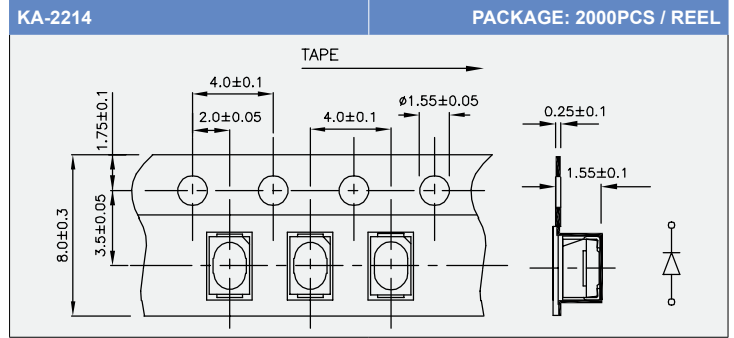
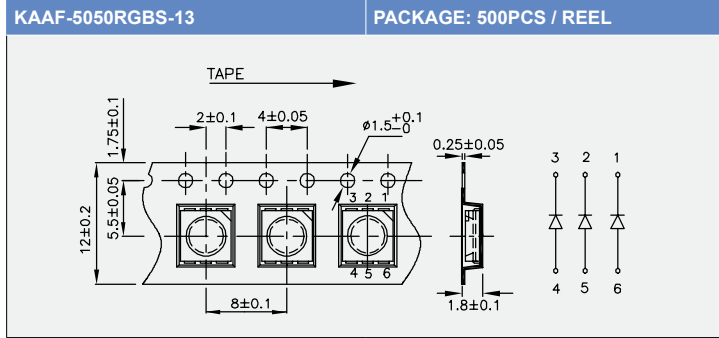


KAAF-3529RGB-11-C3

PACKAGE: 2000PCS / REEL

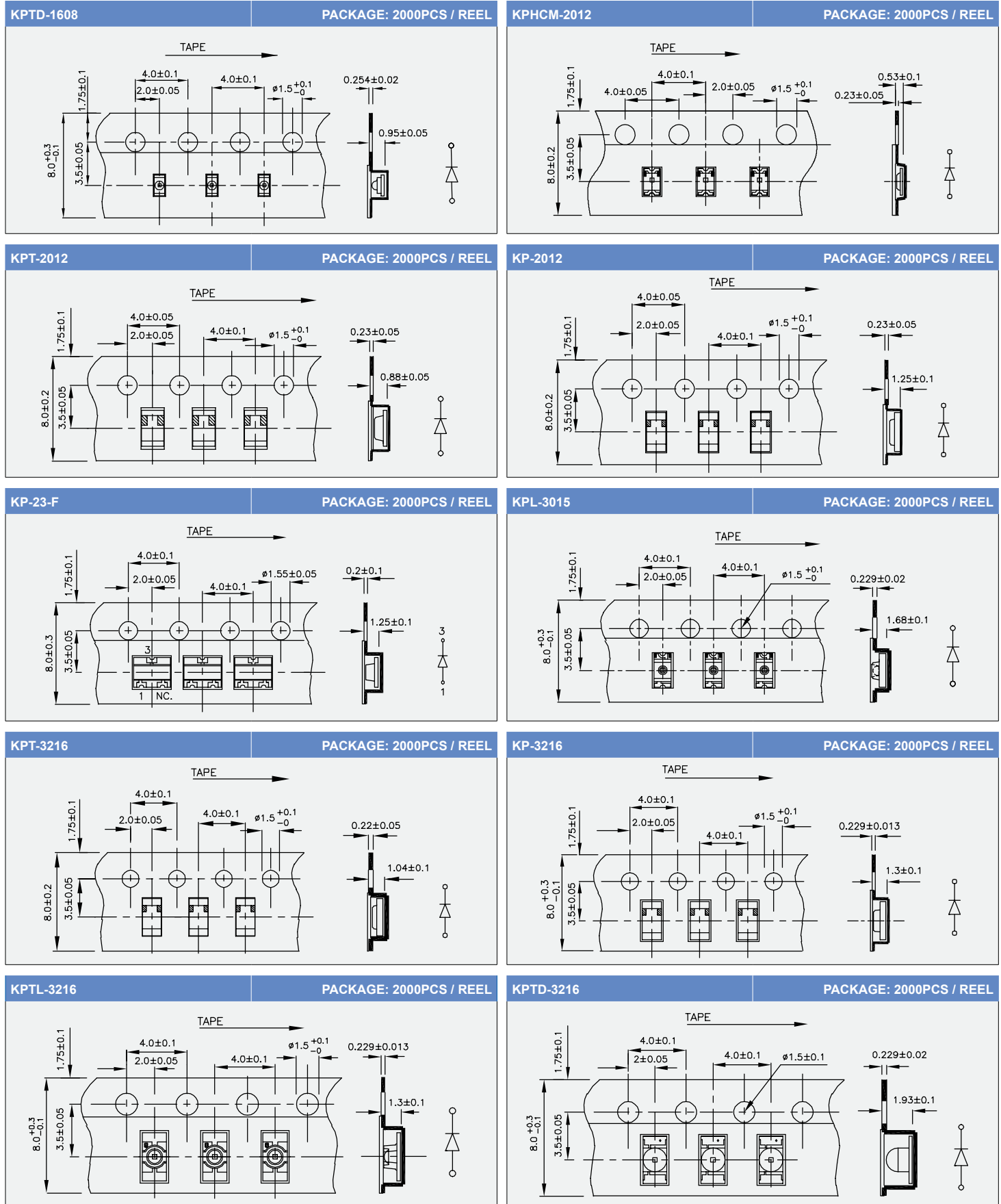


SMD TAPE SPECIFICATIONS



NOTE: 1. All dimensions are in millimeters.

SMD TAPE SPECIFICATIONS



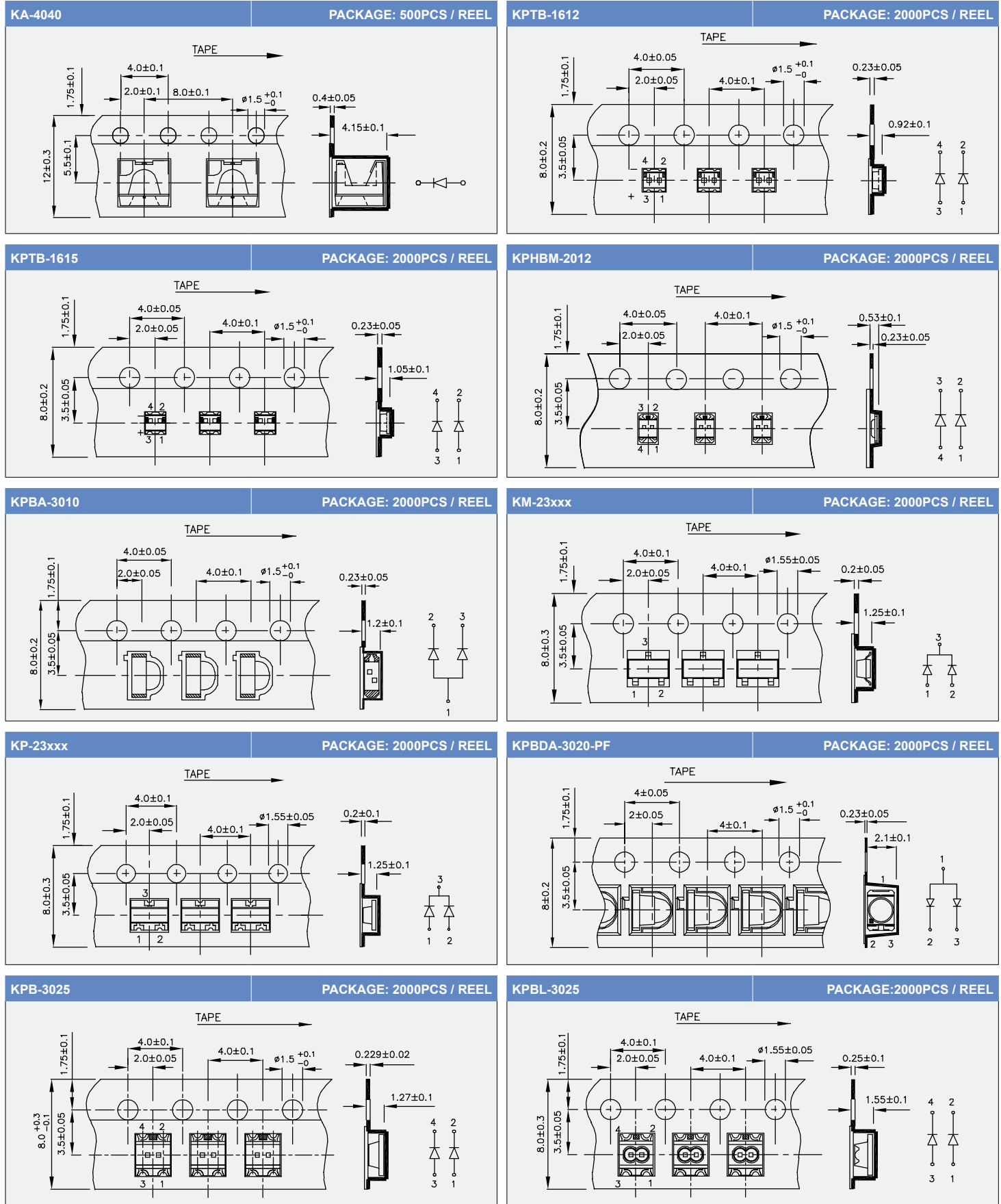
NOTE: 1. All dimensions are in millimeters.

SMD TAPE SPECIFICATIONS

KPD-3224	PACKAGE: 1500PCS / REEL	KPED-3528	PACKAGE: 500PCS / REEL
KPED-3820	PACKAGE: 500PCS / REEL	KPA-1606	PACKAGE: 2000PCS / REEL
KPA-2106	PACKAGE: 2000PCS / REEL	KPJA-2107	PACKAGE: 2000PCS / REEL
KPA-3010	PACKAGE: 2000PCS / REEL	KPA-3210	PACKAGE: 2000PCS / REEL
KA-2810A	PACKAGE: 2000PCS / REEL	KA-4008	PACKAGE: 2000PCS / REEL

NOTE: 1. All dimensions are in millimeters.

SMD TAPE SPECIFICATIONS



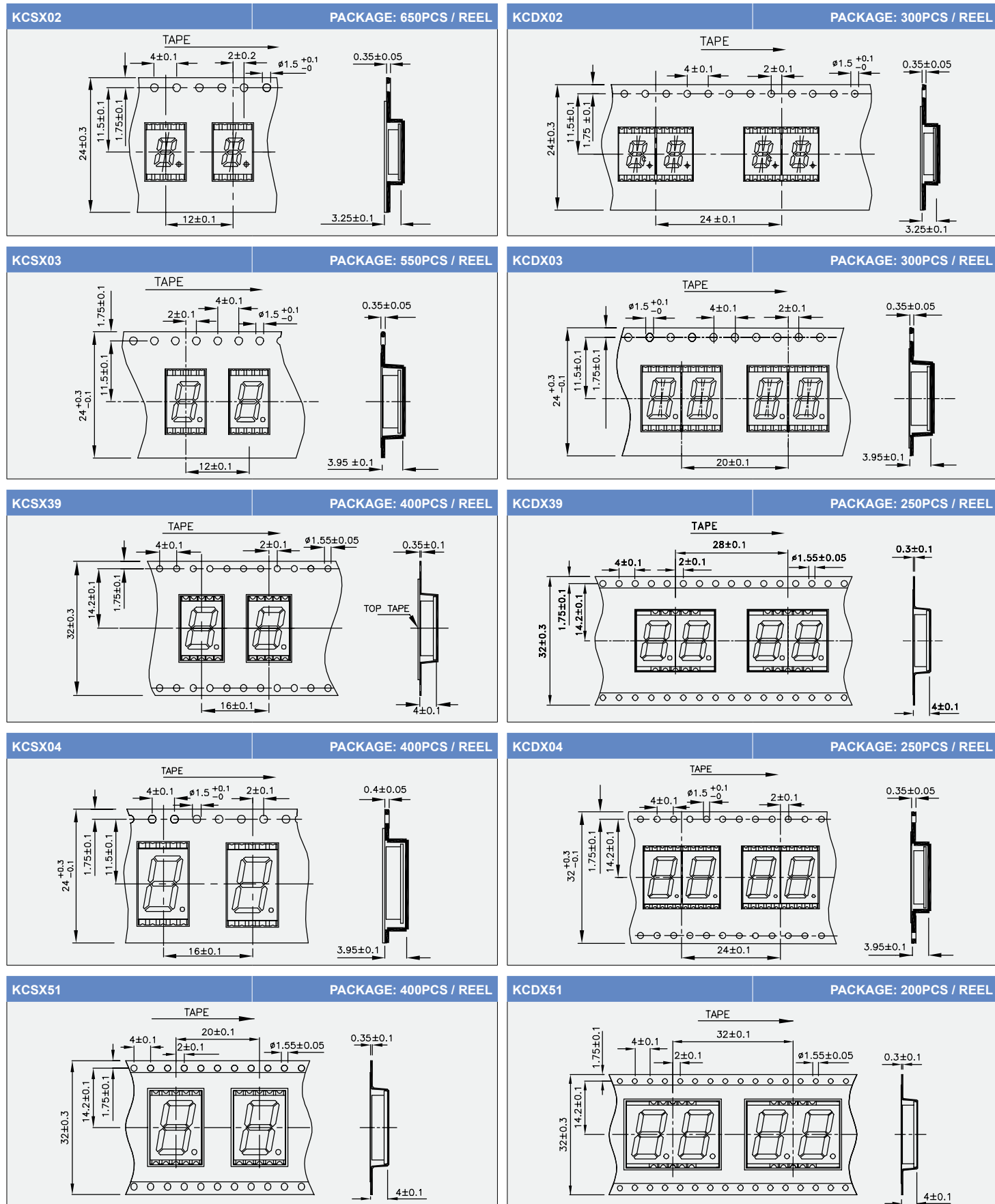
NOTE: 1. All dimensions are in millimeters.

SMD TAPE SPECIFICATIONS

KPBD-3224	PACKAGE: 1500PCS / REEL	KA-2735	PACKAGE: 1000PCS / REEL
KAA-3528	PACKAGE: 2000PCS / REEL	KM2520xxx03	PACKAGE: 1000PCS / REEL
KM2520xxx08	PACKAGE: 1000PCS / REEL	KM2520xxx09	PACKAGE: 1000PCS / REEL
KPTR-3216	PACKAGE: 2000PCS / REEL	KM-23-F	PACKAGE: 2000PCS / REEL
KPS-3227	PACKAGE: 2000PCS / REEL	KPS-5130	PACKAGE: 1500PCS / REEL

NOTE: 1. All dimensions are in millimeters.

SMD TAPE SPECIFICATIONS

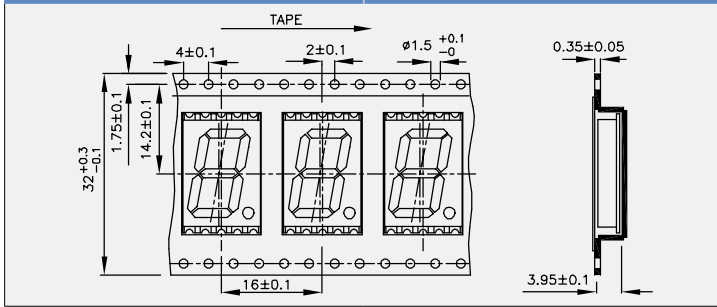


NOTE: 1. All dimensions are in millimeters.

SMD TAPE SPECIFICATIONS

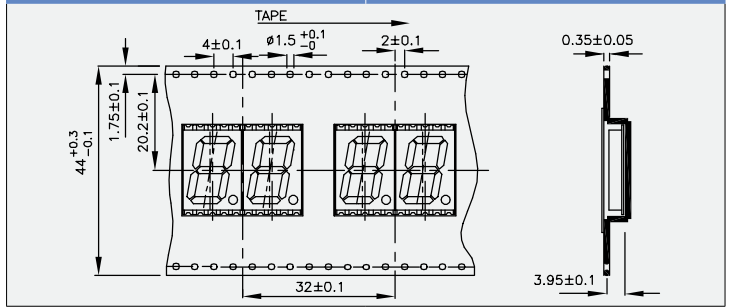
KCSX56

PACKAGE: 400PCS / REEL



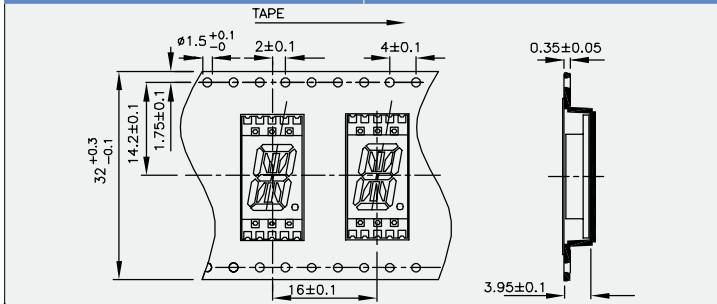
KCDX56

PACKAGE: 200PCS / REEL



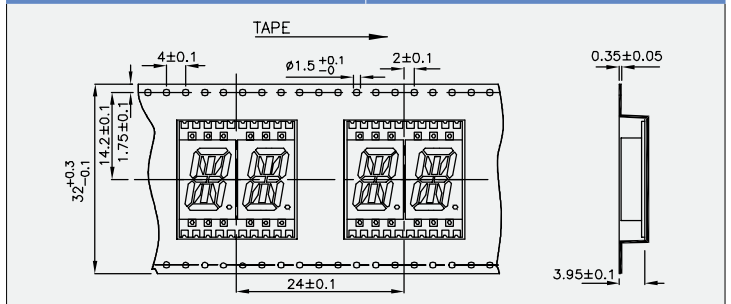
KCPX04

PACKAGE: 400PCS / REEL



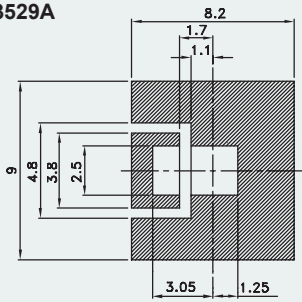
KCPDX04

PACKAGE: 250PCS / REEL

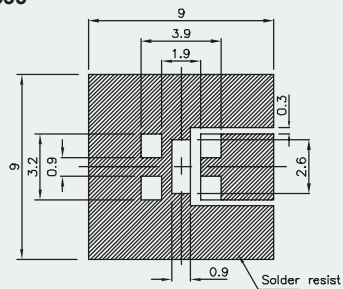


RECOMMENDED SOLDERING PATTERN

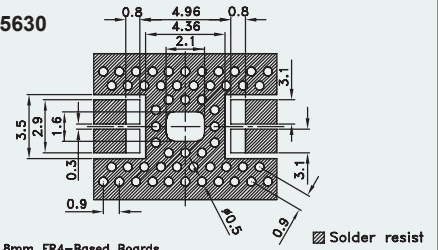
KA-3529A



KA-3535

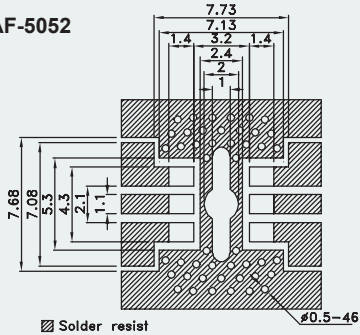


KA-5630

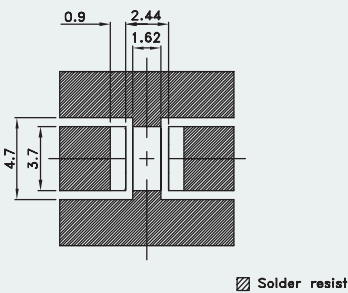


0.8mm FR4-Based Boards
For both the open via PTH and filled and capped via design, the finished hole diameter is 0.5mm. A smaller diameter will lead to an increase of thermal resistance. The recommended distance between two holes is 0.4 mm. This results in a minimal pitch of 0.9mm between the vias.

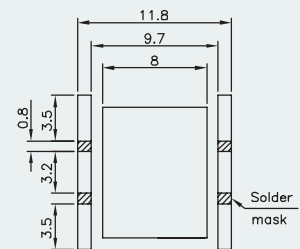
KAAF-5052



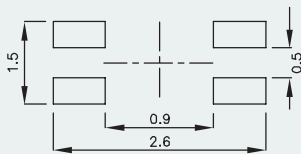
KTDS-3536



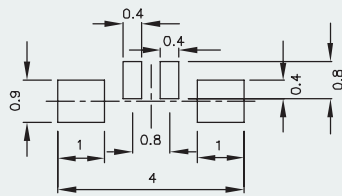
KT-1213



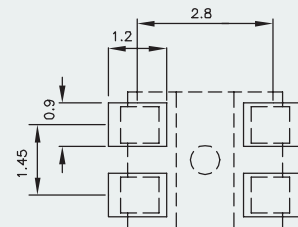
KPTF-1616RGB-13



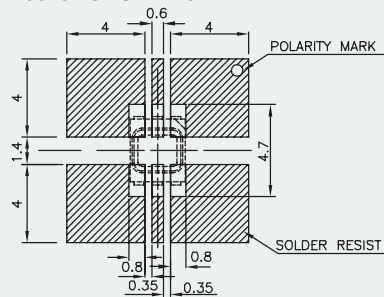
KPFA-3010RGB-11



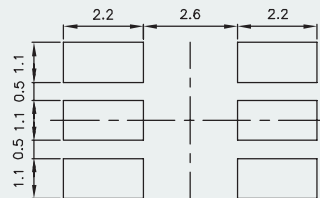
KAA-3528RGB-11



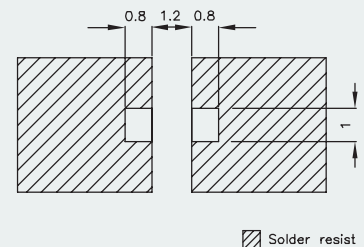
KAAF-3529RGB-11-C3



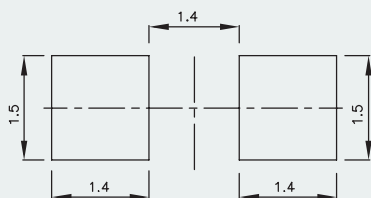
KAAF-5050RGB-13



KA-2214



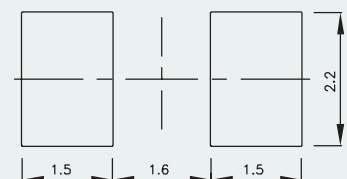
KA-3021



KA-3022-4.5SF

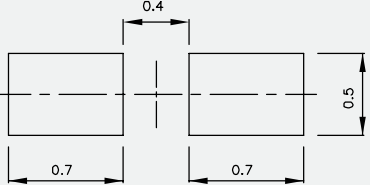
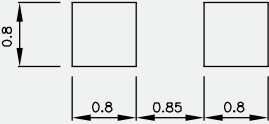
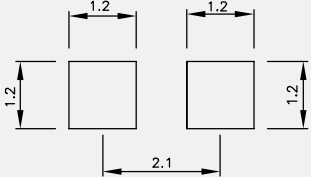
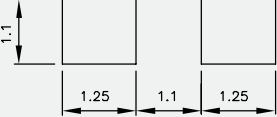
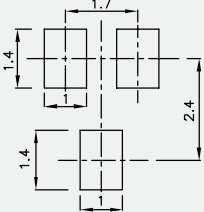
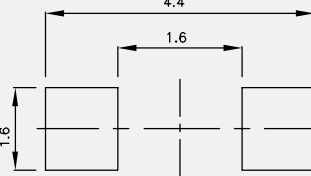
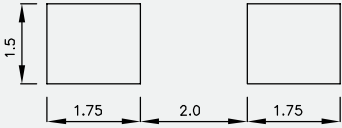
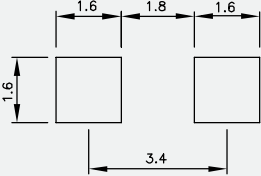
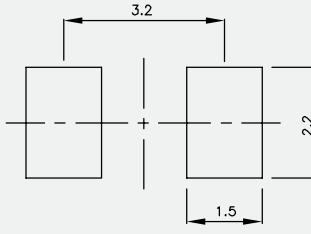
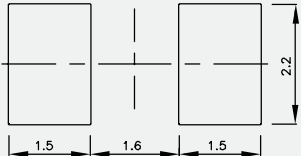
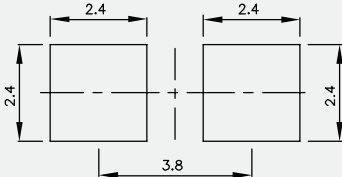
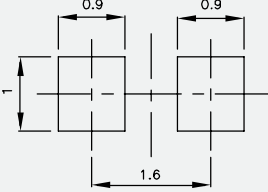
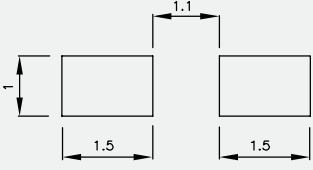
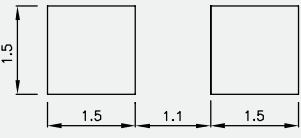
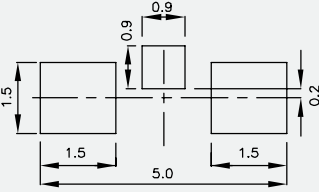


KA-3528



NOTES:
1. All dimensions are in millimeters.
2. Tolerance is $\pm 0.1\text{mm}$ unless otherwise noted.

RECOMMENDED SOLDERING PATTERN

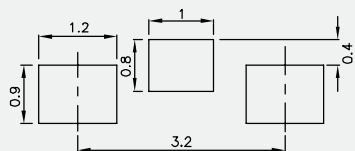
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<p>KPT-2012, KP-2012</p> 	<p>KP-23-F, KP-23xxx</p> 	<p>KPL-3015</p> 
<p>KPT-3216, KP-3216, KPTD-3216</p> 	<p>KPTL-3216</p> 	<p>KPD-3224</p> 
<p>KPED-3528</p> 	<p>KPED-3820</p> 	<p>KPA-1606</p> 
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NOTES:

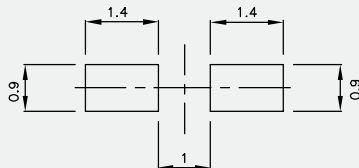
1. All dimensions are in millimeters.
2. Tolerance is $\pm 0.1\text{mm}$ unless otherwise noted.

RECOMMENDED SOLDERING PATTERN

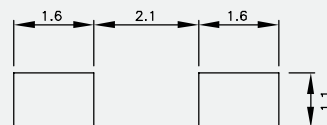
KPA-3210



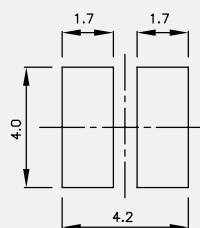
KA-2810A



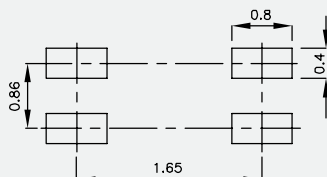
KA-4008



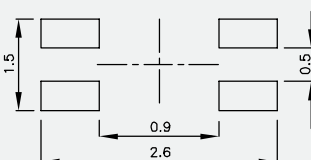
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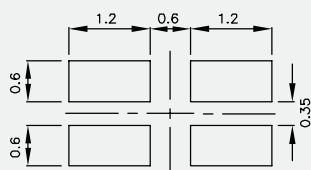
KPTB-1612



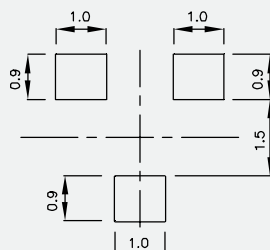
KPTB-1615



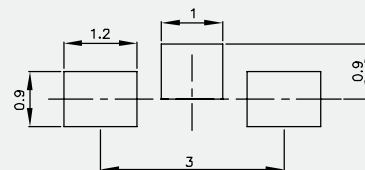
KPHBM-2012



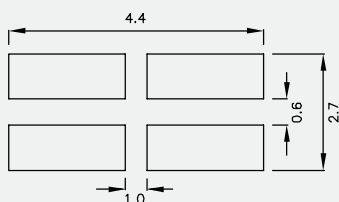
KM-23-F, KM-23xxx



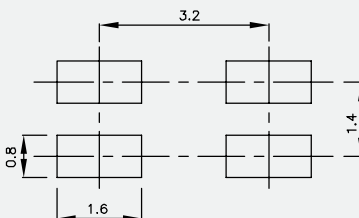
KPBDA-3020-PF



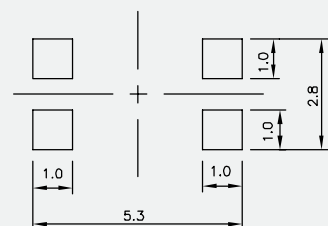
KPB-3025, KPBL-3025



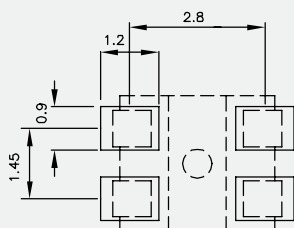
KPB-3224



KA-2735



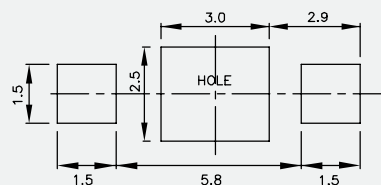
KAA-3528



KM2520xxx03



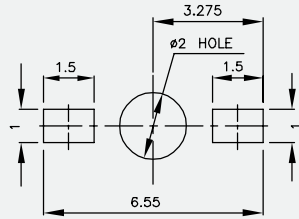
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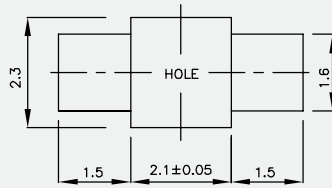
NOTES:
1. All dimensions are in millimeters.
2. Tolerance is $\pm 0.1\text{mm}$ unless otherwise noted.

RECOMMENDED SOLDERING PATTERN

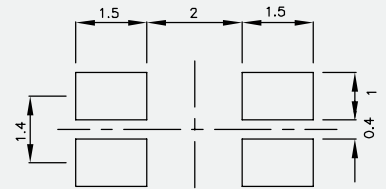
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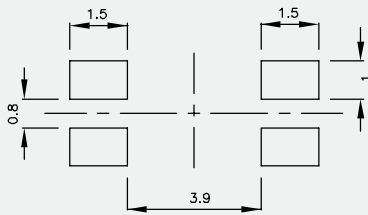
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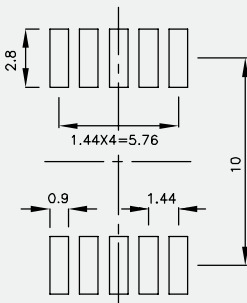
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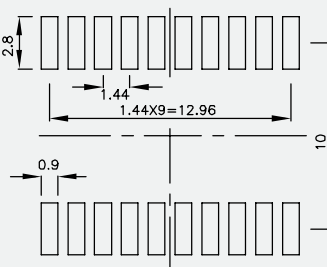
NOTES:

1. All dimensions are in millimeters.
2. Tolerance is $\pm 0.1\text{mm}$ unless otherwise noted.

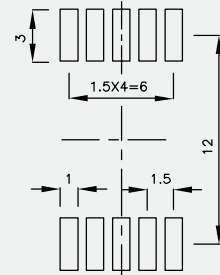
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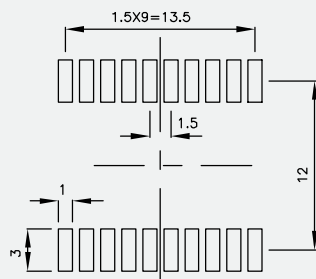
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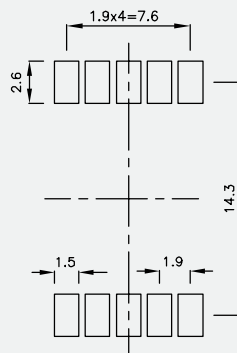
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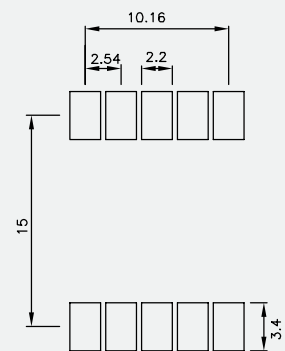
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KCSX39



KCDX39

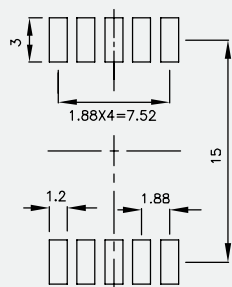


NOTES:

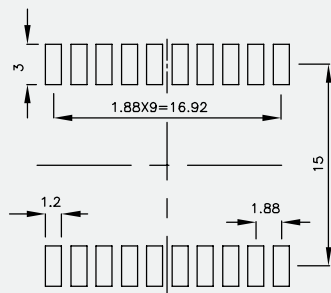
1. All dimensions are in millimeters.
2. Tolerance is $\pm 0.15\text{mm}$ unless otherwise noted.

RECOMMENDED SOLDERING PATTERN

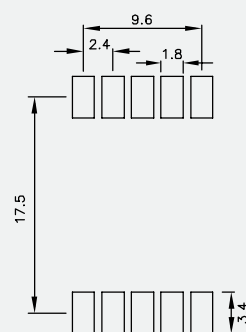
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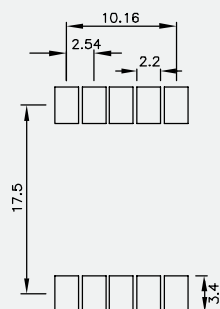
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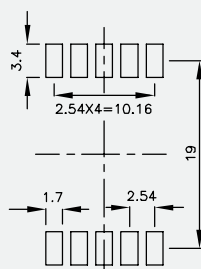
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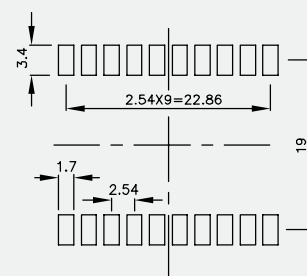
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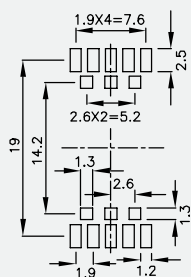
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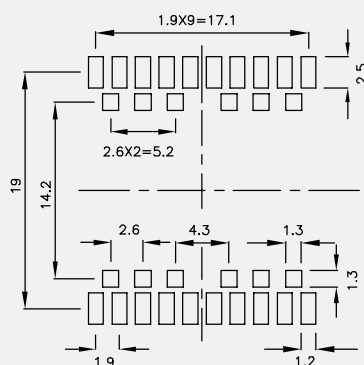
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KCPSX04



KCPDX04



NOTES:

1. All dimensions are in millimeters.
2. Tolerance is $\pm 0.15\text{mm}$ unless otherwise noted.

TECHNICAL DATA

Absolute maximum ratings (T _A =25°C)		E,I Hi.Eff.Red Orange (GaAsP/GaP)	H Bright Red (GaP)	SR Super Bright Red (GaAlAs)	SURK Hyper Red (AlGaInP)	SURK-T Hyper Red (AlGaInP)	SUR-E Hyper Red (AlGaInP)	Unit
Reverse voltage	V _R	5	5	5	5	5	5	V
Forward current	I _F	30	25	30	30	30	30	mA
Forward current (Peak) 1/10 Duty Cycle, 0.1ms Pulse Width	i _{FS}	160	130	155	185	150	200	mA
Power dissipation	P _D	75	62.5	75	75	75	75	mW
LED LAMPS:								
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
LED DISPLAYS:								
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C

Operating Characteristics		E,I Hi.Eff.Red Orange (GaAsP/GaP)	H Bright Red (GaP)	SR Super Bright Red (GaAlAs)	SURK Hyper Red (AlGaInP)	SURK-T Hyper Red (AlGaInP)	SUR-E Hyper Red (AlGaInP)	Unit
Forward voltage (typ.) I _F =20mA	V _F	2.0	2.25	1.85	1.95	2.0	1.9	V
I _F =10mA		1.9	2.05	1.8	1.85	1.85	1.8	
I _F =2mA		1.7	1.85	1.65	1.75	1.75	1.7	
Forward voltage (max.) I _F =20mA, 10mA, 2mA	V _F	2.5	2.5	2.5	2.5	2.5	2.5	V
Reverse current V _R =5V	I _R	10	10	10	10	10	10	uA
Peak Emission Wavelength I _F =20mA, 10mA, 2mA	λ _p	627	700	655	645	645	645	nm
Dominant Wavelength I _F =20mA, 10mA, 2mA	λ _D	617	635	640	630	630	630	nm
Spectral line half-width I _F =20mA, 10mA, 2mA	Δλ _{1/2}	45	45	20	28	20	25	nm
Capacitance V _F =0V, f=1MHZ	C	15	40	45	35	35	45	pF

TECHNICAL DATA

Absolute maximum ratings (T _A =25°C)		SUR-G Hyper Red (AlGaInP)	N Pure Orange (GaAsP/GaP)	SEK Super Bright Orange (AlGaInP)	SEK-T Super Bright Orange (AlGaInP)	SE-H Hyper Orange (AlGaInP)	SE-J3 Hyper Red (AlGaInP)	Unit
Reverse voltage	V _R	5	5	5	5	5	5	V
Forward current	I _F	30	25	30	30	30	30	mA
Forward current (Peak) 1/10 Duty Cycle, 0.1ms Pulse Width	i _{FS}	150	145	195	150	150	150	mA
Power dissipation	P _D	75	62.5	75	75	84	84	mW
LED LAMPS:								
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
LED DISPLAYS:								
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C

Operating Characteristics		SUR-G Hyper Red (AlGaInP)	N Pure Orange (GaAsP/GaP)	SEK Super Bright Orange (AlGaInP)	SEK-T Super Bright Orange (AlGaInP)	SE-H Hyper Orange (AlGaInP)	SE-J3 Hyper Red (AlGaInP)	Unit
Forward voltage (typ.) I _F =20mA	V _F	1.9	2.05	2.1	2.05	2.2	2.2	V
I _F =10mA		1.85	1.95	2.0	1.95	2.05	2.0	
I _F =2mA		1.75	1.85	1.85	1.8	1.85	1.8	
Forward voltage (max.) I _F =20mA, 10mA, 2mA	V _F	2.5	2.5	2.5	2.5	2.8	2.5	V
Reverse current V _R =5V	I _R	10	10	10	10	10	10	uA
Peak Emission Wavelength I _F =20mA, 10mA, 2mA	λ _p	645	607	610	610	635	640	nm
Dominant Wavelength I _F =20mA, 10mA, 2mA	λ _D	630	602	601	601	625	625	nm
Spectral line half-width I _F =20mA, 10mA, 2mA	Δλ _{1/2}	22	35	29	17	25	25	nm
Capacitance V _F =0V, f=1MHZ	C	45	15	15	15	27	27	pF

TECHNICAL DATA

Absolute maximum ratings (T _A =25°C)		G,SG Green, Super Bright Green (GaP)	PG Pure Green (GaP)	CGK Green (AlGaInP)	CGK-T Green (AlGaInP)	ZG Green (InGaIn)	ZG-E Green (InGaIn)	Unit
Reverse voltage	V _R	5	5	5	5	5	5	V
Forward current	I _F	25	25	30	30	25	30	mA
Forward current (Peak) 1/10 Duty Cycle, 0.1ms Pulse Width	i _{FS}	140	135	150	150	150	100	mA
Power dissipation	P _D	62.5	62.5	75	78	102.5	120	mW
LED LAMPS:								
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
LED DISPLAYS:								
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C

Operating Characteristics		G,SG Green, Super Bright Green (GaP)	PG Pure Green (GaP)	CGK Green (AlGaInP)	CGK-T Green (AlGaInP)	ZG Green (InGaIn)	ZG-E Green (InGaIn)	Unit
Forward voltage (typ.) I _F =20mA	V _F	2.2	2.25	2.1	2.1	3.3	3.2	V
I _F =10mA		2.0	2.1	2.0	1.95	3.0	3.05	
I _F =2mA		1.9	1.9	1.9	1.8	2.65	2.8	
Forward voltage (max.) I _F =20mA, 10mA, 2mA	V _F	2.5	2.5	2.5	2.6	4.1	4.0	V
Reverse current V _R =5V	I _R	10	10	10	10	50	50	uA
Peak Emission Wavelength I _F =20mA, 10mA, 2mA	λ _P	565	557	574	574	515	520	nm
Dominant Wavelength I _F =20mA, 10mA, 2mA	λ _D	568	557	570	570	525	525	nm
Spectral line half-width I _F =20mA, 10mA, 2mA	Δλ _{1/2}	30	30	20	15	30	35	nm
Capacitance V _F =0V,f=1MHZ	C	15	45	15	15	45	100	pF

TECHNICAL DATA

Absolute maximum ratings (T _A =25°C)		ZG-G Green (InGaN)	Y Yellow (GaAsP/GaP)	SYK Super Bright Yellow (AlGaInP)	SYK-T Super Bright Yellow (AlGaInP)	SY-H Super Bright Yellow (AlGaInP)	SY-J3 Super Bright Yellow (AlGaInP)	Unit
Reverse voltage	V _R	5	5	5	5	5	5	V
Forward current	I _F	30	30	30	30	30	30	mA
Forward current (Peak) 1/10 Duty Cycle, 0.1ms Pulse Width	I _{FS}	100	140	175	150	140	140	mA
Power dissipation	P _D	120	75	75	75	84	75	mW
LED LAMPS:								
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
LED DISPLAYS:								
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C

Operating Characteristics		ZG-G Green (InGaN)	Y Yellow (GaAsP/GaP)	SYK Super Bright Yellow (AlGaInP)	SYK-T Super Bright Yellow (AlGaInP)	SY-H Super Bright Yellow (AlGaInP)	SY-J3 Super Bright Yellow (AlGaInP)	Unit
Forward voltage (typ.) I _F =20mA		3.2	2.1	2.0	2.05	2.3	2.0	V
I _F =10mA	V _F	3.05	1.95	1.95	1.95	2.2	1.95	
I _F =2mA		2.8	1.85	1.85	1.8	2	1.85	
Forward voltage (max.) I _F =20mA, 10mA, 2mA	V _F	4.0	2.5	2.5	2.5	2.8	2.5	V
Reverse current V _R =5V	I _R	50	10	10	10	10	10	uA
Peak Emission Wavelength I _F =20mA, 10mA, 2mA	λ _P	520	590	590	590	590	590	nm
Dominant Wavelength I _F =20mA, 10mA, 2mA	λ _D	525	588	590	590	589	590	nm
Spectral line half-width I _F =20mA, 10mA, 2mA	Δλ _{1/2}	35	35	20	15	20	20	nm
Capacitance V _F =0V, f=1MHZ	C	100	20	20	25	45	45	pF

TECHNICAL DATA

Absolute maximum ratings (T _A =25°C)		MB Blue	PB-A Blue	QB-D Blue	QB-F Blue	QB-G Blue	VB-D Blue	Unit
		(GaN)	(InGaN)	(InGaN)	(InGaN)	(InGaN)	(InGaN)	
Reverse voltage	V _R	5	5	5	5	5	5	V
Forward current	I _F	30	30	30	30	30	30	mA
Forward current (Peak) 1/10 Duty Cycle, 0.1ms Pulse Width	i _{FS}	150	100	150	150	150	100	mA
Power dissipation	P _D	135	120	120	120	120	120	mW
LED LAMPS:								
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
LED DISPLAYS:								
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C






Operating Characteristics		MB Blue	PB-A Blue	QB-D Blue	QB-F Blue	QB-G Blue	VB-D Blue	Unit
		(GaN)	(InGaN)	(InGaN)	(InGaN)	(InGaN)	(InGaN)	
Forward voltage (typ.) I _F =20mA	V _F	3.8	3.2	3.3	3.3	3.3	3.3	V
I _F =10mA		3.6	3.05	3.0	3.0	3.0	3.0	
I _F =2mA		3.4	2.8	2.65	2.65	2.65	2.65	
Forward voltage (max.) I _F =20mA, 10mA, 2mA	V _F	4.5	4.0	4.0	4.0	4.0	4.0	V
Reverse current V _R =5V	I _R	10	10	50	50	50	50	uA
Peak Emission Wavelength I _F =20mA, 10mA, 2mA	λ _P	430	468	460	460	461	465	nm
Dominant Wavelength I _F =20mA, 10mA, 2mA	λ _D	466	465	465	465	465	470	nm
Spectral line half-width I _F =20mA, 10mA, 2mA	Δλ _{1/2}	60	21	25	25	25	22	nm
Capacitance V _F =0V, f=1MHZ	C	100	100	100	100	100	100	pF






TECHNICAL DATA 5V/14V WITH INTERNAL RESISTANCE

Absolute maximum ratings (T _A =25°C)		E,I Hi.Eff.Red (GaAsP/GaP)	SR Super Bright Red (GaAlAs)	G Green (GaP)	Y Yellow (GaAsP/GaP)	Unit
Reverse voltage	V _R	5	5	5	5	V
Forward voltage (Max.) for 5V	V _F	6	6	6	6	V
Forward voltage (Max.) for 14V	V _F	16	16	16	16	V
Power dissipation for 5V	P _D	85	85	85	85	mW
Power dissipation for 14V	P _D	160	160	160	160	mW
LED LAMPS:						
Operating temperature	T _A	- 40~+70	- 40~+70	- 40~+70	- 40~+70	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
LED DISPLAYS:						
Operating temperature	T _A	- 40~+70	- 40~+70	- 40~+70	- 40~+70	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C

Operating Characteristics		E,I Hi.Eff.Red (GaAsP/GaP)	SR Super Bright Red (GaAlAs)	G Green (GaP)	Y Yellow (GaAsP/GaP)	Unit
Forward current (typ.) V _F =5V	I _F	13	13	11.5	13	mA
Forward current (typ.) V _F =14V	I _F	10.5	10.5	10.5	10.5	mA
Forward current (max.) V _F =5V	I _F	17.5	17.5	17.5	17.5	mA
Forward current (max.) V _F =14V	I _F	13.5	13.5	13.5	13.5	mA
Reverse current V _R =5V	I _R	10	10	10	10	uA
Peak Emission Wavelength V _F =5V,14V	λ _p	627	655	565	590	nm
Dominant Wavelength V _F =5V,14V	λ _D	617	640	568	588	nm
Spectral line half-width V _F =5V,14V	Δλ _{1/2}	45	20	30	35	nm

TECHNICAL DATA FOR BLINKING LED LAMPS

Absolute maximum ratings (T _A =25°C)		E,I Hi.Eff.Red (GaAsP/GaP)	H Bright Red (GaP)	SR Super Bright Red (GaAlAs)	G Green (GaP)	Y Yellow (GaAsP/GaP)	Unit
Reverse voltage	V _R	 0.5	 0.5	 0.5	 0.5	 0.5	V
Forward voltage (max.)	V _F	14	14	14	14	14	V
Total Power dissipation	P _D	310	310	310	310	310	mW
Operating temperature	T _A	- 40~+70	- 40~+70	- 40~+70	- 40~+70	- 40~+70	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C

Operating Characteristics		E,I Hi.Eff.Red (GaAsP/GaP)	H Bright Red (GaP)	SR Super Bright Red (GaAlAs)	G Green (GaP)	Y Yellow (GaAsP/GaP)	Unit
Forward current (min.) V _F =3.5V	I _F	 8	 8	 8	 8	 8	mA
Forward current (typ.) V _F =5V	I _F	22	22	22	22	22	mA
Supply current V _F =3.5V ~ 14V	I _{SON}	8 ~ 44	8 ~ 44	8 ~ 44	8 ~ 44	8 ~ 44	mA
Blink frequency V _F =3.5V ~ 14V	f	3 ~ 1.5	3 ~ 1.5	3 ~ 1.5	3 ~ 1.5	3 ~ 1.5	Hz
Peak Emission Wavelength	λ _p	627	700	655	565	590	nm
Dominant Wavelength	λ _D	617	635	640	568	588	nm
Spectral line half-width	Δλ _{1/2}	45	45	20	30	35	nm

TECHNICAL DATA FOR INFRARED

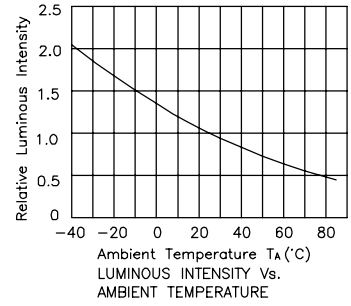
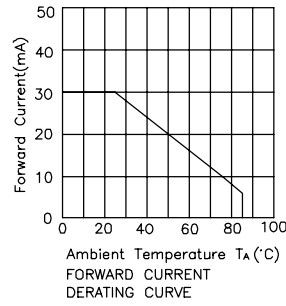
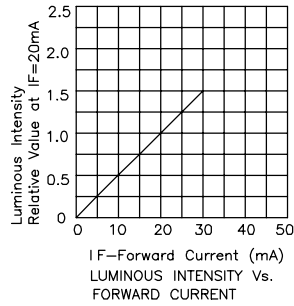
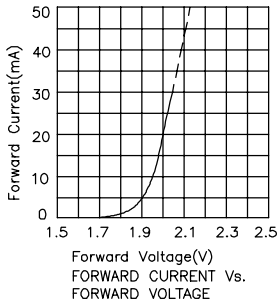
Absolute maximum ratings (T _A =25°C)		F3	SF4	SF6	SF7	Unit
		(GaAs)	(GaAlAs)	(GaAlAs)	(GaAlAs)	
Reverse voltage	V _R	5	5	5	5	V
Forward current	I _F	50	50	50	50	mA
Forward current (Peak) 1/100 Duty Cycle, 10μs Pulse Width	i _{FS}	1.2	1.2	1	1	A
Power dissipation	P _D	80	80	80	80	mW
LED LAMPS:						
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
LED DISPLAYS:						
Operating temperature	T _A	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C
Storage temperature	T _{STG}	- 40~+85	- 40~+85	- 40~+85	- 40~+85	°C

Operating Characteristics		F3	SF4	SF6	SF7	Unit
		(GaAs)	(GaAlAs)	(GaAlAs)	(GaAlAs)	
Forward voltage (typ.) I _F =20mA	V _F	1.2	1.3	1.35	1.4	V
Forward voltage (max.) I _F =20mA	V _F	1.6	1.6	1.6	1.6	V
Reverse current V _R =5V	I _R	10	10	10	10	uA
Peak Emission Wavelength I _F =20mA	λ _p	940	880	860	850	nm
Spectral line half-width I _F =20mA	Δλ _{1/2}	50	50	50	50	nm
Capacitance V _F =0V, f=1MHZ	C	90	90	30	30	pF

TECHNICAL DATA

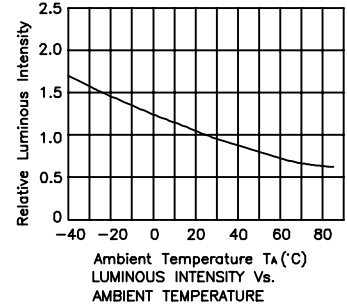
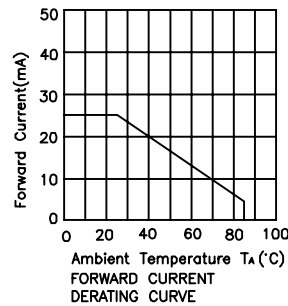
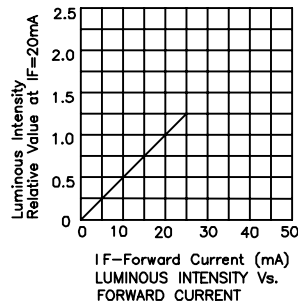
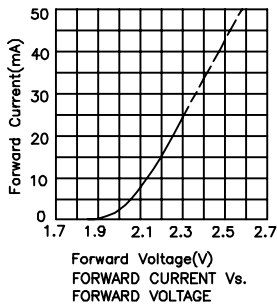
High Efficiency Red, Orange

E,I : GaAsP/GaP



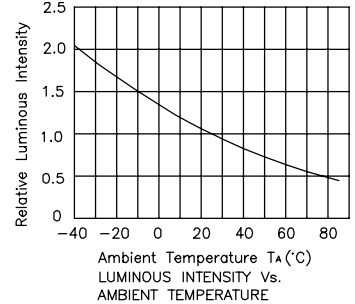
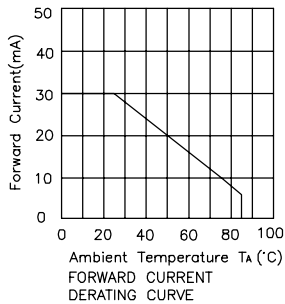
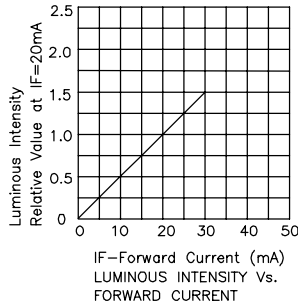
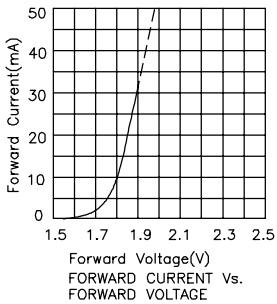
Bright Red

H : GaP



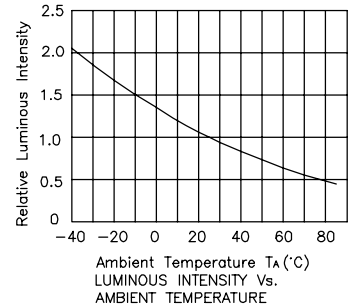
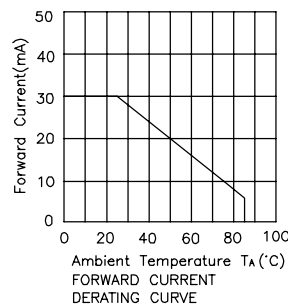
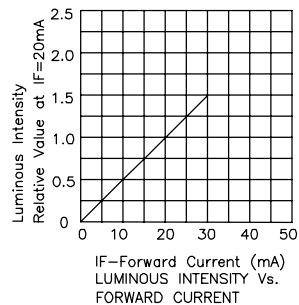
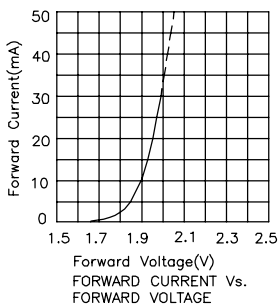
Super Bright Red

SR : GaAlAs



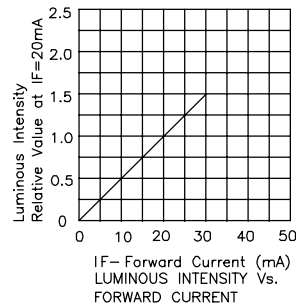
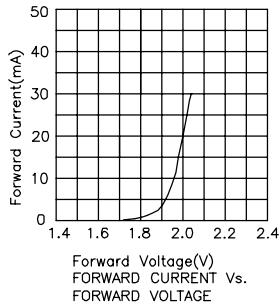
Hyper Red

SURK : AlGaInP

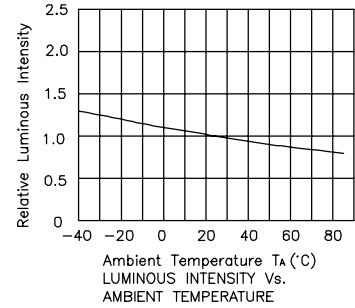
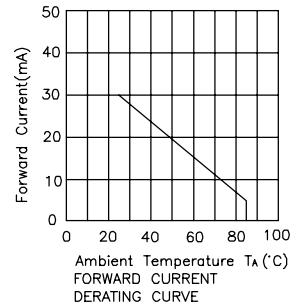


TECHNICAL DATA

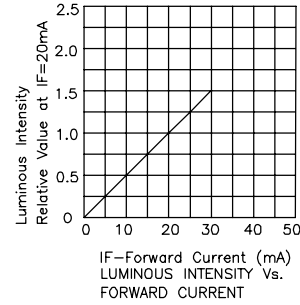
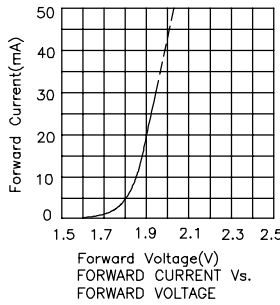
Hyper Red



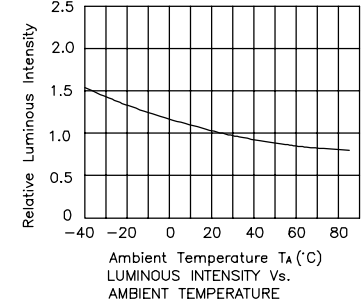
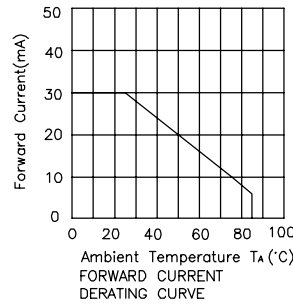
SURK-T : AlGaInP



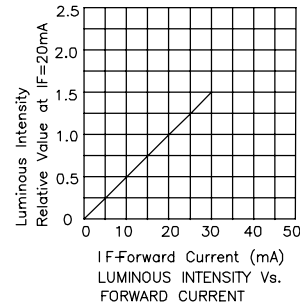
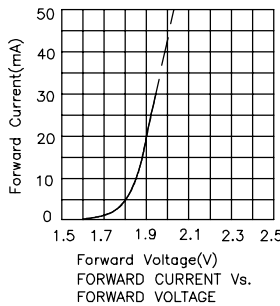
Hyper Red



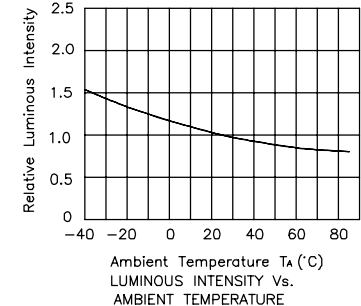
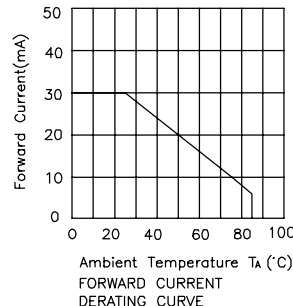
SUR-E : AlGaInP



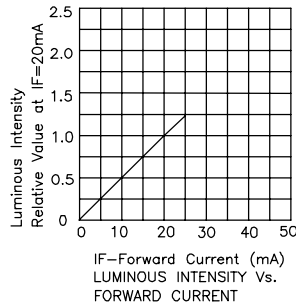
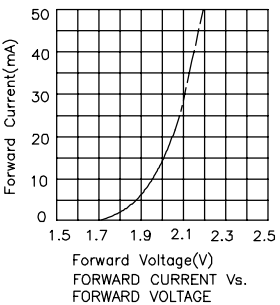
Hyper Red



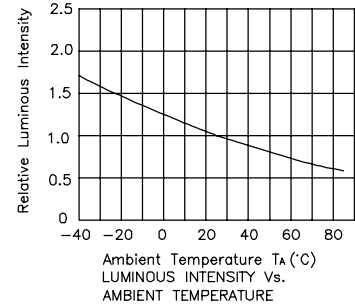
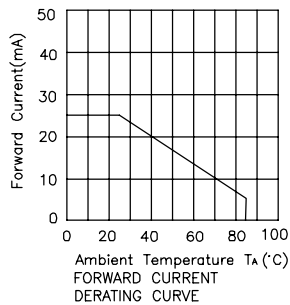
SUR-G : AlGaInP



Pure Orange



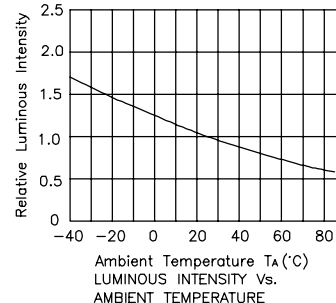
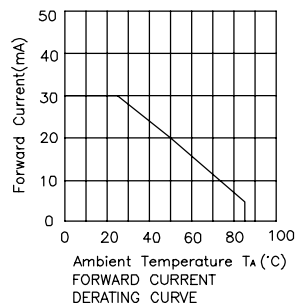
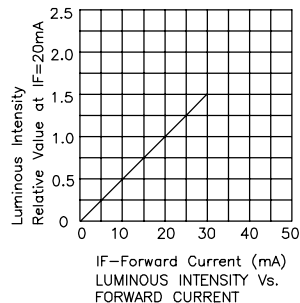
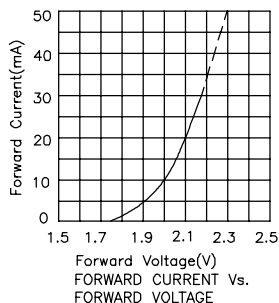
N : GaAsP/GaP



TECHNICAL DATA

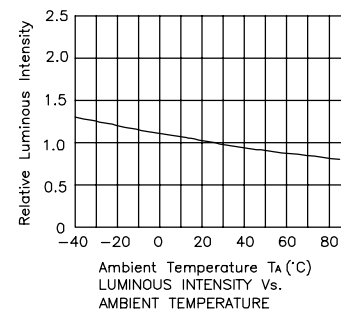
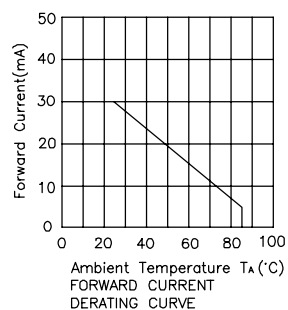
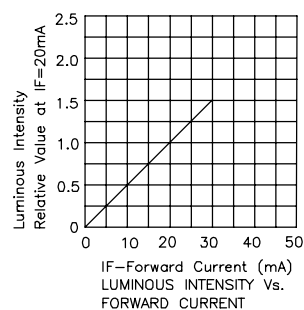
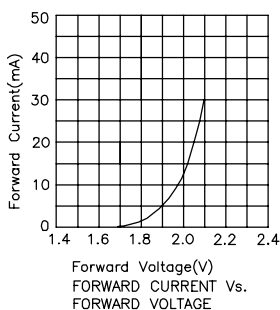
Super Bright Orange

SEK : AlGaInP



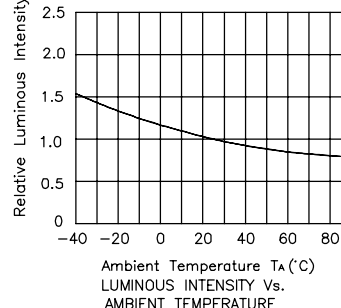
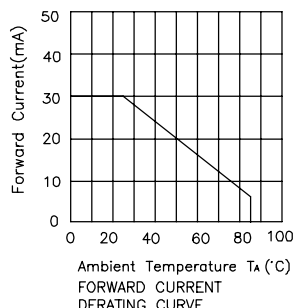
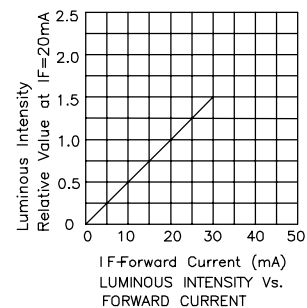
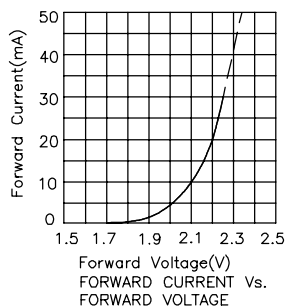
Super Bright Orange

SEK-T : AlGaInP



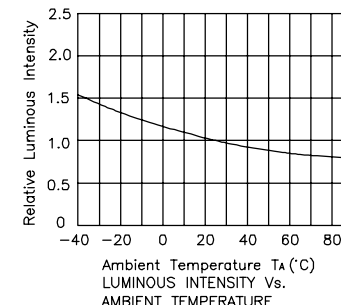
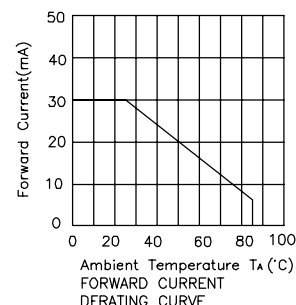
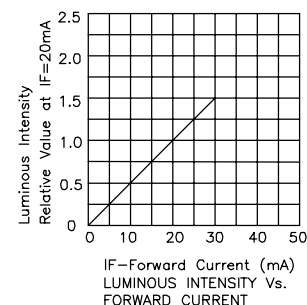
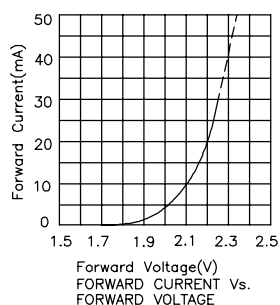
Hyper Orange

SE-H : AlGaInP



Hyper Red

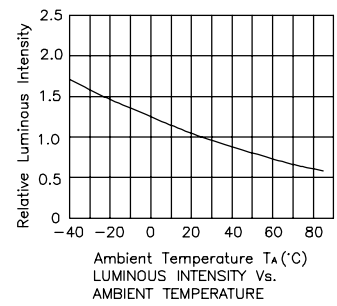
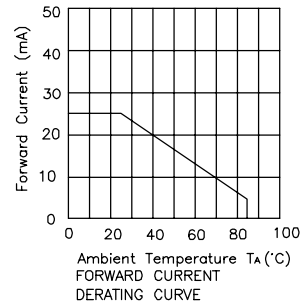
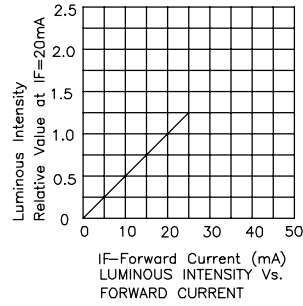
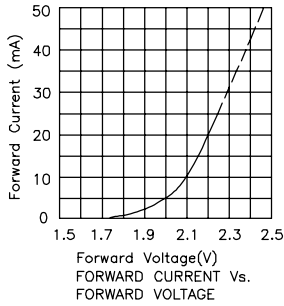
SE-J3 : AlGaInP



TECHNICAL DATA

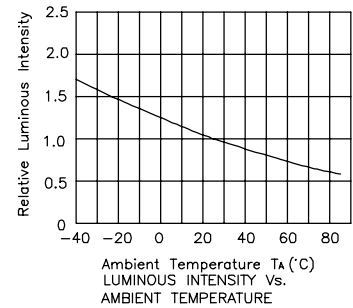
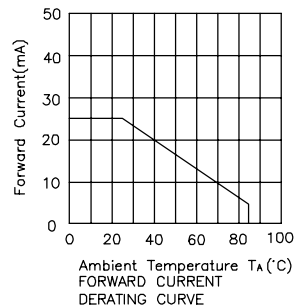
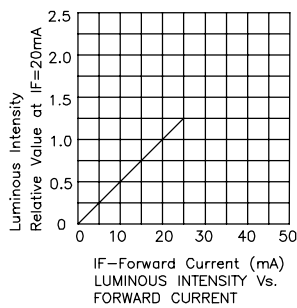
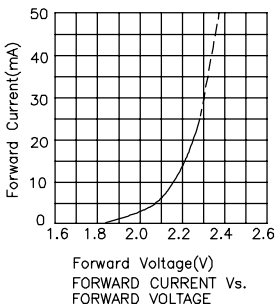
Green / Super Bright Green

G, SG : GaP



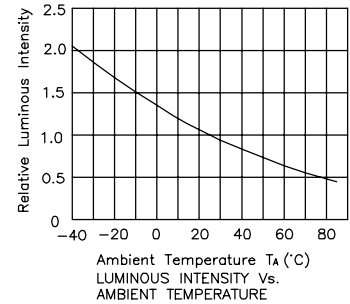
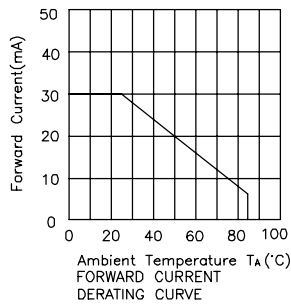
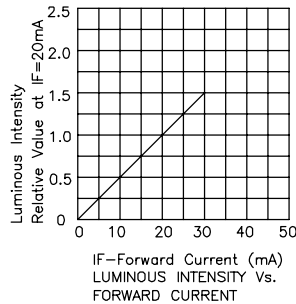
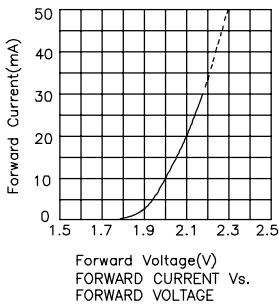
Pure Green

PG : GaP



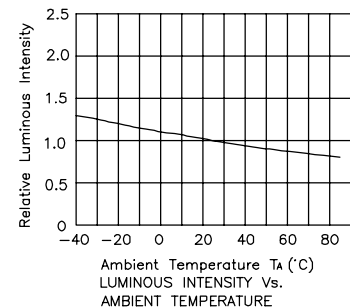
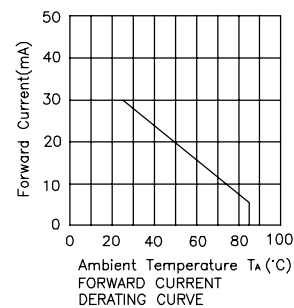
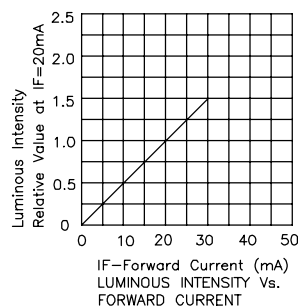
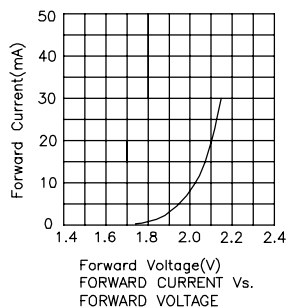
Green

CGK : AlGaInP



Green

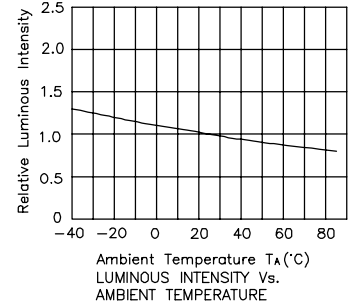
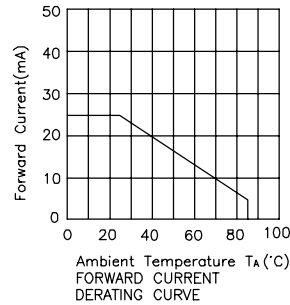
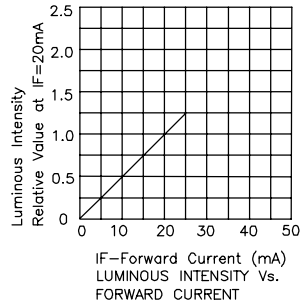
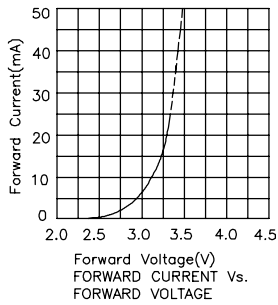
CGK-T : AlGaInP



TECHNICAL DATA

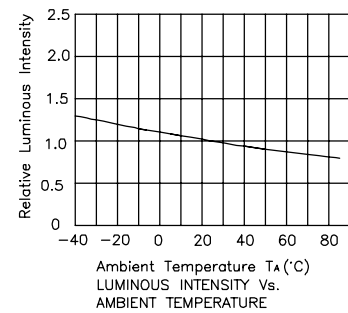
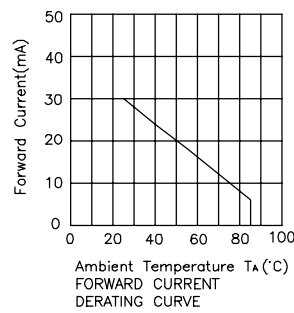
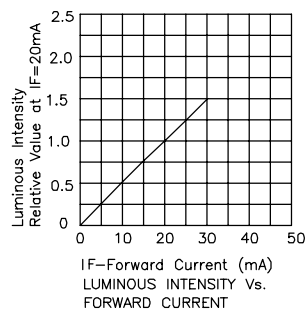
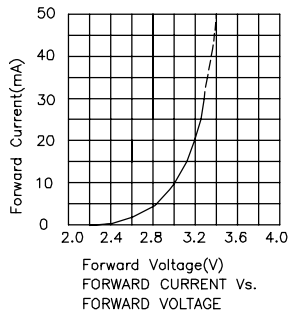
Green

ZG : InGaN



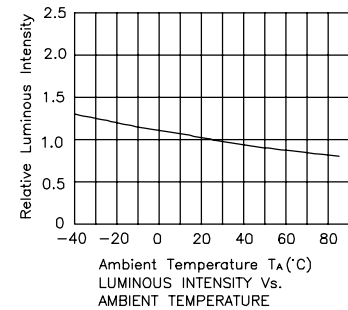
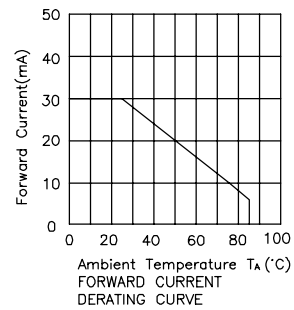
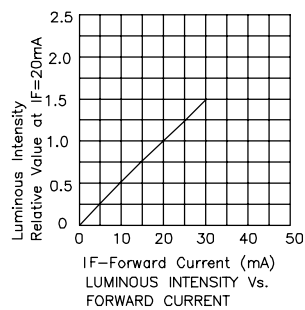
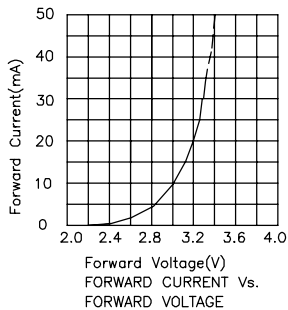
Green

ZG-E : InGaN



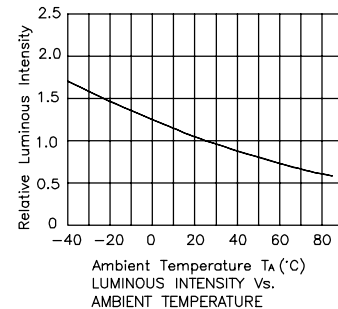
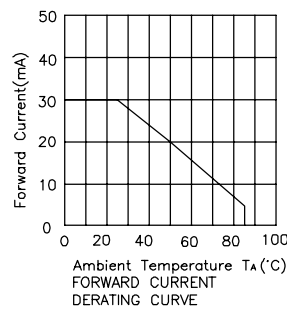
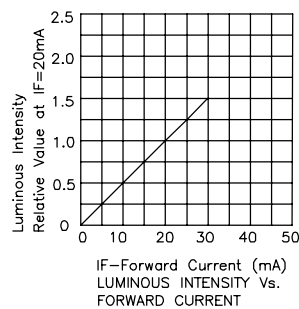
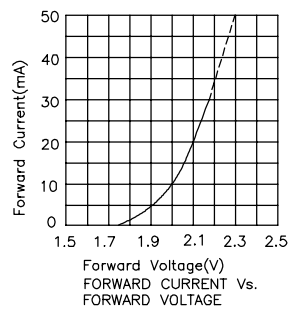
Green

ZG-G : InGaN



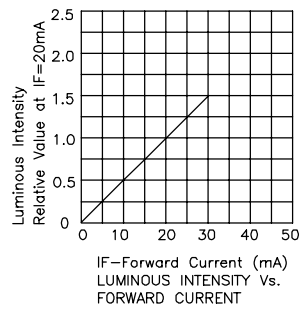
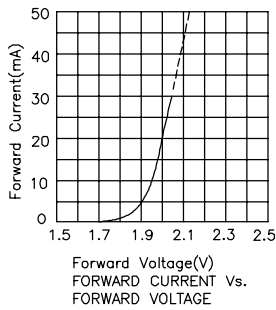
Yellow

Y : GaAsP/GaP

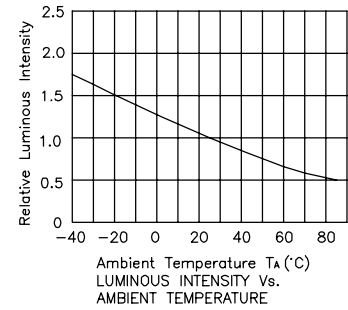
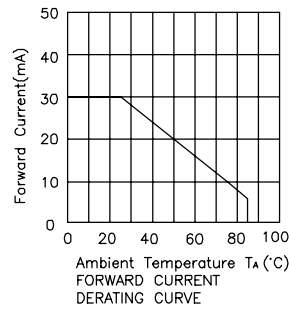


TECHNICAL DATA

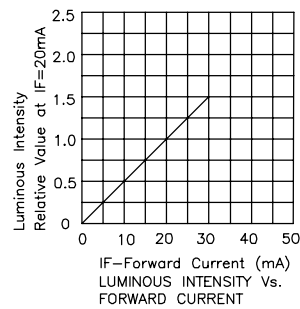
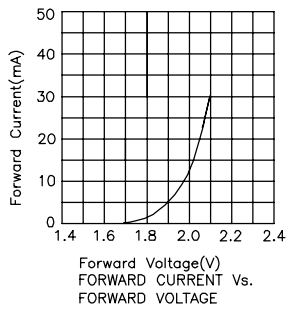
Super Bright Yellow



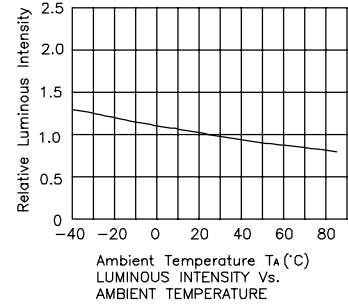
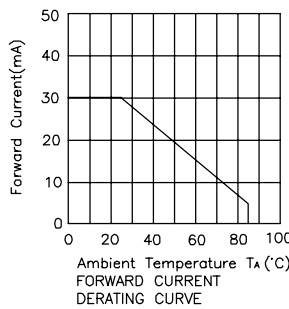
SYK : AlGaInP



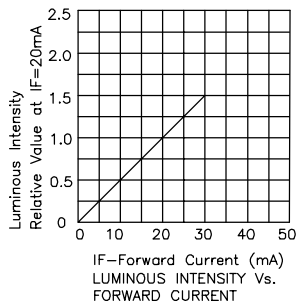
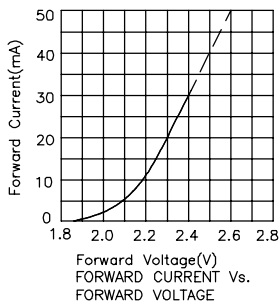
Super Bright Yellow



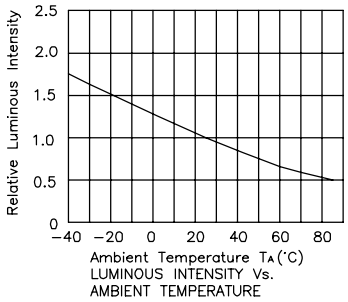
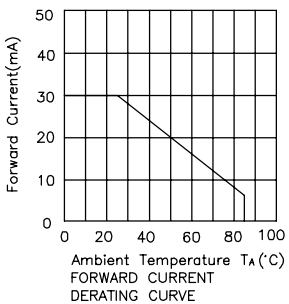
SYK-T : AlGaInP



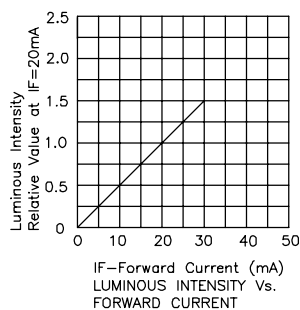
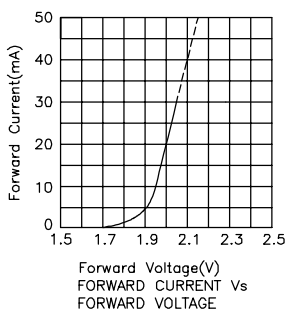
Super Bright Yellow



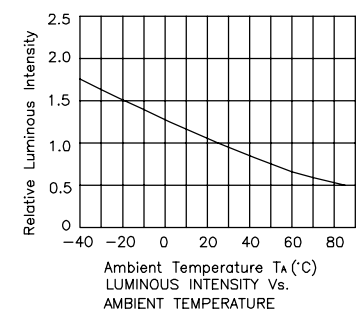
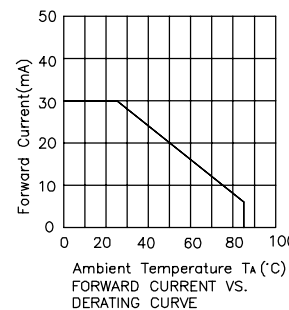
SY-H : AlGaInP



Super Bright Yellow



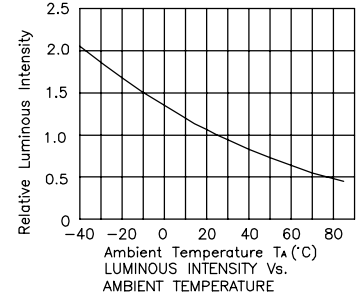
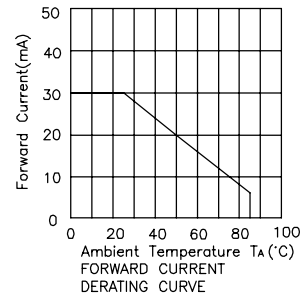
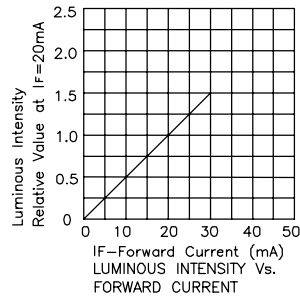
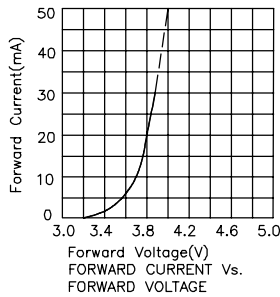
SY-J3 : AlGaInP



TECHNICAL DATA

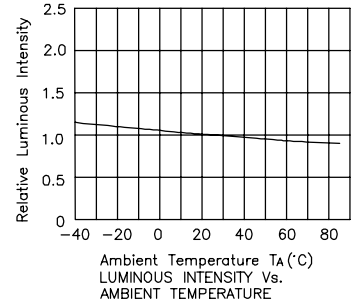
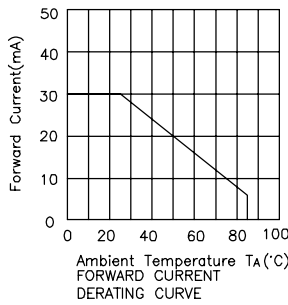
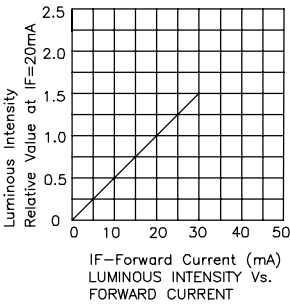
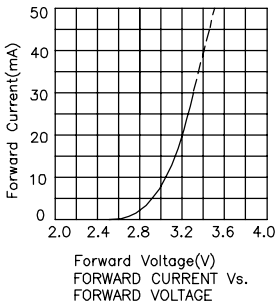
Blue

MB : GaN



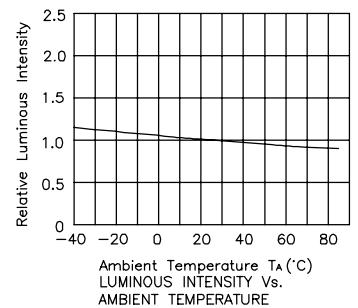
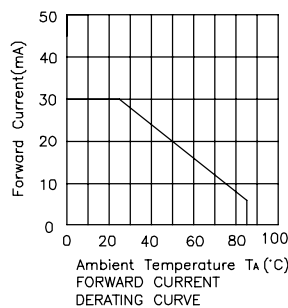
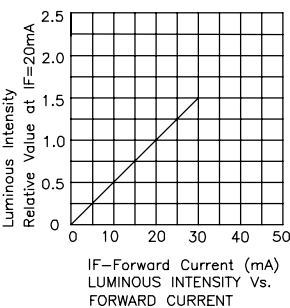
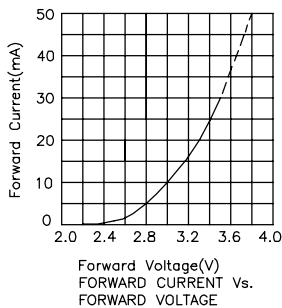
Blue

PB-A : InGaN



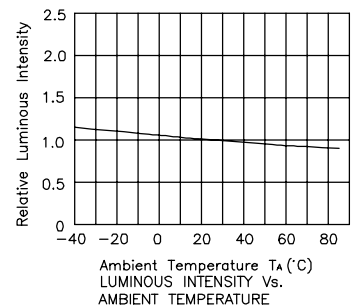
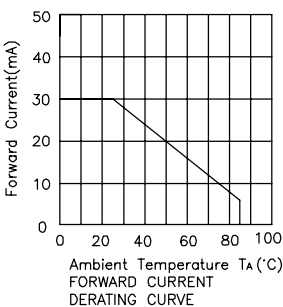
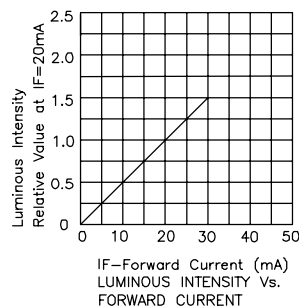
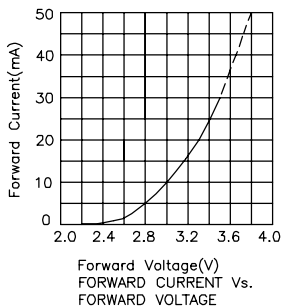
Blue

QB-D : InGaN



Blue

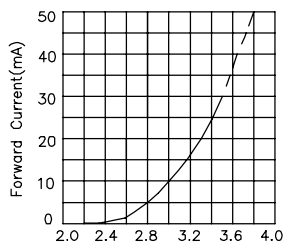
QB-F : InGaN



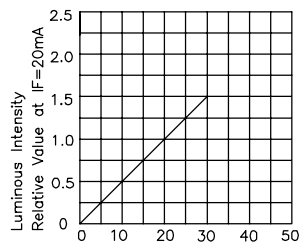
TECHNICAL DATA

Blue

QB-G : InGaN



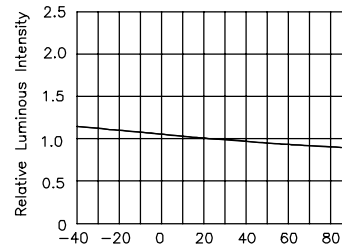
Forward Voltage(V)
FORWARD CURRENT Vs.
FORWARD VOLTAGE



IF-Forward Current (mA)
LUMINOUS INTENSITY Vs.
FORWARD CURRENT



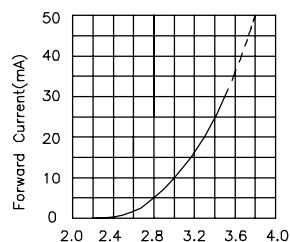
Ambient Temperature TA(°C)
FORWARD CURRENT
DERATING CURVE



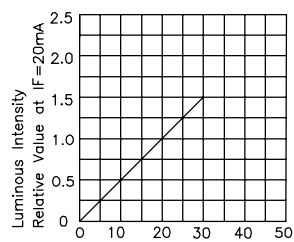
Ambient Temperature TA(°C)
LUMINOUS INTENSITY Vs.
AMBIENT TEMPERATURE

Blue

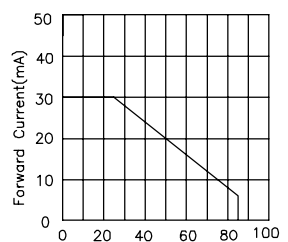
VB-D : InGaN



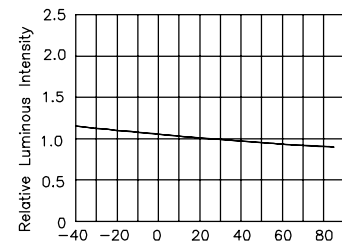
Forward Voltage(V)
FORWARD CURRENT Vs.
FORWARD VOLTAGE



IF-Forward Current (mA)
LUMINOUS INTENSITY Vs.
FORWARD CURRENT



Ambient Temperature TA(°C)
FORWARD CURRENT
DERATING CURVE



Ambient Temperature TA(°C)
LUMINOUS INTENSITY Vs.
AMBIENT TEMPERATURE

BIN CODE SYSTEMS

SELECTION CODE FOR STANDARD LEDS					
(T _A =25°C;Tolerance: +/-15%)					
Group	Light intensity in mcd(10mA)		Group	Light intensity in mcd(10mA)	
	Min.	Max.		Min.	Max.
F	0.1	0.2	W	120	180
G	0.2	0.35	X	180	250
H	0.35	0.5	Y	250	320
I	0.5	0.8	Z	320	450
K	0.8	1.2	ZA	450	550
L	1.2	2	ZB	550	700
M	2	4	ZC	700	1000
N	4	6	ZD	1000	1600
P	6	10	ZE	1600	2200
Q	10	15	ZF	2200	2800
R	15	20	ZG	2800	3400
S	20	30	ZH	3400	4300
T	30	50	ZM	4300	5200
U	50	80	ZN	5200	6300
V	80	120	ZP	6300	7400

SELECTION CODE FOR NPN PHOTOTRANSISTORS					
(T _A =25°C;Tolerance: +/-15%)					
Group	Photocurrent(mA)		Group	Photocurrent(mA)	
	Min.	Max.		Min.	Max.
F	0.1	0.2	L	1.2	2
G	0.2	0.35	M	2	4
H	0.35	0.5	N	4	6
I	0.5	0.8	P	6	10
K	0.8	1.2	-	-	-

SELECTION CODE FOR INFRARED EMITTING DIODES					
(T _A =25°C;Tolerance: +/-15%)					
Group	Radiant intensity in mW/sr(20mA)		Group	Radiant intensity in mW/sr(20mA)	
	Min.	Max.		Min.	Max.
AK	0.8	1.2	D	8	12
AL	1.2	2	E	12	20
A	2	3	F	20	40
B	3	5	G	40	55
C	5	8	H	55	80

SELECTION CODE FOR SUPER BRIGHT LEDS					
(T _A =25°C;Tolerance: +/-15%)					
Group	Light intensity in mcd(20mA)		Group	Light intensity in mcd(20mA)	
	Min.	Max.		Min.	Max.
A	2	3	ZA	3100	3600
B	3	5	ZB	3600	4200
C	5	8	ZC	4200	5000
D	8	12	ZD	5000	6000
E	12	20	ZE	6000	7000
F	20	40	ZF	7000	8000
G	40	55	ZG	8000	9000
H	55	80	ZH	9000	11000
M	80	120	ZM	11000	14000
N	120	200	ZN	14000	18000
P	200	300	ZP	18000	22000
Q	300	400	ZQ	22000	27000
R	400	500	ZR	27000	35000
S	500	700	ZS	35000	43000
T	700	1000	ZT	43000	55000
U	1000	1300	ZU	55000	75000
V	1300	1600	ZV	75000	130000
W	1600	1900	ZW	130000	200000
X	1900	2300	ZX	200000	320000
Y	2300	2700	ZY	320000	490000
Z	2700	3100	ZZ	490000	800000

SELECTION CODE FOR DISPLAYS					
(T _A =25°C;Tolerance: +/-15%)					
Group	Light intensity in ucd(10mA)		Group	Light intensity in ucd(10mA)	
	Min.	Max.		Min.	Max.
C	70	140	P	14000	21000
D	140	240	Q	21000	31000
E	240	360	R	31000	52000
F	360	560	S	52000	88000
G	560	900	T	88000	150000
H	900	1400	U	150000	255000
I	1400	2200	V	255000	433000
K	2200	3600	W	433000	736000
L	3600	5600	X	736000	1251000
M	5600	9000	Y	1251000	2126000
N	9000	14000	Z	2126000	3614000

BIN CODE SYSTEMS

SELECTION CODE FOR LUMINOUS FLUX (T _A =25°C; Tolerance: +/-15%)					
Group	Luminous Flux in lm		Group	Luminous Flux in lm	
	Min.	Max.		Min.	Max.
A1	0.5	0.6	B10	50	60
A2	0.6	0.7	B11	60	70
A3	0.7	0.8	B12	70	80
A4	0.8	1	B13	80	90
A5	1	1.2	B14	90	100
A6	1.2	1.4	C1	100	120
A7	1.4	1.7	C2	120	140
A8	1.7	2	C3	140	160
A9	2	2.4	C4	160	180
A10	2.4	2.9	C5	180	210
A11	2.9	3.5	C6	210	240
A12	3.5	4.2	C7	240	280
A13	4.2	5	C8	280	320
A14	5	6	C9	320	370
A15	6	7.2	C10	370	430
A16	7.2	8.6	C11	430	490
A17	8.6	10	C12	490	560
B1	10	12	C13	560	640
B2	12	14	C14	640	740
B3	14	17	C15	740	850
B4	17	20	C16	850	1000
B5	20	24	D1	1000	1200
B6	24	29	D2	1200	1400
B7	29	35	D3	1400	1600
B8	35	42	D4	1600	1800
B9	42	50	D5	1800	2100

COLOR CODE FOR GREEN LEDS + DISPLAYS (T _A =25°C; Tolerance: +/-1nm)				
Group	Dom. Wavelength (nm)			
	G/SG, CGK, MG/ MGK Chip		VG + ZG Chip	
	Min.	Max.	Min.	Max.
0	556	559	-	-
1	559	561	515	520
2	561	563	520	525
3	563	565	525	530
4	565	567	530	535
5	567	569	535	540
6	569	571	-	-
7	571	573	-	-
8	573	575	-	-

COLOR CODE FOR BLUE LEDS + DISPLAYS (T _A =25°C; Tolerance: +/-1nm)					
Group	Dom. Wavelength (nm)		Group	Dom. Wavelength (nm)	
	Min.	Max.		Min.	Max.
1	445	450	3A	471	473
2	450	455	3B	473	475
3	455	460	4A	475	477
1A	460	463	4B	477	479
1B	463	466	5A	479	481
2A	466	469	5B	481	483
2B	469	471	5C	483	486

COLOR CODE FOR YELLOW LEDS + DISPLAYS (T _A =25°C; Tolerance: +/-1nm)					
Group	Dom. Wavelength (nm)		Group	Dom. Wavelength (nm)	
	Min.	Max.		Min.	Max.
1	581	584	5	590	592
2	584	586	6	592	594
3	586	588	7	594	597
4	588	590	8	597	600

SOLDERING INSTRUCTIONS						
Types	Dip soldering / * wave soldering			Iron soldering (with 1.5mm iron tip)		
	Temperature of the soldering bath	Maximum soldering time	Distance from solder joint to package	Temperature of soldering iron	Maximum soldering time	Distance from solder joint to package
LEDS	<=260°C	3s	>=2mm	<=350°C	3s	>2mm
	<=260°C	5s	>=5mm	<=350°C	5s	>5mm
SMDS	-	-	-	<=350°C	3s (one time only)	-
DISPLAYS	*<=260°C	*3s	*>2mm	<=350°C	3s	>2mm
PHOTOCOUPLER	<=260°C	3s	>2mm	<=310°C	3s	-
	-	-	-	<=260°C	10s	-