

**MATCH
LED**
LED
WATCH



CA18-3X

Product Code: KWNP-1818xxG

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REVISION HISTORY

Rev.	Date	Charged	Approved	Revision Summary
A	2015/09/15	Frank	Bruce	<i>First issue(CA18-3X)</i>
B	2015/11/27	Frank	Bruce	Revised: Product Code ABSOLUTE MAXIMUM RATING (Tj= 85 °C) PRODUCT CHARACTERISTICS FLUX CHARACTERISTICS (Tj = 85 °C) RELATIVE SPECTRAL POWER DISTRIBUTION ELECTRICAL CHARACTERISTIC (Tj = 85 °C) RELATIVE LUMINOUS FLUX VS. CURRENT (Tj= 85 °C) PERFORMANCE GROUPS – BRIGHTNESS (Tj = 85 °C) PERFORMANCE GROUPS –FORWARD VOLTAGE (Tj = 85 °C) PERFORMANCE GROUPS – CHROMATICITY GPI's STANDARD WHITE CHROMATICITY REGINS PLOTTED ON THE 1931 CIE CURVE MECHANICAL DIMENSIONS CAUTIONS
C	2016/01/08	Frank	Bruce	Revised: 1. Photo 2. Product Code 3. Table of Contents 4. FLUX CHARACTERISTICS (Tj = 85 °C) 5. PERFORMANCE GROUPS – BRIGHTNESS (Tj = 85 °C) 6. PERFORMANCE GROUPS –FORWARD VOLTAGE (Tj = 85 °C) 7. TAPE AND REEL 8. PACKING
D	2016/02/16	Frank	Bruce	Revised: 1. MECHANICAL DIMENSIONS 2. TAPE AND REEL
E	2016/03/23	Frank	Bruce	Revised: 1. FLUX CHARACTERISTICS (Tj = 85 °C) 2. PERFORMANCE GROUPS – CHROMATICITY 3. GPI's STANDARD WHITE CHROMATICITY REGINS PLOTTED ON THE 1931 CIE CURVE
F	2016/05/02	Frank	Bruce	Revised: 1. FLUX CHARACTERISTICS (Tj = 85 °C) 2. PERFORMANCE GROUPS – BRIGHTNESS (Tj = 85 °C)
G	2016/05/31	Frank	Bruce	Revised: 1. PERFORMANCE GROUPS – CHROMATICITY 2. GPI's STANDARD WHITE CHROMATICITY REGINS PLOTTED ON THE 1931 CIE CURVE
H	2016/07/18	Frank	Bruce	Revised: 1. PERFORMANCE GROUPS – CHROMATICITY 2. GPI's STANDARD WHITE CHROMATICITY REGINS PLOTTED ON THE 1931 CIE CURVE
I	2016/11/21	Frank	Bruce	Revised: 1. FLUX CHARACTERISTICS (Tj = 85 °C) 2. RELATIVE SPECTRAL POWER DISTRIBUTION 3. PERFORMANCE GROUPS – BRIGHTNESS (Tj = 85 °C) 4. CAUTIONS

ABSOLUTE MAXIMUM RATING ($T_j = 85^\circ\text{C}$)

Characteristics	Value	Unit
DC Forward Current	1000	mA
Power Dissipation	3.4	W
Peak Forward Current	¹⁾ 1500	mA
DC Reverse Voltage	5	V
Storage Temperature	-40 ~ 125	$^\circ\text{C}$
Operating Temperature	-30 ~ 85	$^\circ\text{C}$
LED Junction Temperature	150	$^\circ\text{C}$

1) 1/10 Duty Cycle @ 1kHz .

PRODUCT CHARACTERISTICS

Characteristics	Unit	minimum	Typ.	Maximum
Thermal resistance, junction to solder point	$^\circ\text{C/W}$		10	
Viewing Angle (FWHM)	degrees		115	
Temperature coefficient of voltage	mV/ $^\circ\text{C}$		-2.5	
DC Forward Current	mA		700	1000
Reverse Voltage	V			5
Forward Voltage (@700mA)	V		3.0	3.4
LED junction temperature	$^\circ\text{C}$			150

FLUX CHARACTERISTICS ($T_j = 85^\circ\text{C}$)

Color	CCT		Base Order codes Minimum Luminous Flux (lm) @ 700mA		Calculated Minimum Luminous Flux (lm)*	Order Code
	Min	Max	Group	@85°C	1000mA	
70 CRI, Cool White	6300K	8000K	E12	230	305	KWNP-1818C7G
			E13	250	332	
			E14	270	359	
			E15	290	385	
70 CRI, Cool White	4500K	6000K	E12	230	305	KWNP-1818C7G
			E13	250	332	
			E14	270	359	
80 CRI, Cool White	4500K	6000K	E11	210	279	KWNP-1818C8G
			E12	230	305	
			E13	250	332	
80 CRI, Natural White	3700K	4500K	E11	210	279	KWNP-1818N8G
			E12	230	305	
			E13	250	332	
80 CRI, Warm White	2600K	3700K	E10	190	252	KWNP-1818W8G
			E11	210	279	
			E12	230	305	

Notes:

- GPI maintains a tolerance of $\pm 5\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and ± 2 on CRI measurements.
- Calculated flux values are for reference only.

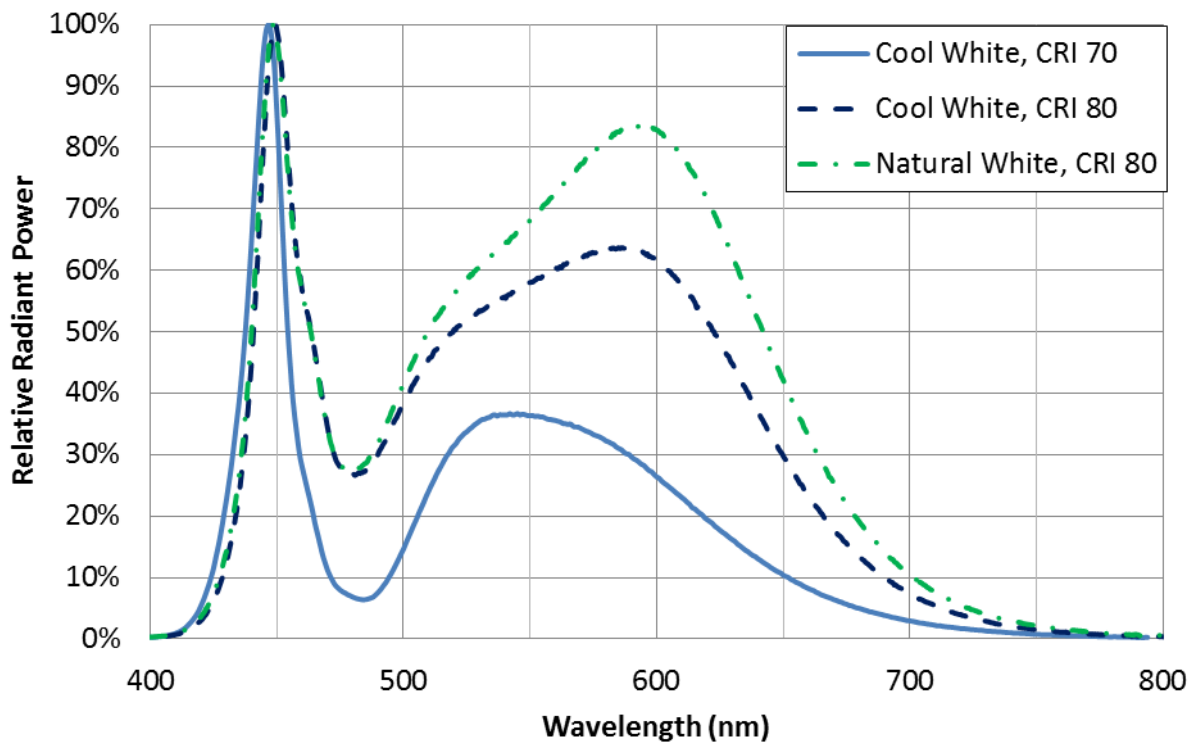
FLUX CHARACTERISTICS ($T_j = 85^\circ\text{C}$) – CONTINUED

Color	CCT		Base Order codes Minimum Luminous Flux (lm) @ 700mA		Calculated Minimum Luminous Flux (lm)*	Order Code
	Min	Max	Group	@85°C	1000mA	
PC Amber	1700K	2000K	E07	130	167	KWNP-1818PCG
			E08	150	193	

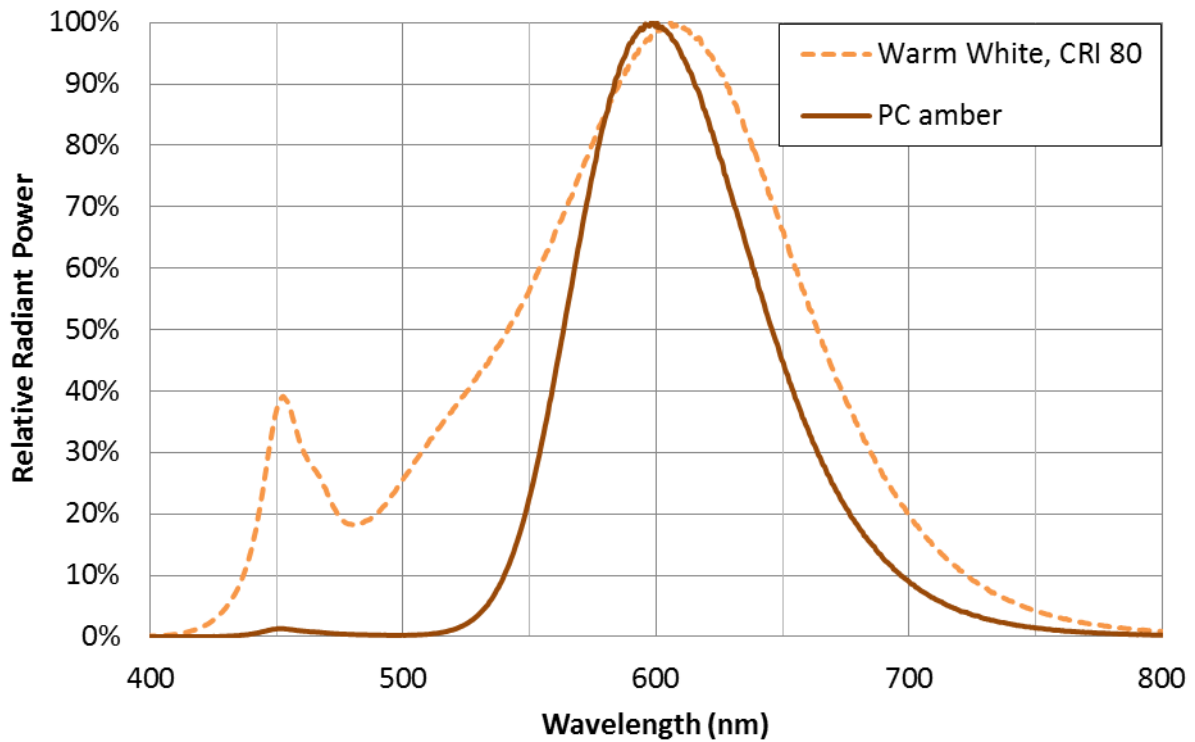
Notes:

- GPI maintains a tolerance of $\pm 5\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and ± 2 on CRI measurements.
- Calculated flux values are for reference only.

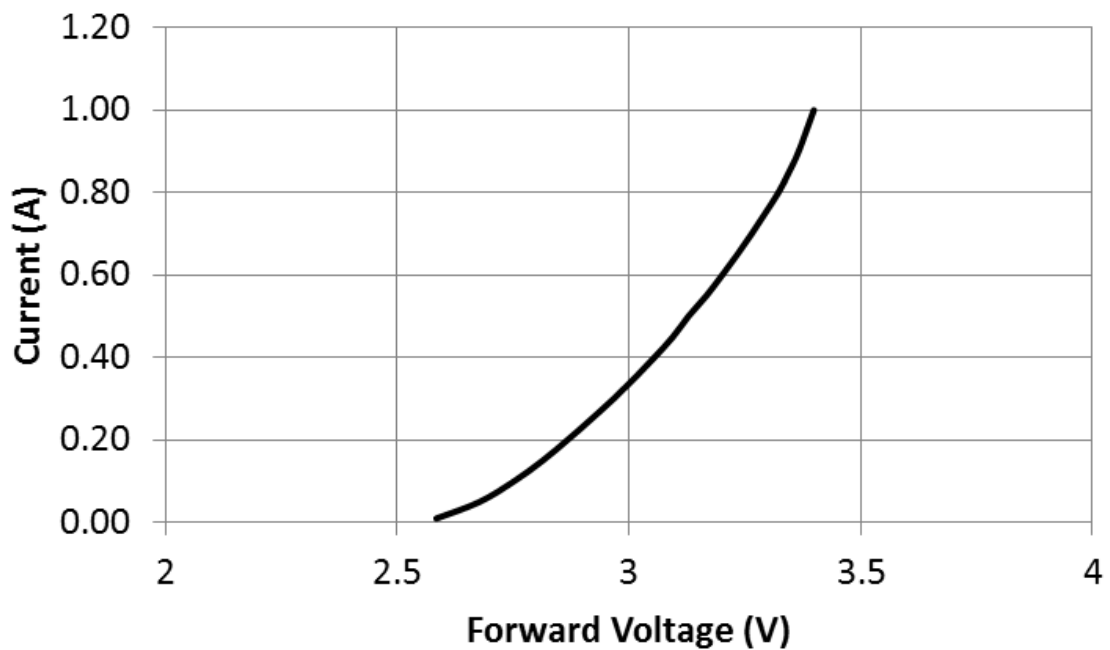
RELATIVE SPECTRAL POWER DISTRIBUTION



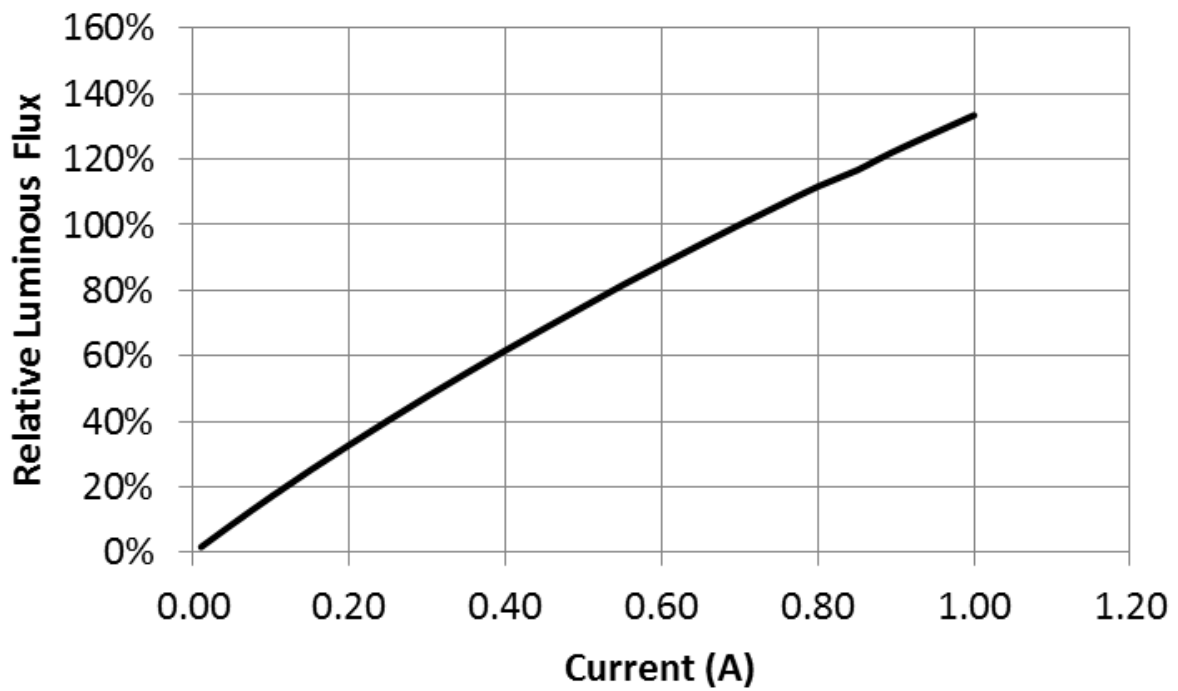
RELATIVE SPECTRAL POWER DISTRIBUTION – CONTINUED



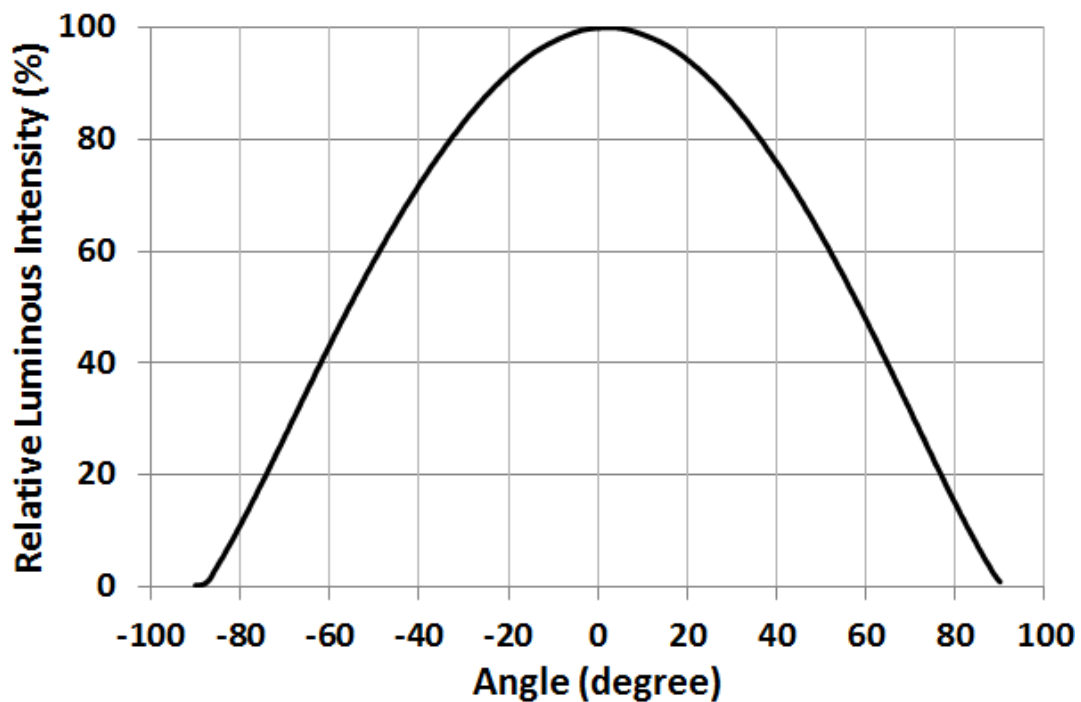
ELECTRICAL CHARACTERISTIC ($T_j = 85\text{ }^{\circ}\text{C}$)



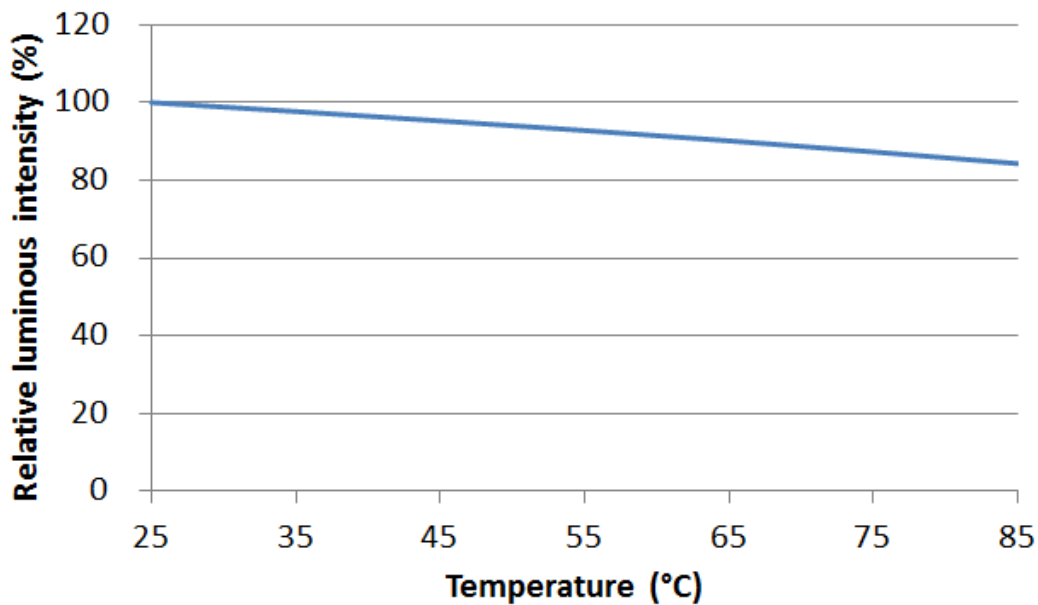
RELATIVE LUMINOUS FLUX VS. CURRENT ($T_j = 85\text{ }^{\circ}\text{C}$)



TYPICAL SPATIAL DISTRIBUTION



RELATIVE LUMINOUS INTENSITY V.S. TEMPERATURE (I=700mA)



PERFORMANCE GROUPS – BRIGHTNESS ($T_j = 85^\circ\text{C}$)

Group code	Min. Luminous Flux (lm)	Max. Luminous Flux (lm)
E07	130	150
E08	150	170
E09	170	190
E10	190	210
E11	210	230
E12	230	250
E13	250	270
E14	270	290
E15	290	310

PERFORMANCE GROUPS – FORWARD VOLTAGE ($T_j = 85^\circ\text{C}$)

Group code	Minimum Forward Voltage (V)	Maximum Forward Voltage (V)
M9	2.8	3.0
MA	3.0	3.2
MB	3.2	3.4

PERFORMANCE GROUPS – CHROMATICITY

Bin Code	CCT	Bin	x1	y1	x2	y2	x3	y3	x4	y4
AA	6300K – 7000K	AAA	0.3150	0.3440	0.3090	0.3385	0.3099	0.3329	0.3155	0.3385
		AAB	0.3155	0.3385	0.3099	0.3329	0.3108	0.3273	0.3160	0.3330
		AAC	0.3090	0.3385	0.3030	0.3330	0.3043	0.3273	0.3099	0.3329
		AAD	0.3099	0.3329	0.3043	0.3273	0.3055	0.3215	0.3108	0.3273

Bin Code	CCT	Bin	x1	y1	x2	y2	x3	y3	x4	y4
AB	6300K – 7000K	ABA	0.3160	0.3330	0.3108	0.3273	0.3116	0.3211	0.3165	0.3265
		ABB	0.3165	0.3265	0.3116	0.3211	0.3125	0.3150	0.3170	0.3200
		ABC	0.3108	0.3273	0.3055	0.3215	0.3068	0.3158	0.3116	0.3211
		ABD	0.3116	0.3211	0.3068	0.3158	0.3080	0.3100	0.3125	0.3150

Bin Code	CCT	Bin	x1	y1	x2	y2	x3	y3	x4	y4
BA	7000K – 8000K	BAA	0.3030	0.3330	0.2975	0.3270	0.2990	0.3216	0.3043	0.3273
		BAB	0.3043	0.3273	0.2990	0.3216	0.3005	0.3163	0.3055	0.3215
		BAC	0.3055	0.3215	0.3005	0.3163	0.3020	0.3109	0.3068	0.3158
		BAD	0.3068	0.3158	0.3020	0.3109	0.3035	0.3055	0.3080	0.3100
		BAE	0.2975	0.3270	0.2920	0.3210	0.2938	0.3160	0.2990	0.3216
		BAF	0.2990	0.3216	0.2938	0.3160	0.2955	0.3110	0.3005	0.3163
		BAG	0.3005	0.3163	0.2955	0.3110	0.2973	0.3060	0.3020	0.3109
		BAH	0.3020	0.3109	0.2973	0.3060	0.2990	0.3010	0.3035	0.3055

PERFORMANCE GROUPS – CHROMATICITY – CONTINUED

Bin Code	Sub-bin	x	y
57	57A	0.3215	0.3350
		0.3290	0.3417
		0.3290	0.3300
		0.3222	0.3243
	57B	0.3207	0.3462
		0.3290	0.3538
		0.3290	0.3417
		0.3215	0.3350

Bin Code	Sub-bin	x	y
57	57C	0.3290	0.3538
		0.3376	0.3616
		0.3371	0.3490
		0.3290	0.3417
	57D	0.3290	0.3417
		0.3371	0.3490
		0.3366	0.3369
		0.3290	0.3300

Bin Code	Sub-bin	x	y
50	50A	0.3371	0.3490
		0.3451	0.3554
		0.3440	0.3427
		0.3366	0.3369
	50B	0.3376	0.3616
		0.3463	0.3687
		0.3451	0.3554
		0.3371	0.3490

Bin Code	Sub-bin	x	y
50	50C	0.3463	0.3687
		0.3551	0.3760
		0.3533	0.3620
		0.3451	0.3554
	50D	0.3451	0.3554
		0.3533	0.3620
		0.3515	0.3487
		0.3440	0.3427

CCT	Mac Adam ellipse	Center x	Center y	a	b	theta
4000K	3-step	0.3818	0.3797	0.00939	0.00402	53.72
	5-step	0.3818	0.3797	0.01565	0.00670	53.72

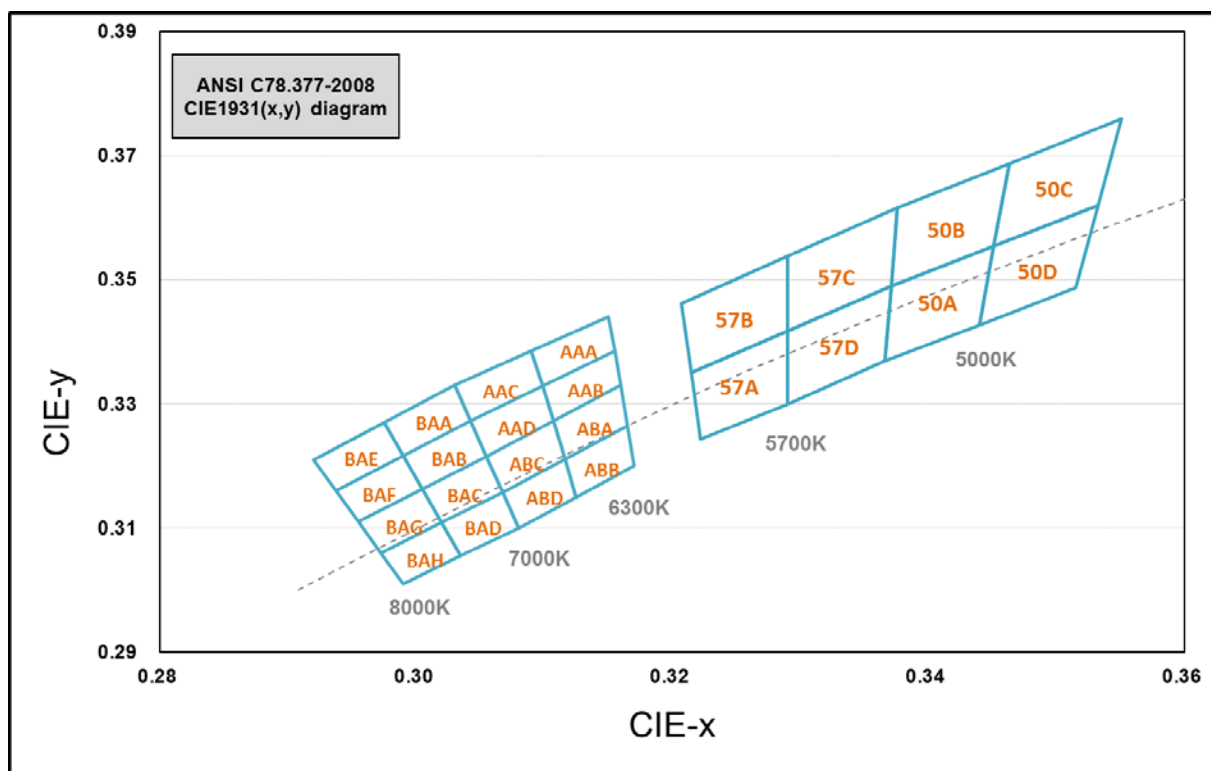
PERFORMANCE GROUPS – CHROMATICITY – CONTINUED

CCT	Mac Adam ellipse	Center x	Center y	a	b	theta
3000K	3-step	0.4338	0.403	0.00834	0.00408	53.22
	5-step	0.4338	0.403	0.0139	0.0068	53.22

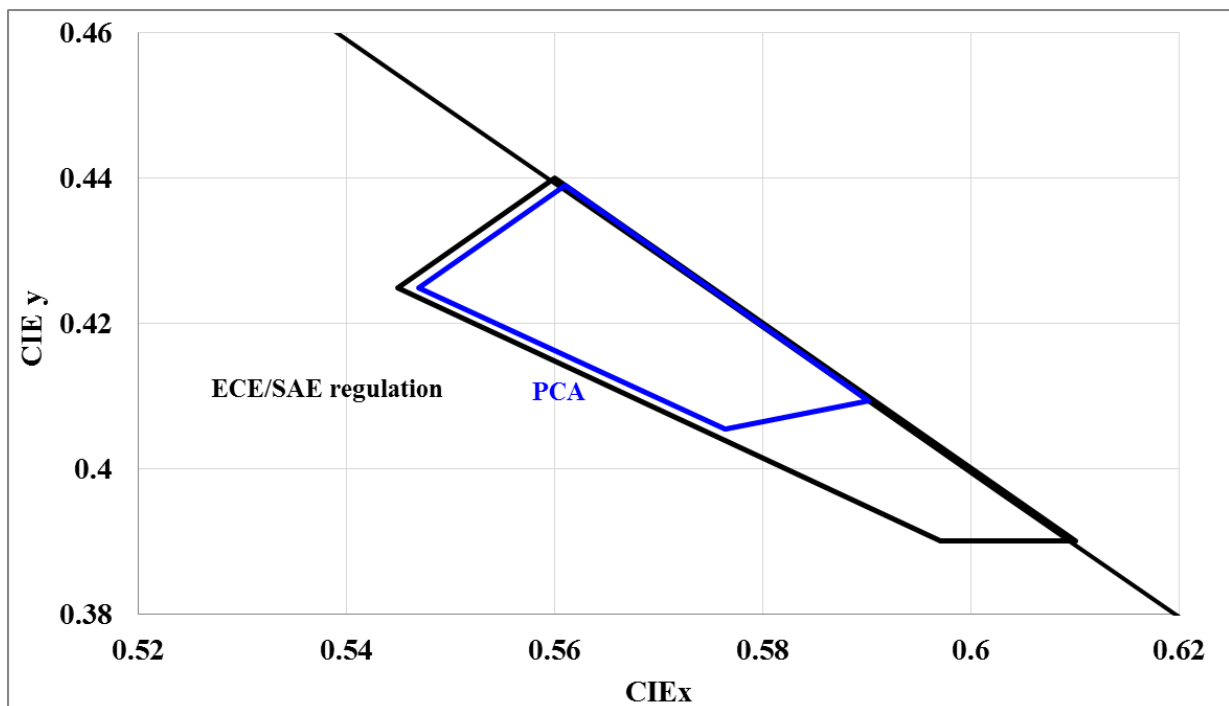
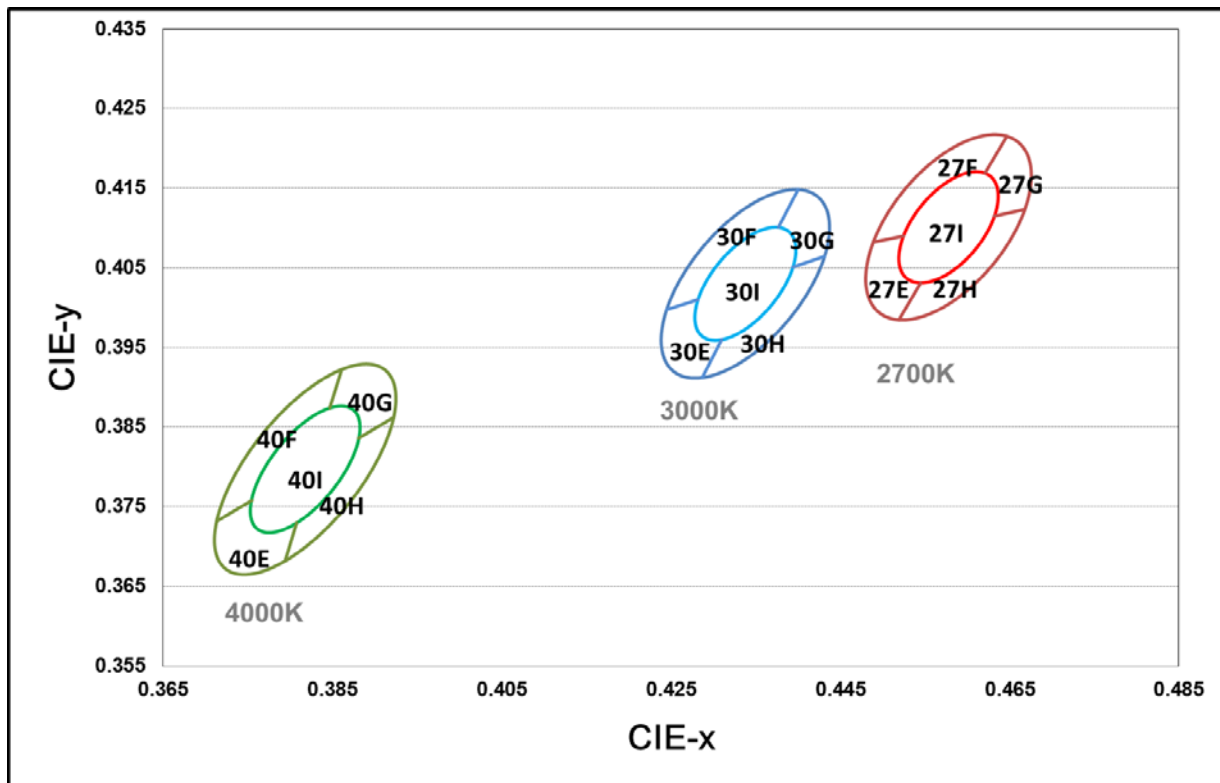
CCT	Mac Adam ellipse	Center x	Center y	a	b	theta
2700K	3-step	0.4578	0.4101	0.0081	0.0042	53.7
	5-step	0.4578	0.4101	0.0135	0.007	53.7

Bin Code	x	y
PCA	0.5763	0.4054
	0.5901	0.4094
	0.561	0.439
	0.5469	0.4249

GPI's STANDARD WHITE CHROMATICITY REGINS PLOTTED ON THE 1931 CIE CURVE



GPI's STANDARD WHITE CHROMATICITY REGINS PLOTTED ON THE 1931 CIE CURVE – CONTINUED



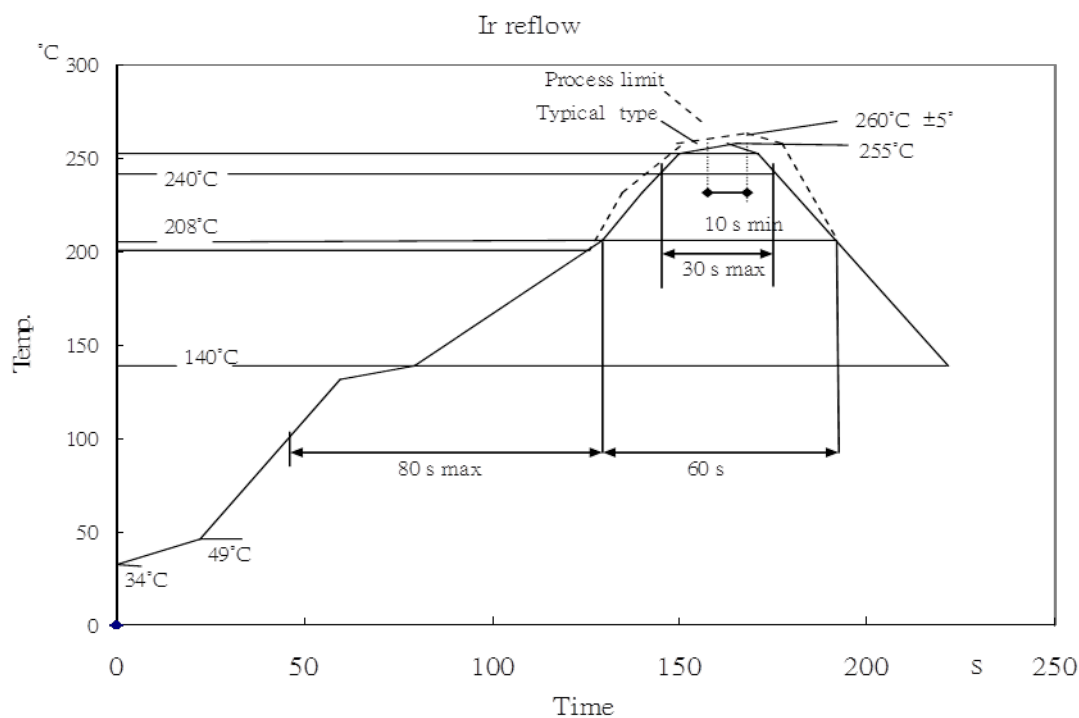
RELIABILITY

Test Item	Test Conditions	Test Period	Ac/Re
Room Temperature Operating Life (RTOL)	IF=700mA DC	1000hrs	0/1
Wet High Temperature Operating Life (WHTOL)	TA=85°C ; 85% humidity IF=700mA DC	1000hrs	0/1
High Temperature Operating Life (HTOL)	TA=85°C ; IF=700mA DC	1000hrs	0/1
Thermal Cycle	<div> <div>-40°C</div> <div>125°C</div> </div> <div> <div>30min</div> <div>30 min</div> </div>	1000 cycle	0/1
Reflow Soldering	Tmax.=260°C	3 times	0/1

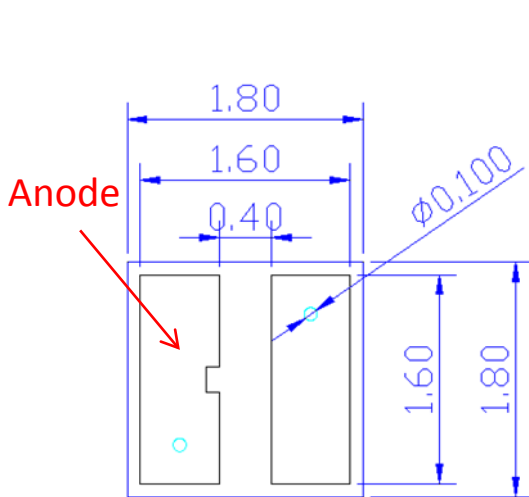
Notes:

- No catastrophic (LED Fail)
- Lumen maintenance > 90%
- Change in Vf < 10%
- Change in white color point $\Delta x \Delta y \pm 0.01$
- No corrosion
- Moisture Sensitivity Level 2 (IPC/JEDEC J-STD-020)

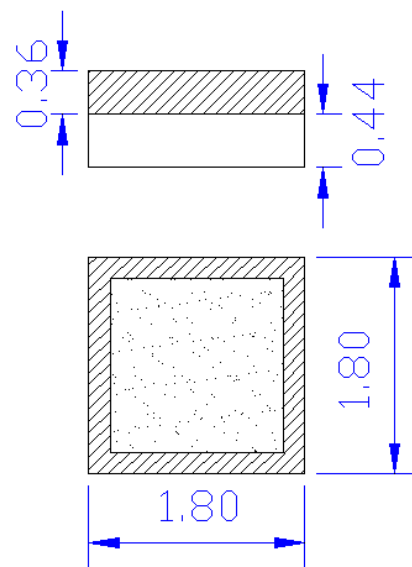
Reflow Soldering Characteristics



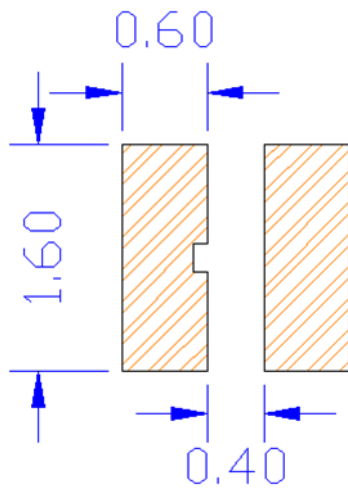
MECHANICAL DIMENSIONS



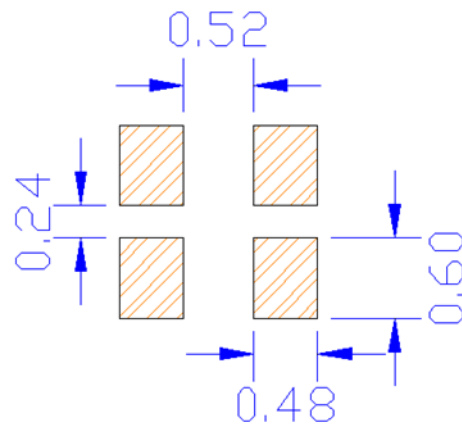
Bottom Layout



Dimension



Recommended Solder Pad



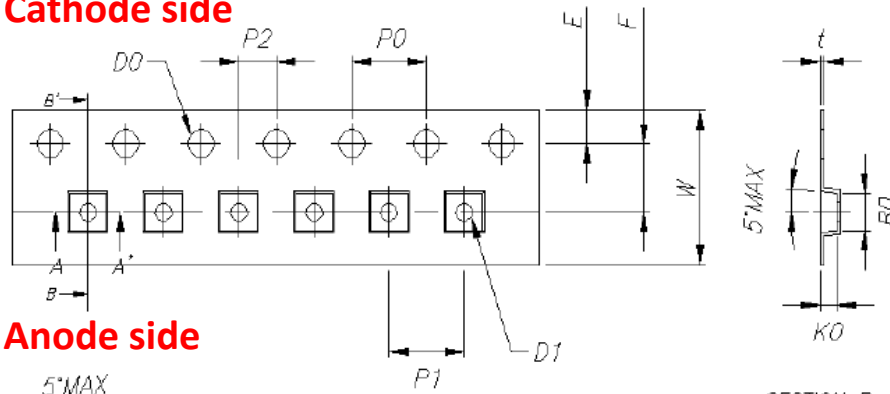
Recommended Stencil Pattern
(Hatched Area is opening)

Note:

1. Dimensions are in millimeters. ± 0.13
2. Measurement tolerances : ± 0.1

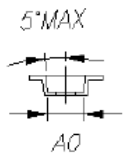
TAPE AND REEL

Cathode side



Item	Specification	Tol. (+/-)
W	8.00	± 0.20
E	1.75	± 0.10
F	3.50	± 0.05
D0	1.50	+0.10, -0
D1	1.00	± 0.10
P0	4.00	± 0.10
P1	4.00	± 0.10
P2	2.00	± 0.10
P0 x 10	40.00	± 0.20

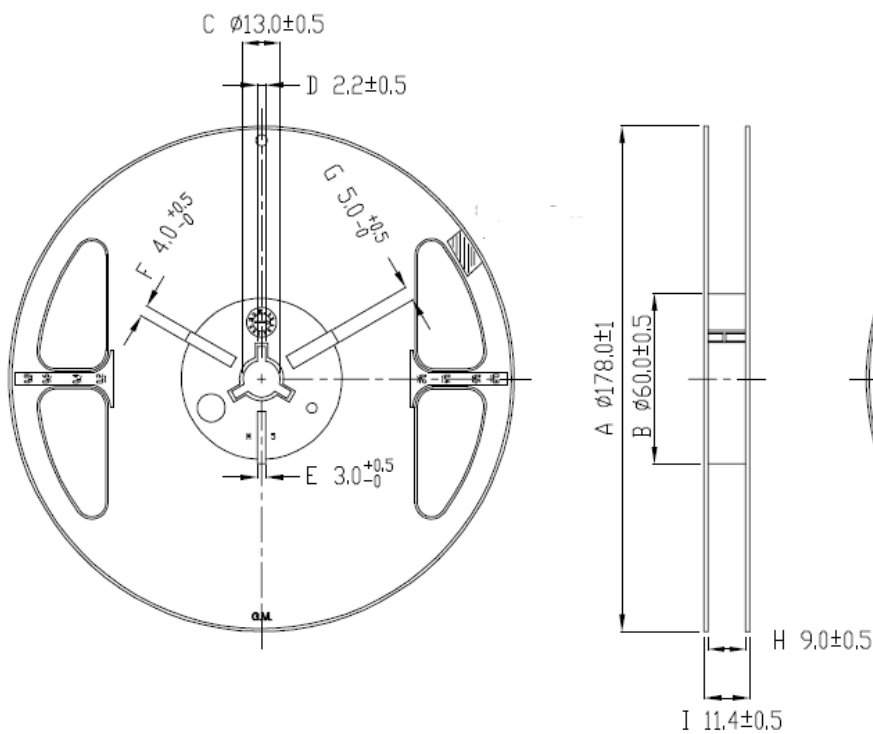
Anode side



SECTION A-A'

SECTION B-B'

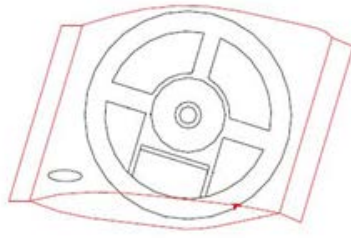
t	0.20	± 0.05
A0	2.00	± 0.10
B0	2.00	± 0.10
K0	0.90	± 0.10



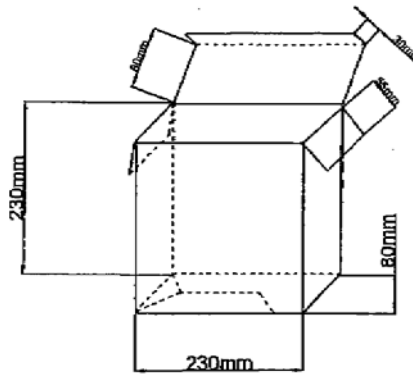
Note:

- Dimension unit: millimeter.

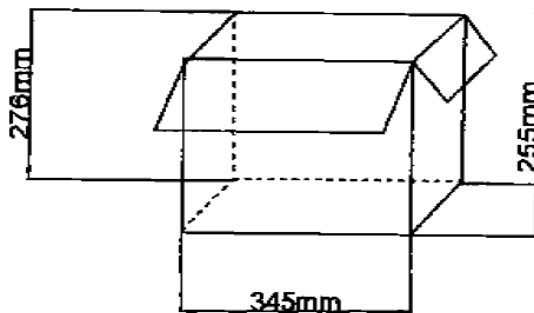
PACKING



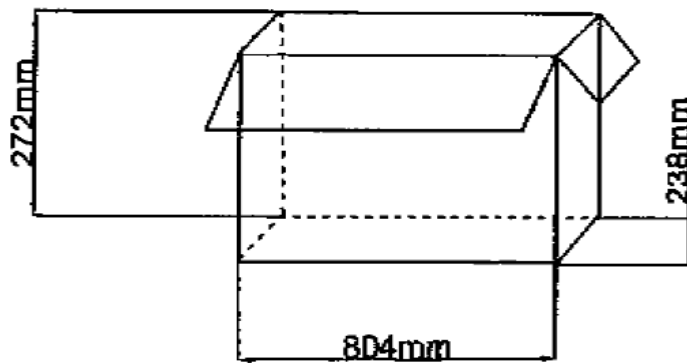
1 Anti-Static Reel in 1 Moistureproof Foil Bag.
(Within Moisture Absorbent Material)



4 Moistureproof Foil Bags in Box.



20 Moistureproof Foil Bags in Box.



50 Moistureproof Foil Bags in Box.

CAUTIONS

1. Moisture Sensitivity

In testing, GPI has found CA18-3X LEDs to have 1 year floor life in condition $\leq 30^{\circ}\text{C}$ / 60% relative humidity (RH). Moisture testing included a 168-hr soak at $85^{\circ}\text{C}/60\%$ RH followed by 3 times reflow cycles, with visual and electrical inspections at each stage.

GPI recommends keeping CA18-3X LEDs in their sealed moisture-barrier packaging until immediately prior to use. GPI also recommends returning any unusual LEDs to the re-sealable moisture-barrier bag and closing the bag immediately after use.

2. Handling Precautions

Do not handle LEDs with bare hands, it may contaminate the LED surface and affect optical characteristics. In the worst case, catastrophic failure from excess pressure through wire-bond breaks and package damage may result.

Do not stack assembled PCBs together. Failure to comply can cause the resin portion of the product to be cut, chipped, delaminated and/or deformed. It may cause wire to break, leading to catastrophic failures.

3. Eye safety

Warning: do not look at exposed lamp in operation. Eye injury can result.

4. Static Electricity

Wristbands and anti-electrostatic gloves are strongly recommended and all devices, equipment and machinery must be properly grounded when handling the LEDs, which are sensitive against static electricity and surge.

Precautions are to be taken against surge voltage to the equipment that mounts the LEDs. Unusual characteristics such as significant increase of current leakage, decrease of turn-on voltage or non-operation at a low current can occur when the LED is damaged.

5. Thermal Constraints

The temperature of the package surface is strongly recommended below 200°C in operation.