

SOP4-Black, AC Input, Photo Transistor Coupler

Description

The IS180 series combine two AlGaAs infrared emitting diode as the AC input which is optically coupled to a silicon planar phototransistor detector in a plastic SOP4 package.

With the robust coplanar double mold structure, IS180 series provide the most stable isolation feature.

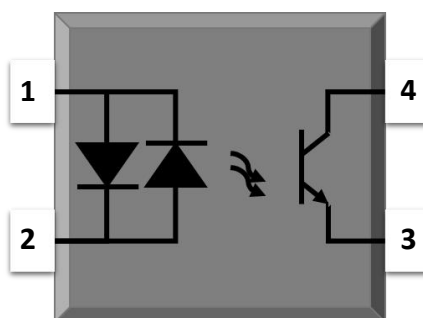
Features

- High isolation 3750 VRMS
- CTR flexibility available see order information
- AC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- RoHS & REACH Compliance
- Halogen free (Optional)
- MSL class 1
- Regulatory Approvals
 - UL - UL1577
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC - GB4943.1, GB8898
 - cUL- CSA Component Acceptance Service Notice No. 5A

Applications

- AC line monitor
- Programmable controller
- Telephone line interface
- System appliance
- Measurement instrument

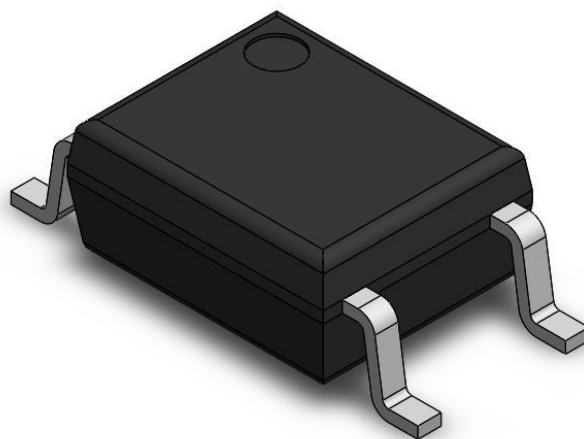
SCHEMATIC

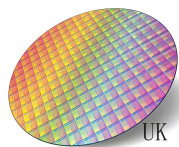


PIN DEFINITION

1. Anode/Cathode
2. Cathode/Anode
3. Emitter
4. Collector

PACKAGE OUTLINE



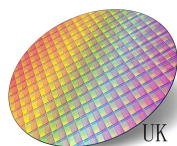


ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT	NOTE
INPUT				
Forward Current	I_F	± 60	mA	
Peak Forward Current	I_{FP}	± 1	A	1
Input Power Dissipation	P_I	100	mW	
OUTPUT				
Collector - Emitter Voltage	V_{CEO}	80	V	
Emitter - Collector Voltage	V_{ECO}	6	V	
Collector Current	I_C	50	mA	
Output Power Dissipation	P_O	150	mW	
COMMON				
Total Power Dissipation	P_{tot}	200	mW	
Isolation Voltage	V_{iso}	3750	V _{rms}	2
Operating Temperature	T_{opr}	-55~110	°C	
Storage Temperature	T_{stg}	-55~150	°C	
Soldering Temperature	T_{sol}	260	°C	

Note 1. 100μs pulse, 100Hz frequency

Note 2. AC For 1 Minute, R.H. = 40 ~ 60%



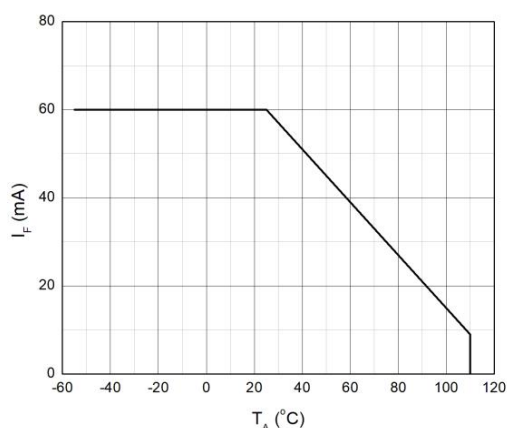
ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C

PARAMETER	SYMBOL	MIN	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
INPUT							
Forward Voltage	V_F	-	1.24	1.4	V	$I_F = \pm 10\text{mA}$	
Input Capacitance	C_{in}	-	10	-	pF	$V = 0, f = 1\text{kHz}$	
OUTPUT							
Collector Dark Current	I_{CEO}	-	-	100	nA	$V_{CE} = 20\text{V}, I_F = 0$	
Collector-Emitter Breakdown Voltage	BV_{CEO}	80	-	-	V	$I_C = 0.1\text{mA}, I_F = 0$	
Emitter-Collector Breakdown Voltage	BV_{ECO}	6	-	-	V	$I_E = 0.1\text{mA}, I_F = 0$	
TRANSFER CHARACTERISTICS							
Current Transfer Ratio	IS180	CTR	20	-	400	$I_F = \pm 1\text{mA}, V_{CE} = 5\text{V}$	
	IS180A		50	-	150		
	IS180B		80	-	400		
CTR Symmetry			0.7	-	1.3	$I_F = \pm 1\text{mA}, V_{CE} = 5\text{V}$	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	0.09	0.2	V	$I_F = \pm 20\text{mA}, I_C = 1\text{mA}$	
Isolation Resistance	R_{ISO}	10^{12}	10^{14}	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	C_{IO}	-	0.4	1	pF	$V = 0, f = 1\text{MHz}$	
Response Time (Rise)	t_r	-	7	18	μs	$V_{CE} = 2\text{V}, I_C = 2\text{mA}$ $R_L = 100\Omega$	3
Response Time (Fall)	t_f	-	9	18	μs		3

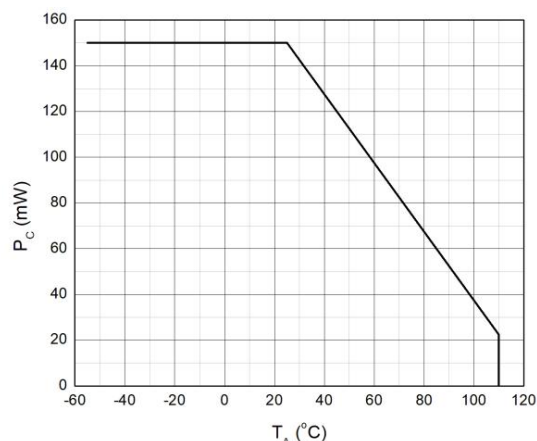
Note 3. Fig.12&13

CHARACTERISTIC CURVES

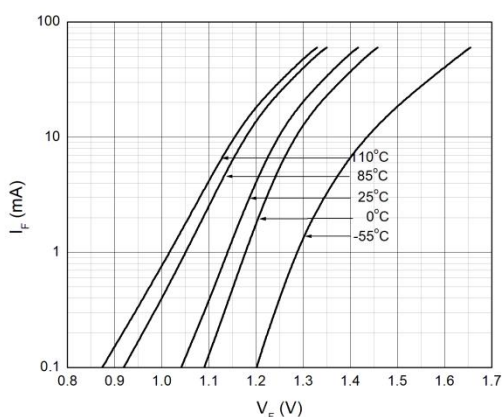
**Fig.1 Forward Current
vs. Ambient Temperature**



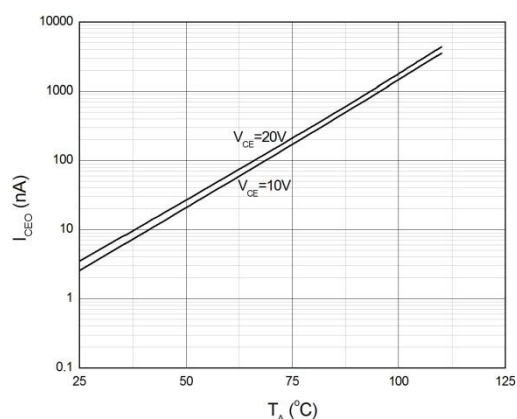
**Fig.2 Collector Power Dissipation
vs. Ambient Temperature**



**Fig.3 Forward Current
vs. Forward Voltage**

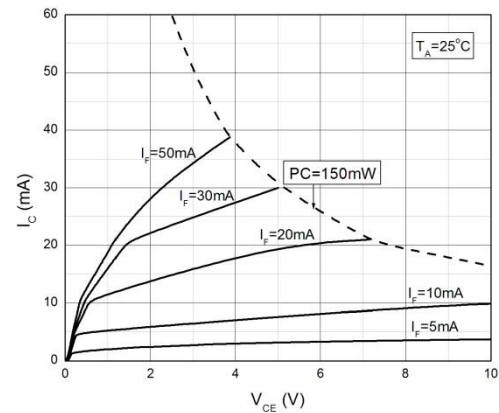
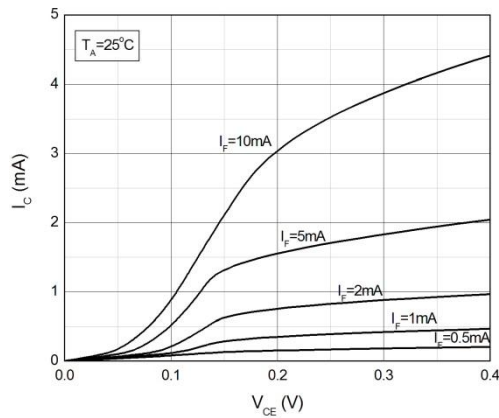
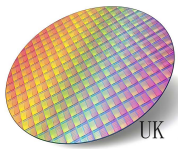


**Fig.4 Collector Dark Current
vs. Ambient Temperature**



**Fig.5 Collector Current
vs. Collector-emitter Voltage**

**Fig.6 Collector Current
vs. Collector-emitter Voltage**



CHARACTERISTIC CURVES

Fig.7 Normalized Current Transfer Ratio vs. Forward Current

Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

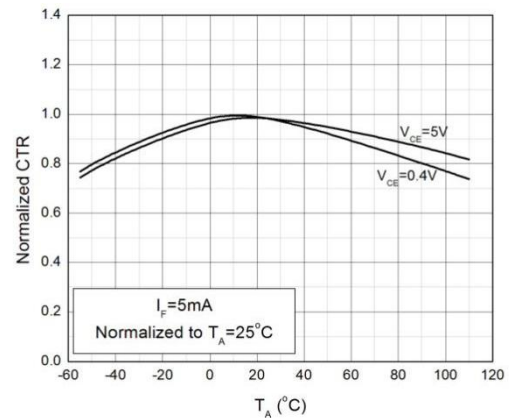
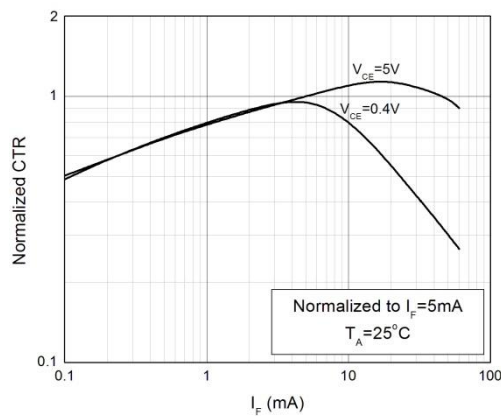


Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature

Fig.10 Switching Time vs. Load Resistance

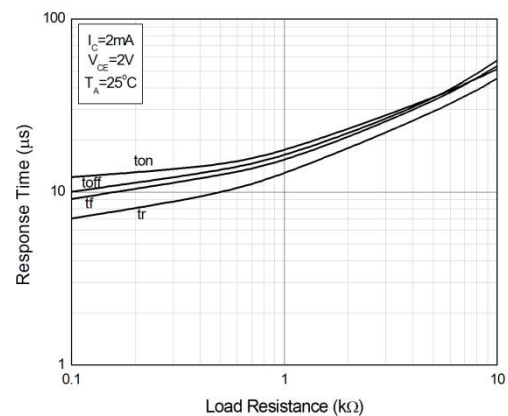
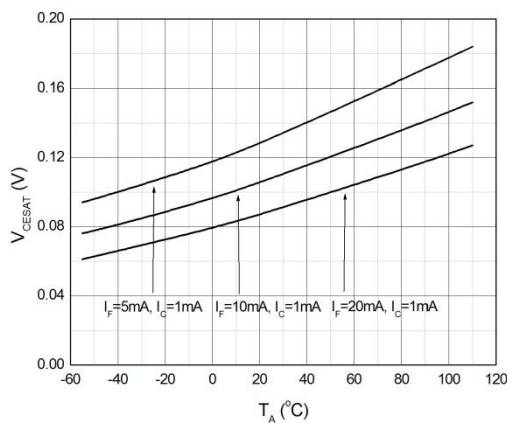
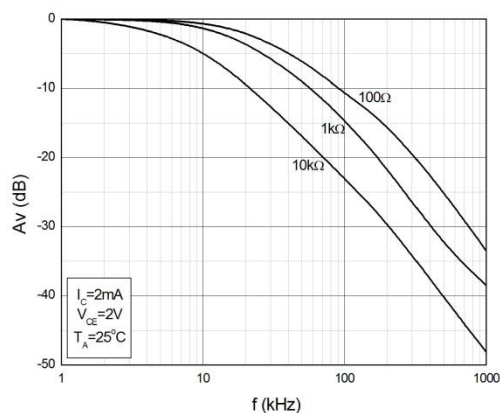
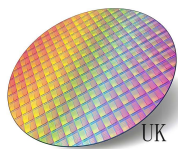


Fig.11 Frequency Response



TEST CIRCUITS

Fig.12 Test Circuits of Response Time

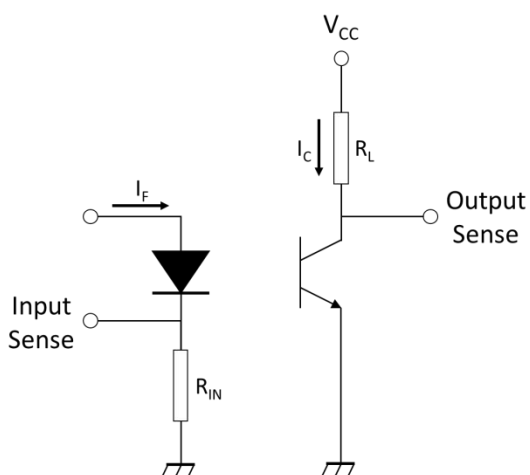
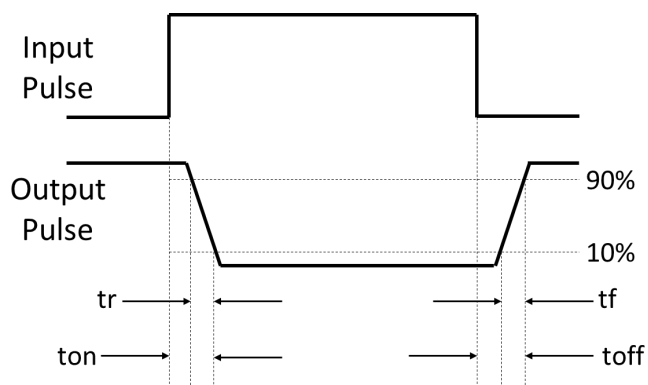
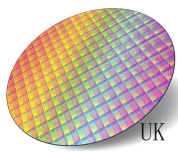
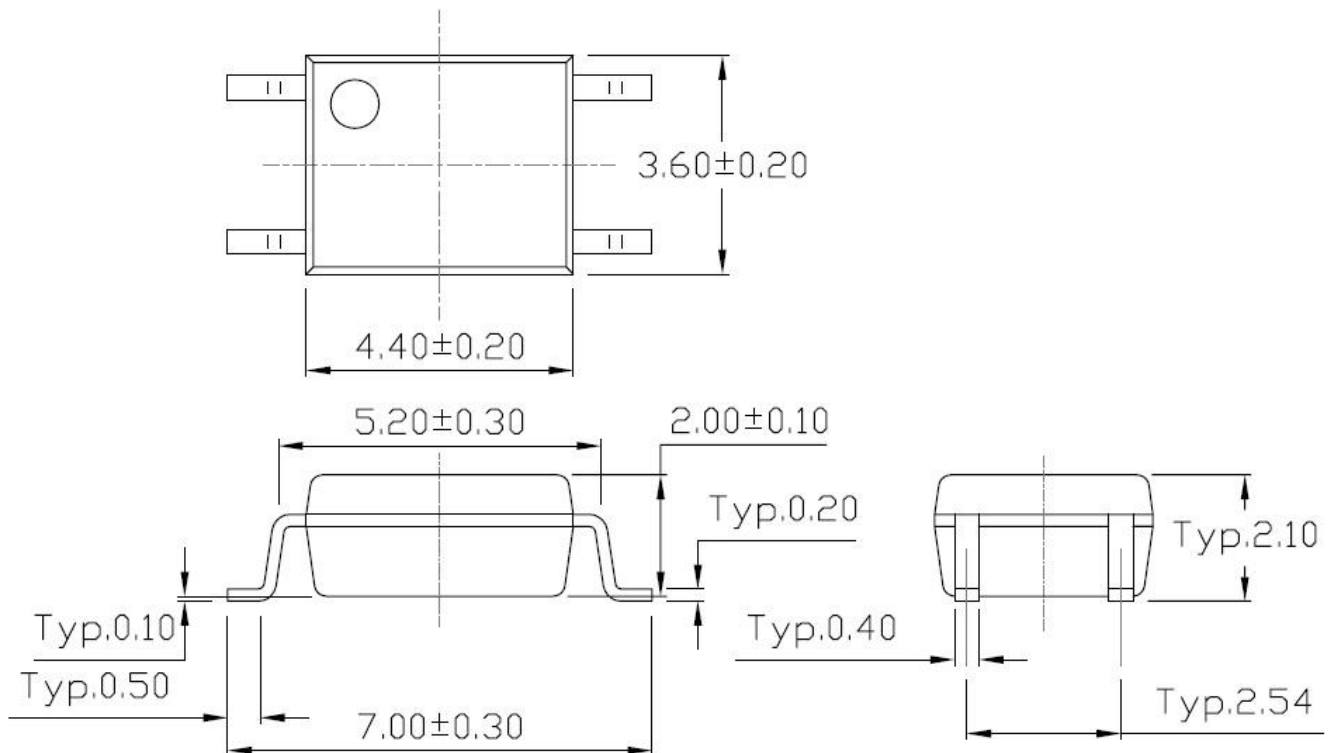


Fig.13 Curves of Response Time

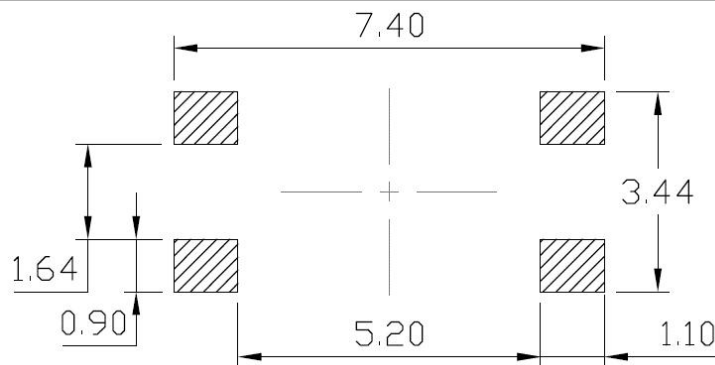


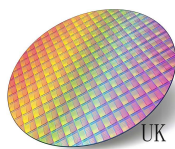


PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)



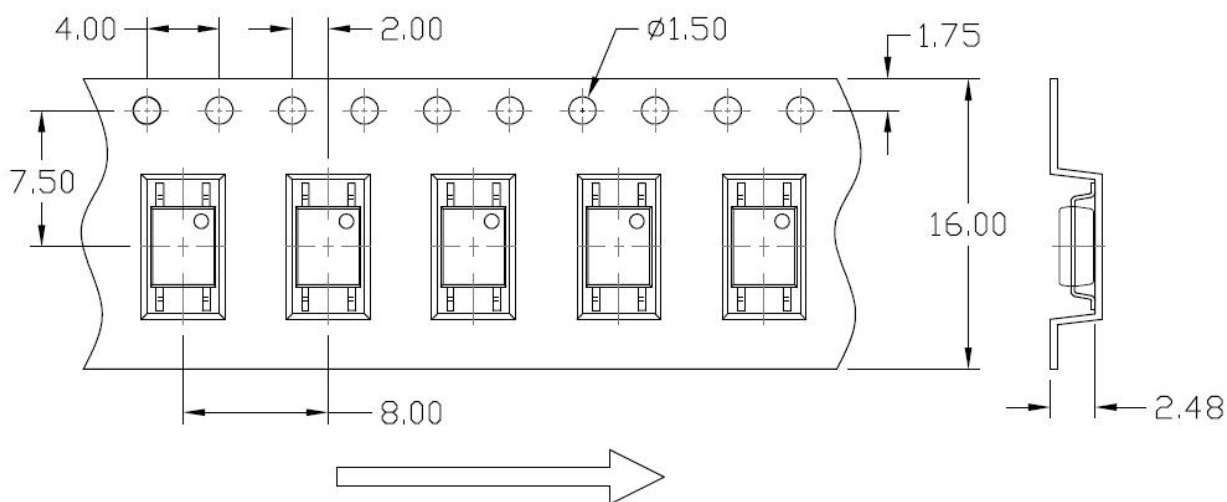
Recommended Solder Mask (Dimensions in mm unless otherwise stated)



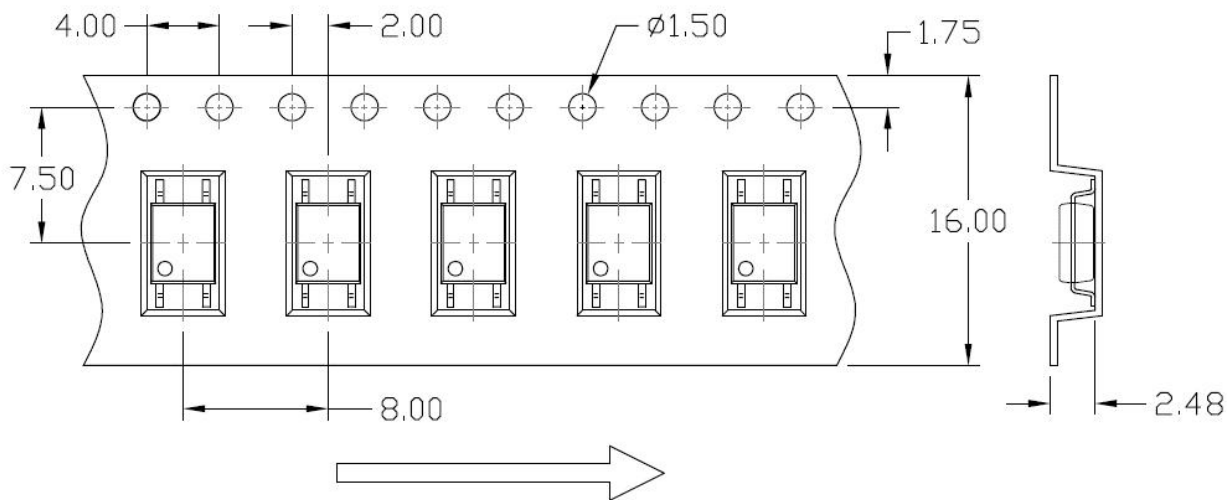


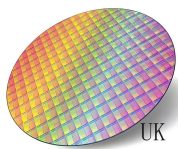
CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1



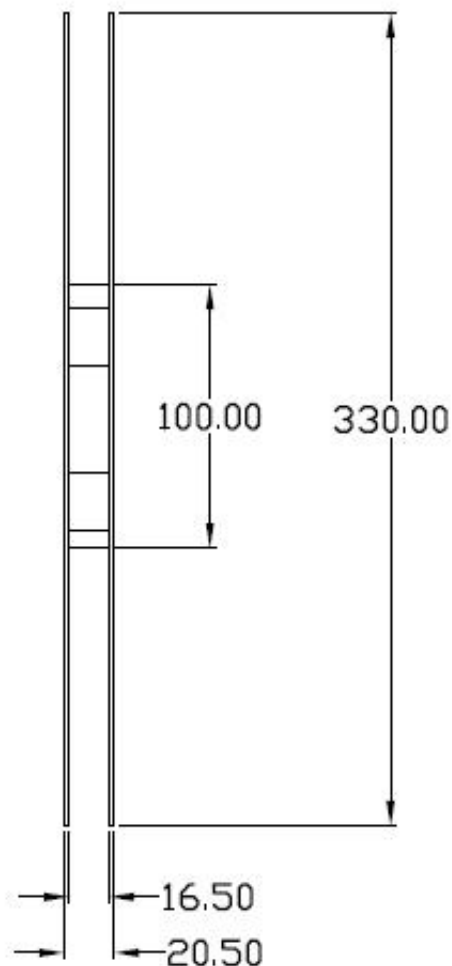
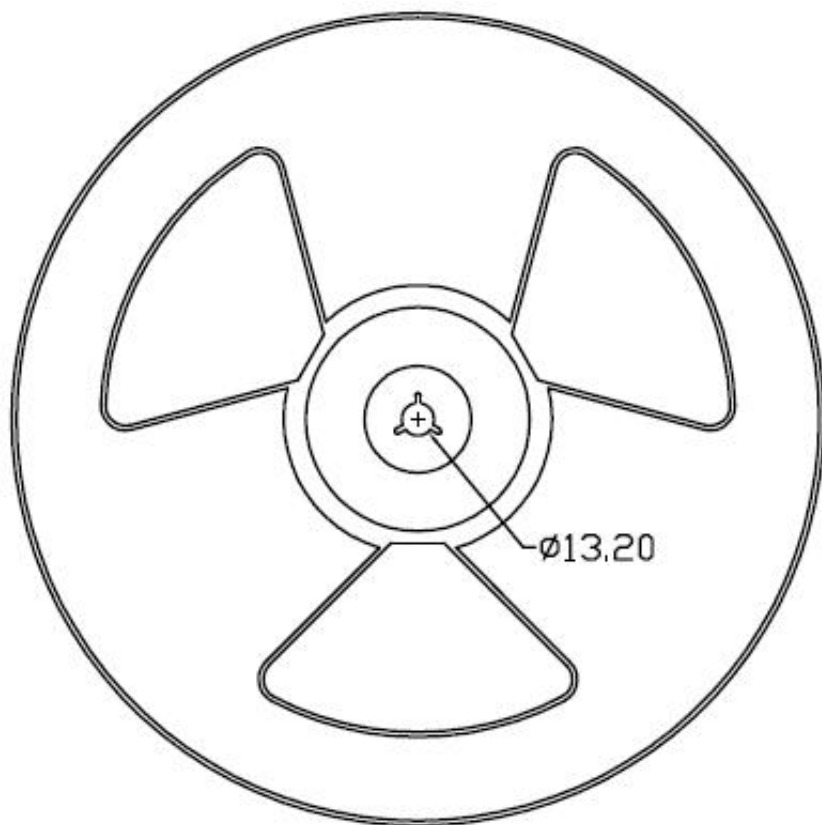
Option T2

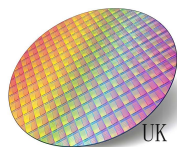




REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1 & T2



**ORDERING AND MARKING INFORMATION****MARKING INFORMATION**

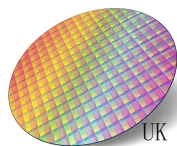
I : Company Abbr.
FPA1 : Part Number Code
Y : Fiscal Year
WW : Work Week
X : CTR Rank

ORDERING INFORMATION**LABEL INFORMATION****IS180-Z**

IS180 – Part Number
X – Rank (A/B/C/ or None)
Z – Tape and Reel Option
(None=T1 IS180T2=T2)

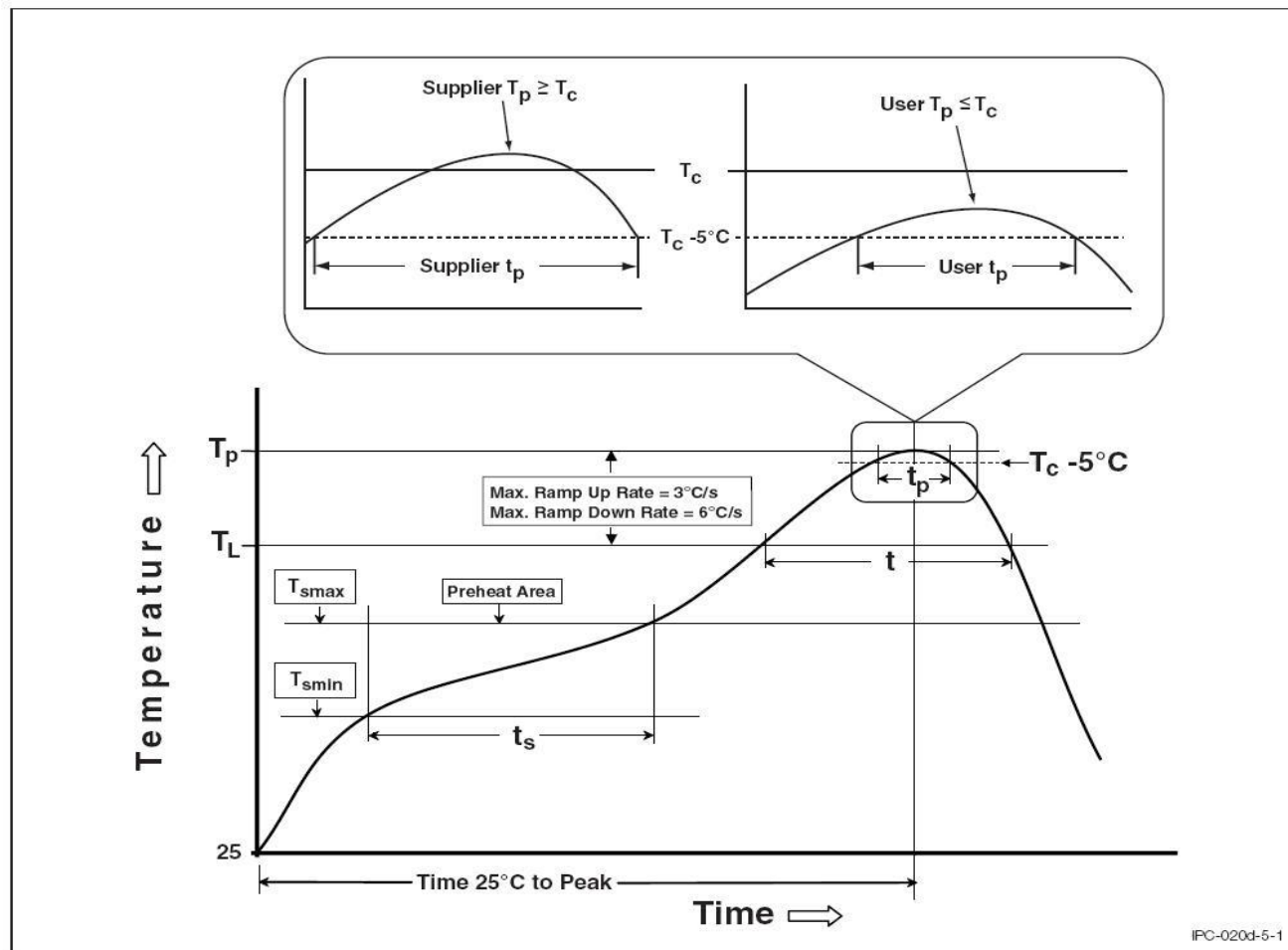
PACKING QUANTITY

Option	Quantity	Quantity – Inner box	Quantity – Outer box
T1	3000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 45k Units
T2	3000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 45k Units



REFLOW INFORMATION

REFLOW PROFILE



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	100	150°C
Temperature Max. (T _{smax})	150	200°C
Time (t _s) from (T _{smin} to T _{smax})	60-120 seconds	60-120 seconds
Ramp-up Rate (t _L to t _P)	3°C/second max.	3°C/second max.
Liquidous Temperature (T _L)	183°C	217°C
Time (t _L) Maintained Above (T _L)	60 – 150 seconds	60 – 150 seconds
Peak Body Package Temperature	235°C +0°C / -5°C	260°C +0°C / -5°C
Time (t _P) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (T _P to T _L)	6°C/second max	6°C/second max
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

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