



SMD REFLECTIVE TYPE OPTO INTERRUPTER

Description

The TR2FdTRF4-BS01-RTA Composed of a GaAs VCSEL and a NPN Photo-transistor which is encased side-by-side on converging optical axis in a black thermoplastic housing. The Photo-transistor receives reflection from the VCSEL only. But when an object is in between, Photo-transistor could not receive the reflection. For additional component information, please refer to VCESL and PT guide.

Features

- Fast High reliability · High radiant intensity · Low forward voltage
- Fast response time · High photo sensitivity
- Cut-off visible wavelength $\lambda_p=940\text{nm}$
- Pb.Free · RoHS compliant version

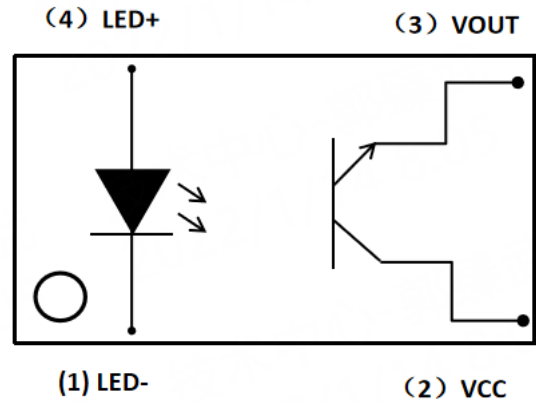
Applications

- TWS · Non-contact Switching
- Intelligent Electronic Products

Device Selection Guide

Device NO	Chip Material
VCESL	GaAS
PT	Silicon

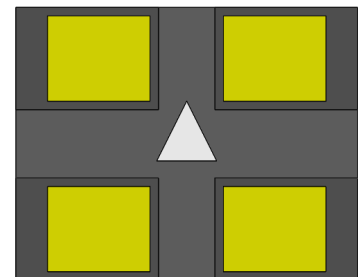
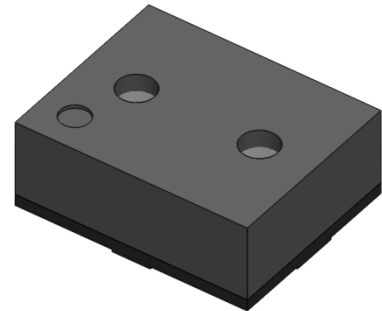
PACKAGE OUTLINE



PIN DEFINITION

4.LED+	3.VOUT
1.LED-	2.VCC

PACKAGE OUTLINE





TR2FdTRF4-BS01-RTA

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ABSOLUTE MAXIMUM RATING TA=25°C					
Parameters		Symbol	Ratings	Units	Notes
Input	Power Dissipation at (or below) 25°C Free Air temperature	P _d	5	mW	
	Reverse Voltage	V _R	5	v	
	Forward Current	I _F	10	mA	
Output	Collector Power Dissipation	P _C	5	mW	
	Collector Current	I _C	20	mA	
	Collector -Emitter Voltage	B _V CEO	20	V	
	Emitter-Collector Voltage	B _V ECO	5	V	
Operating Temperature		T _{opr}	-25~+85	°C	
Storage Temperature		T _{stg}	-40~+100	°C	
Lead Soldering Temperature *		T _{sol}	260	°C	1

*Remark:

1. T=5 sec

OPTICAL CHARACTERISTICS TA = 25°C								
Parameters		Test Conditions	Symbol	Min	Typ	Max	Units	Notes
Input	Forward Voltage	I _F =20mA	V _F	-	2.9	3.5	V	
	Reverse Current	V _R =5V	I _R	-	-	10	uA	
	Peak Wavelength	---	λ _P	-	940	-	nm	
Output	Dark Current	E _e =0mW/cm ² , V _{CE} =20V	I _{CEO}	-	-	10	uA	
	C-E Saturation Voltage	I _C =2mA E _e =1mW/cm ²	V _{CE(SAT)}	-	-	0.8	V	
Transfer Characteristics	Light Current	I _{F(int)} =10mA V _{R(out)} =5V	I _{C(ON)}	0.18	1	-	mA	
	Rise time	V _{R(out)} =2mA、I _C =100uA	t _r	-	20	-	us	
	Fall time	R _L =1KΩ	t _f	-	20	-	us	

*Remark:

1. Pulse width ≤ 100μs,Duty cycle= 1%



CHARACTERISTIC CURVES FOR IR

Fig.1 Forward Voltage vs. Ambient Temperature

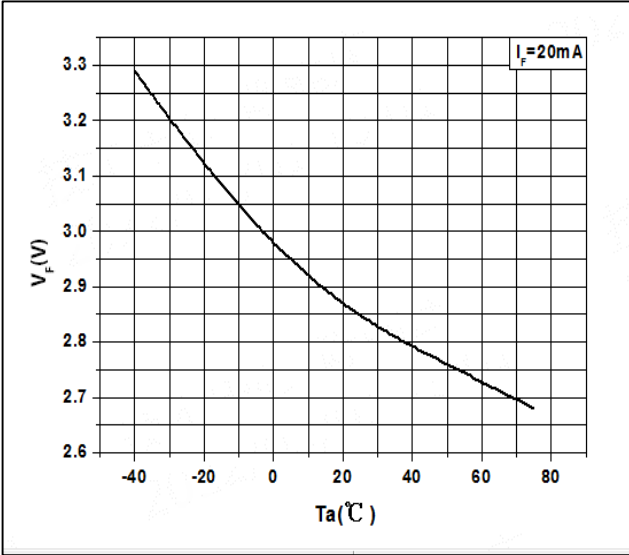


Fig.2 Forward Voltage vs. Forward Current

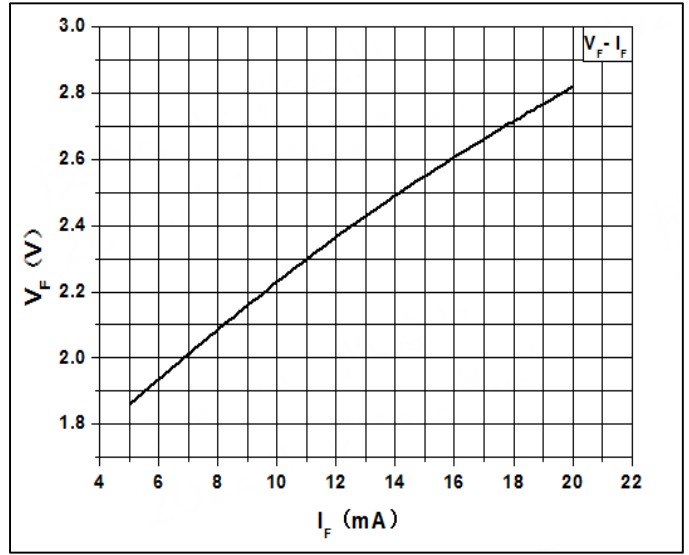


Fig.3 Reverse Current vs. Ambient Temperature

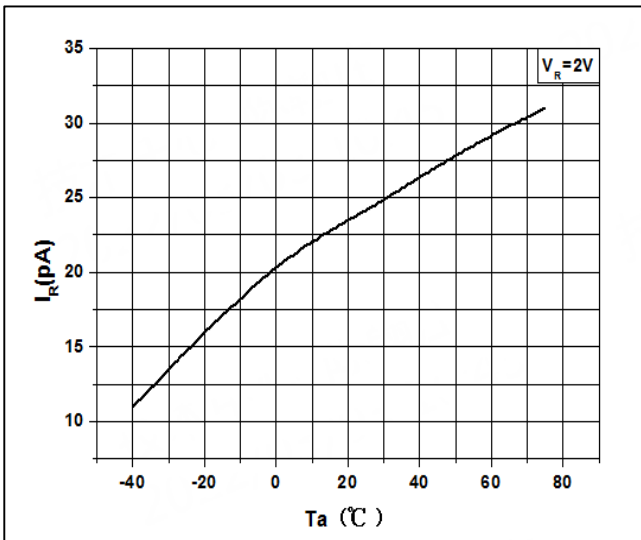
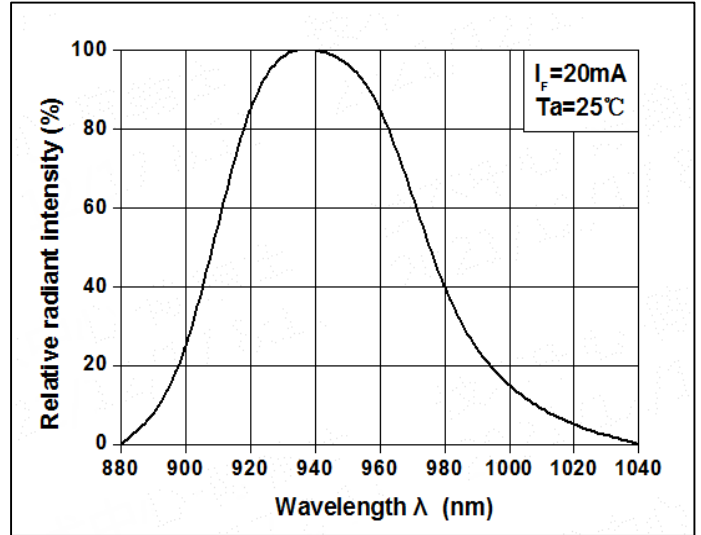


Fig.4 Spectral Distribution



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CHARACTERISTIC CURVES FOR PT

Fig.5 Collector Dark Current vs. Ambient Temperature

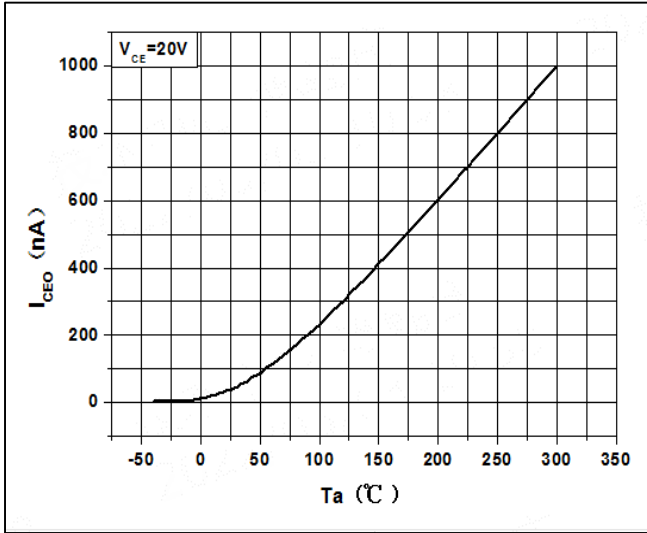


Fig.6 Current transfer ratio vs. Ambient Temperature

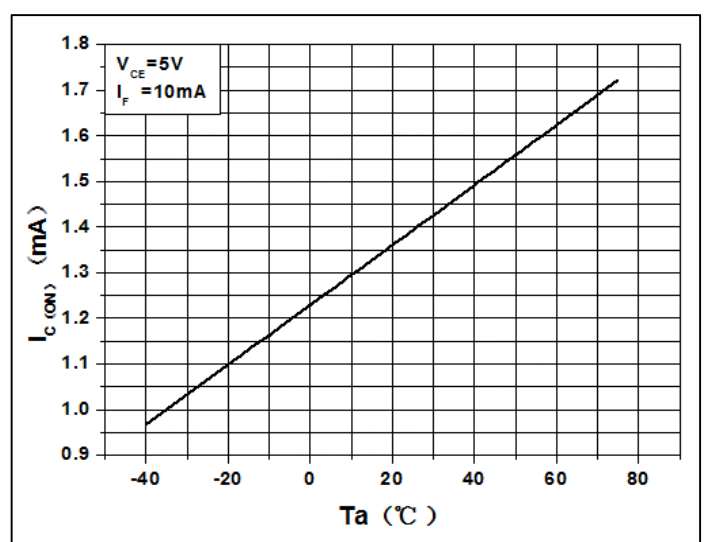
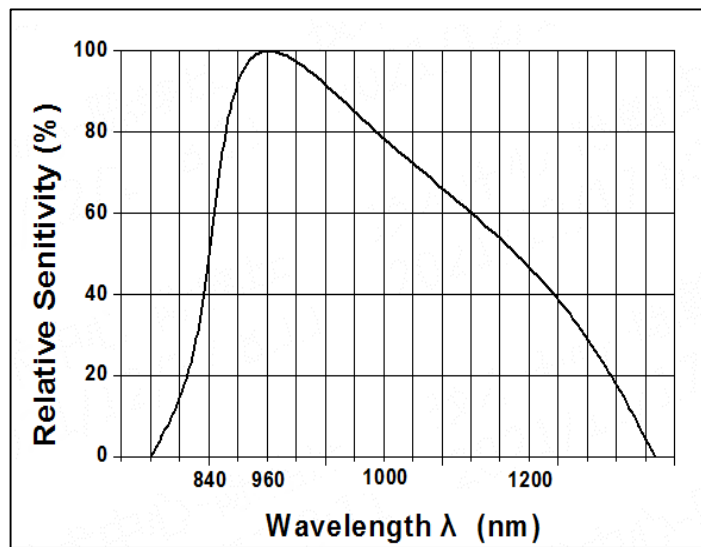


Fig.7 Spectral Sensitivity



TEST CIRCUITS FOR ITR

Fig.8 Relative Collector Current vs. Distance between Sensor and AL Evaporation Glass

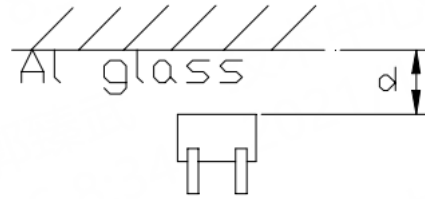
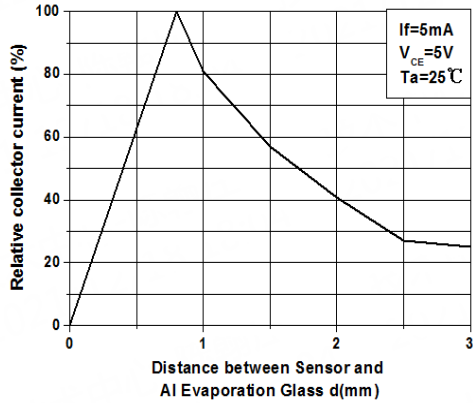


Fig.9 Relative Collector Current vs. Card Moving Distance

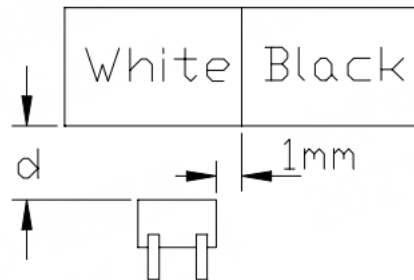
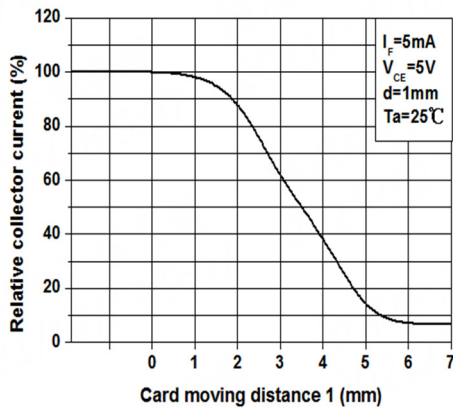
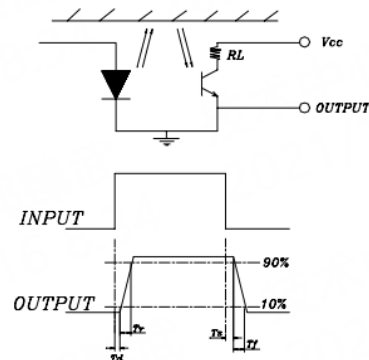
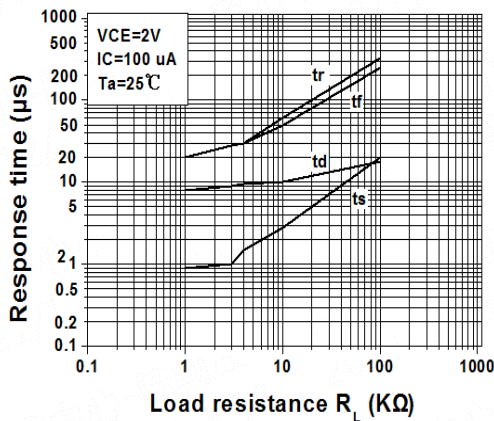


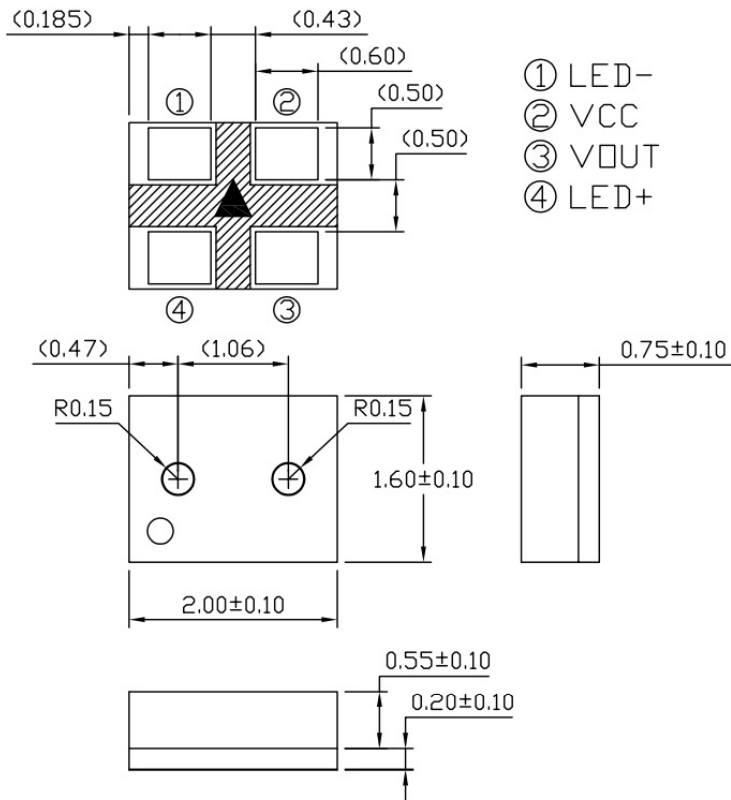
Fig.10 Response Time vs. Load Resistance



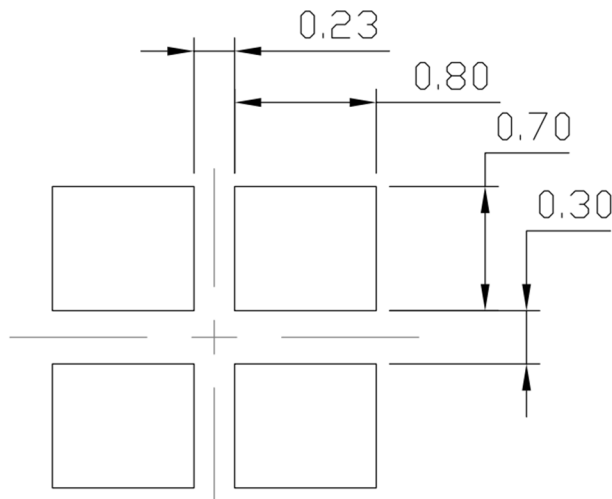
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PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

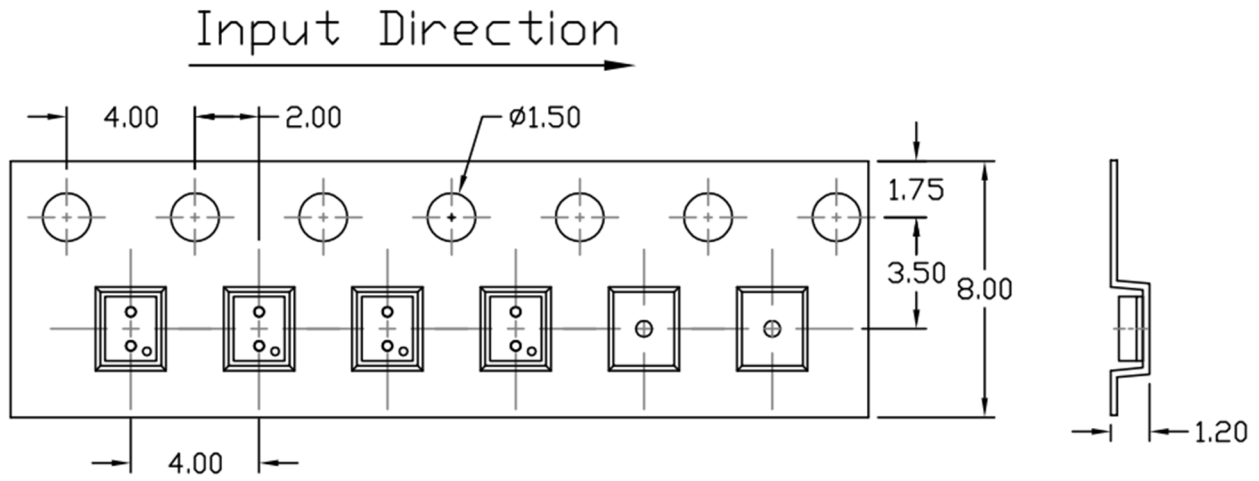
SMD Type



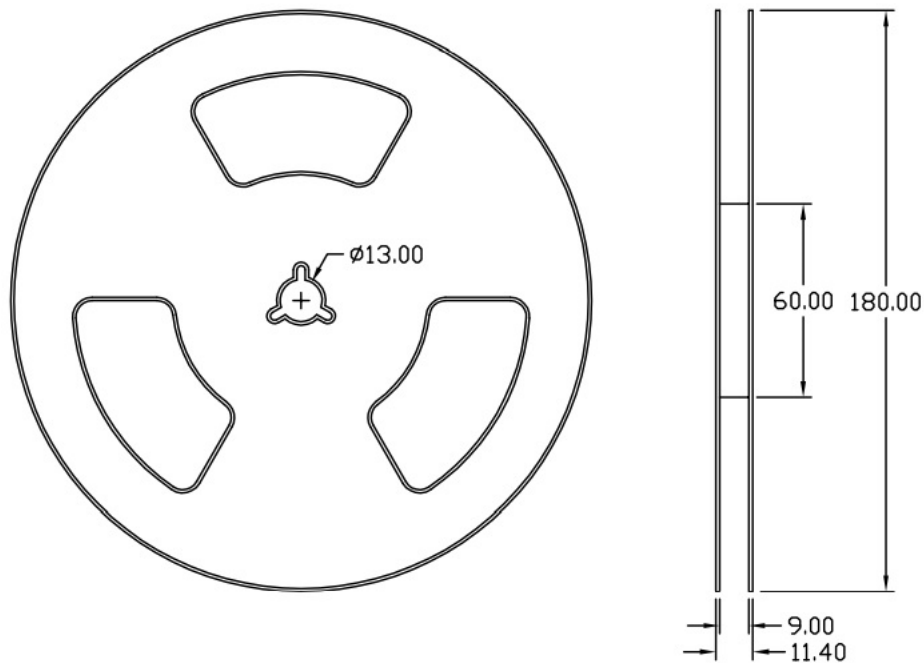
RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)



Tape Dimension (Dimensions in mm unless otherwise stated)



REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)

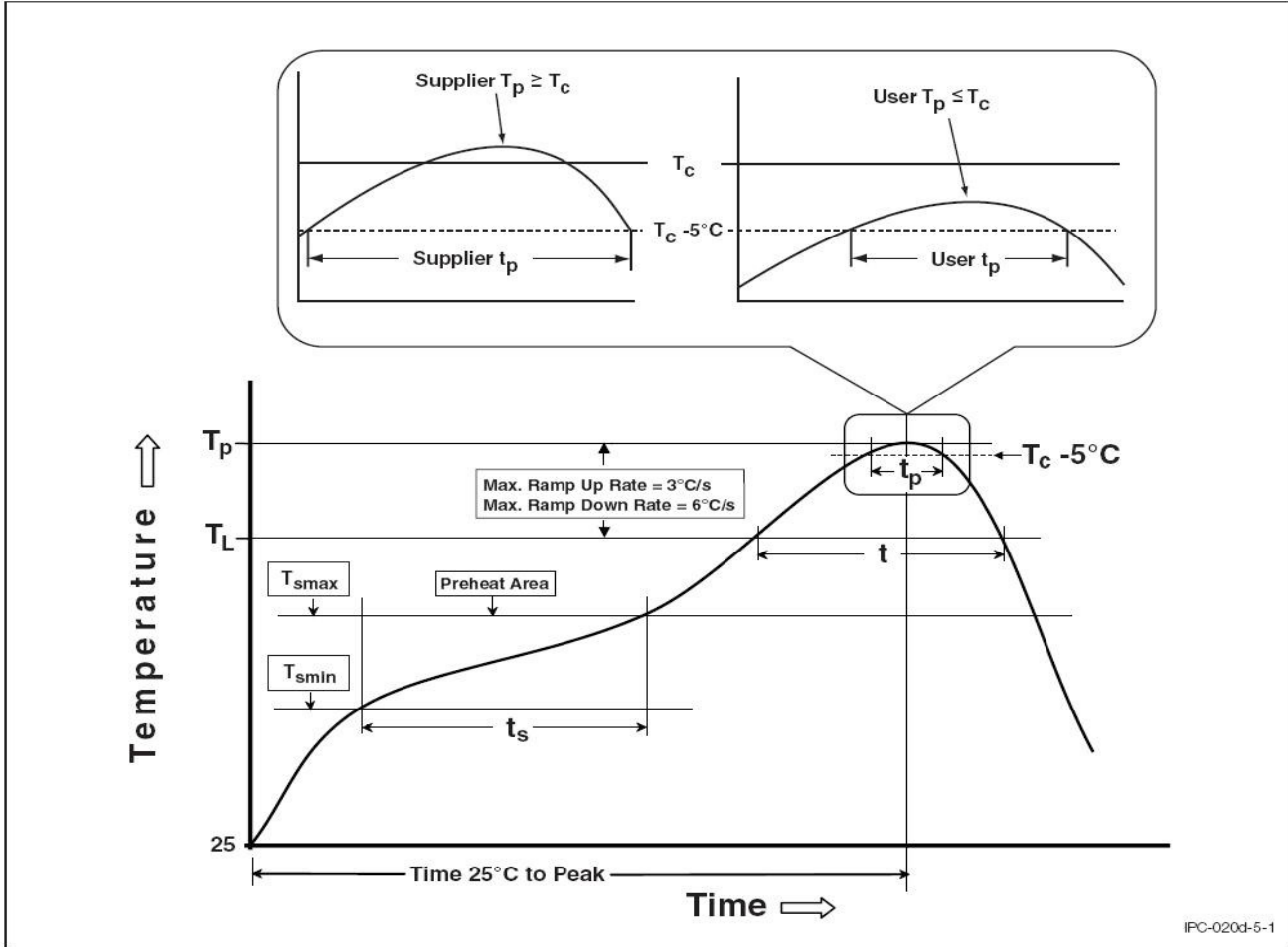


Packing Quantity

Option	Quantity	Quantity – Inner box	Quantity – Outer box
None	3000 Units/Reel	10Reels/Inner box	6 Inner box/Outer box = 180k Units

REFLOW INFORMATION

REFLOW PROFILE



IPC-020d-5-1

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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