

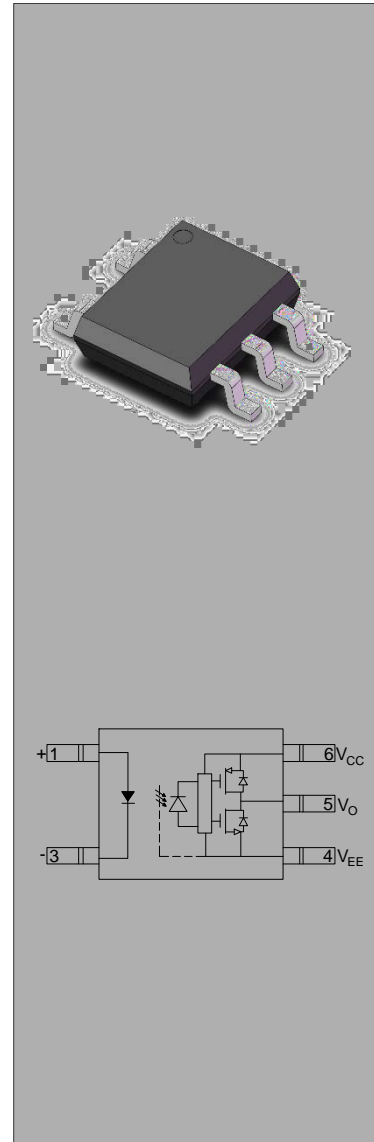


JOCDA1CB-M5

Rev.A.1.0

DESCRIPTION:

The products are gate driver opto-couplers in the SOP5 package. The device consists of an infrared LED optically coupled to an integrated high-gain, high-speed photodetector IC chip. It provides guaranteed performance and specifications at temperature up to 110 . It is physically smaller and compliant with international safety standards for reinforced insulation. It thus provides a smaller footprint solution for applications that require safety standard certification. An internal noise shield provides a guaranteed common-mode transient immunity of ±20 kV/μs. It is ideal for small class IGBT and power MOSFET gate drive. The products are widely used in industrial inverters, IGBT gate drivers, MOSFET gate drivers, induction cooktop and home appliances.



MAIN FEATURES

- High isolation 3750 VRMS
- Buffer logic type
- Operating temperature range -40°C to 110°C
- REACH & RoHS compliance
- HBM: H3A; MM: M4; CDM: C3
- CQC approved
- VDE approved
- UL approved

Truth Table

Input	LED	Output
H	ON	H
L	OFF	L

ABSOLUTE MAXIMUM RATINGS (Temperature=25°C)

Parameter		Symbol	Value	Unit
LED	Forward Current	I _F	50	mA
	Peak Forward Current	I _{FP}	1	A

	Reverse Voltage	V_R	6	V
	Power Dissipation	P_D	100	mW
Detector	Output Voltage	V_O	35	V
	Supply Voltage	V_{CC}	35	V
	Power Dissipation	P_C	400	mW
Isolation Voltage		V_{iso}	3750	Vrms
Operating Temperature		T_{opr}	-40~110	
Junction Temperature		T_j	125	
Storage Temperature		T_{stg}	-55~125	
Total Power Dissipation		P_{tot}	500	mW
Soldering Temperature		T_{sol}	260	

NOTE1: 100 μ s pulse, 100Hz frequency

NOTE2: AC for 1minute, R.H.=40~60%

ELECTRICAL CHARACTERISTICS (Temperature=25°C)

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage	V_F	$I_F=10mA$	-	1.35	1.6	V
	Reverse Current	I_R	$V_R=6V$	-	-	1	μA
	Terminal Capacitance	C_t	$V=0, f=1MHz$	-	60	-	pF
Output	Peak High-level Output Current	I_{OPH}	$V_O=V_{CC}-1.5V$	-	-	-0.3	A
			$V_O=V_{CC}-3V$	-	-	-0.8	A
	Peak Low-level Output Current	I_{OPL}	$V_O=V_{EE}+1.5V$	0.3	-	-	A
			$V_O=V_{EE}+3V$	0.8	-	-	A
	High Level Supply Current	I_{CCH}	$I_F=10mA$ $V_{CC}=30V,$ $V_O=Open,$	-	1.2	2	mA
	Low Level Supply Current	I_{CCL}	$I_F=0mA,$ $V_{CC}=30V,$ $V_O=Open,$	-	1.1	2	mA
	High Level Output Voltage	V_{OH}	$I_F=5mA,$ $V_{CC}=10V,$ $I_O=-100mA$	6	8.4	-	V
	Low Level Output Voltage	V_{OL}	$V_F=0.8V,$ $V_{CC}=10V,$ $I_O=100mA$	-	0.3	1	V
	Threshold Input Current	I_{FLH}	$V_{CC}=15V,$ $V_O=1V$	-	1.2	5	mA

Threshold Input Voltage	V_{FHL}	$V_{CC}=15V,$ $V_o 1V$	0.8	-	-	V
Supply Voltage	V_{CC}	-	10	-	30	V

SWITCHING SPECIFICATION

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Propagation Delay Time to High Output Level	t_{PLH}	$R_g=47 \Omega,$ $C_g=3nF,$ $I_F=0.5mA,$ $V_{CC}=30V$	30	-	500	ns
Propagation Delay Time to Low Output Level	t_{PHL}	$R_g=47 \Omega,$ $C_g=3nF,$ $I_F=5.0mA,$ $V_{CC}=30V$	30	-	500	
Propagation Delay Difference		$R_g=47 \Omega,$ $C_g=3nF,$ $I_F=0.5mA,$ $V_{CC}=30V$	-	-	350	
		$R_g=47 \Omega,$ $C_g=3nF,$ $I_F=0.5mA,$ $V_{CC}=30V$	-	50	-	
		$R_g=47 \Omega,$ $C_g=3nF,$ $I_F=5.0mA,$ $V_{CC}=30V$	-	50	-	

Recommended Operating Conditions

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Input On-state Current	$I_{F(ON)}$	6.5	-	10	mA
Input Off-state Voltage	$V_{F(OFF)}$	0	-	0.8	V
Supply Voltage	V_{CC}	10	-	30	V
Operating Frequency	f	-	-	25	kHz

Note1: The recommended operating conditions are given as a design guide necessary to obtain the intended performance of the device. Each parameter is an independent value. When creating a system design using this device, the electrical characteristics specified in this datasheet should also be considered.

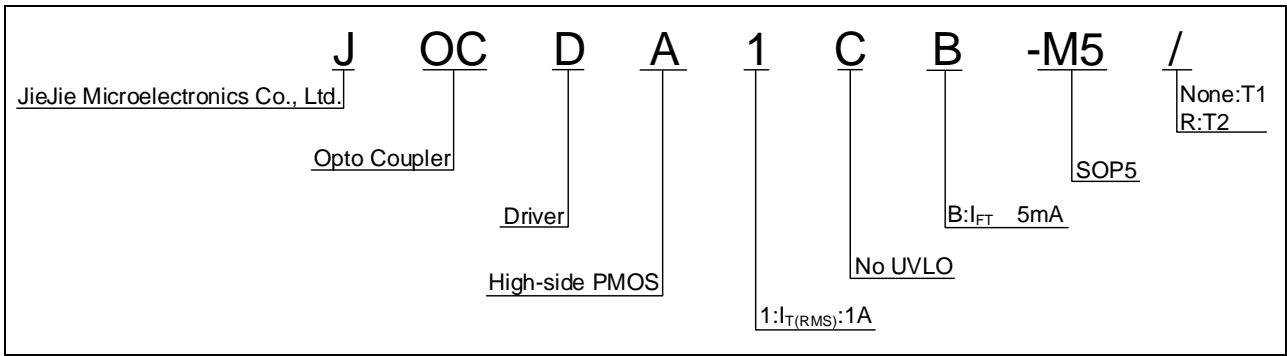
Note2 A ceramic capacitor(0.1μF) should be connected between pin 6 (V_{CC}) and pin 4 (GND) to stabilize the operation of a high gain linear amplifier. Otherwise, this photocoupler may not switch properly. The bypass capacitor should be placed within 1 cm of each pin.

Note3 The rise and fall times of the input on current should be less than 0.5 μs.

Note4: If the rising slope of the supply voltage (V_{CC}) for the detector is steep, stable operation of the internal circuits cannot be guaranteed. Be sure to set 3V/μs or less for a rising slope of the V_{CC} .

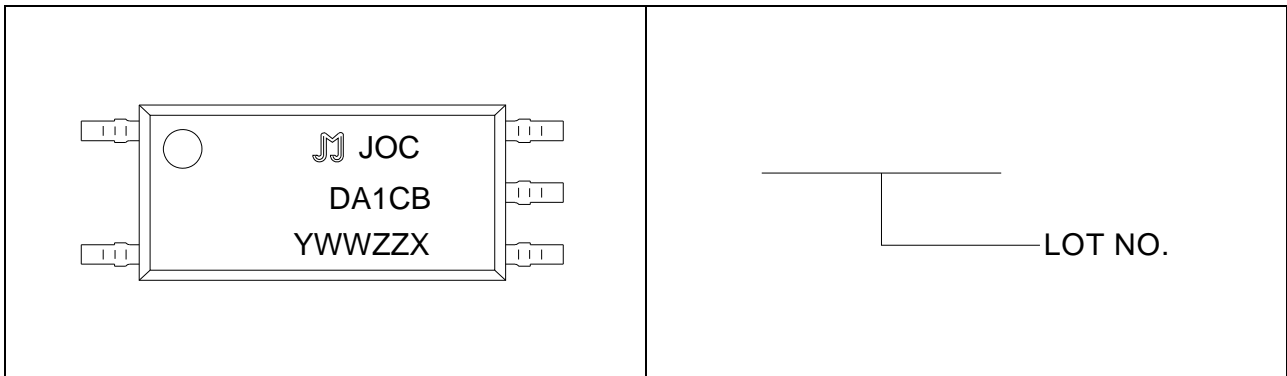
Note5: Denotes the operating range, not the recommended operating condition.

ORDERING INFORMATION



Packing Quantity	
Option	Quantity
None/R	3000 Units/Reel

MARKING



Characteristics Curves

FIG.1: Forward Current vs. Forward Voltage

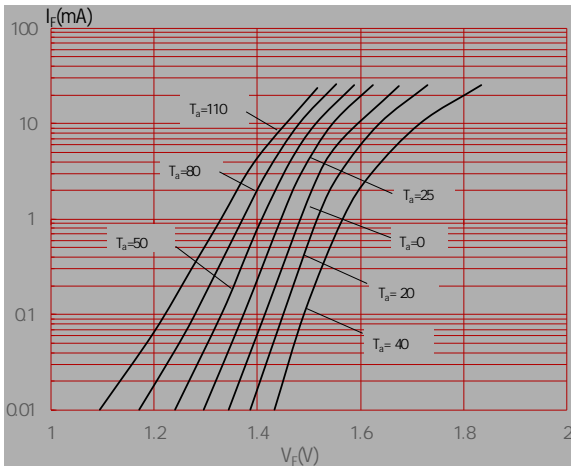


FIG.2: Max. Allowable LED Forward Current vs. Ambient Temperature

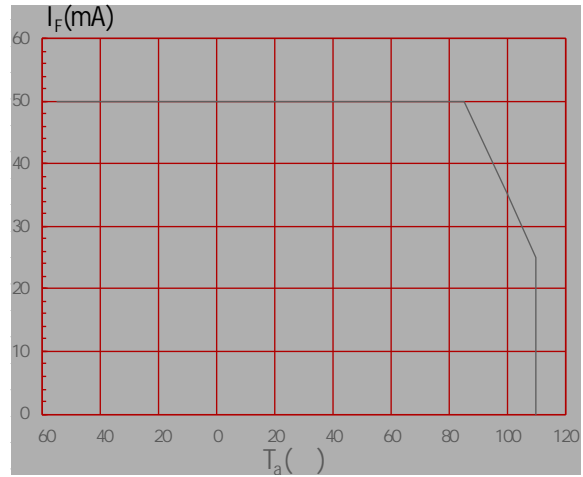


FIG.3: Collector Power Dissipation vs. Ambient Temperature

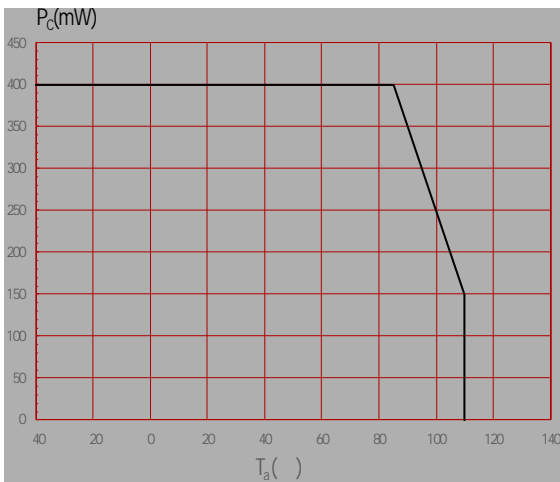


FIG.4: Threshold Input Current vs. Ambient Temperature

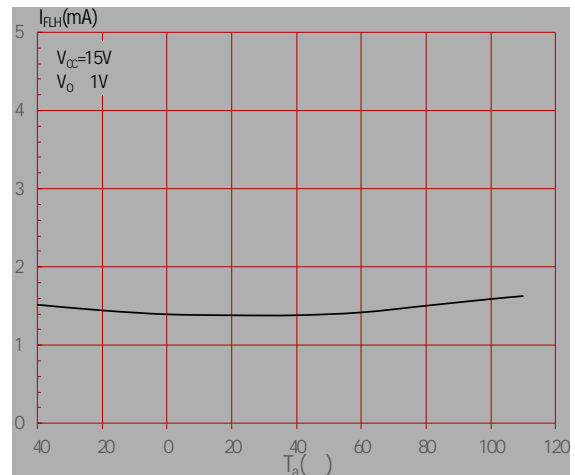


FIG.5: Low-level Supply Current vs. Ambient Temperature

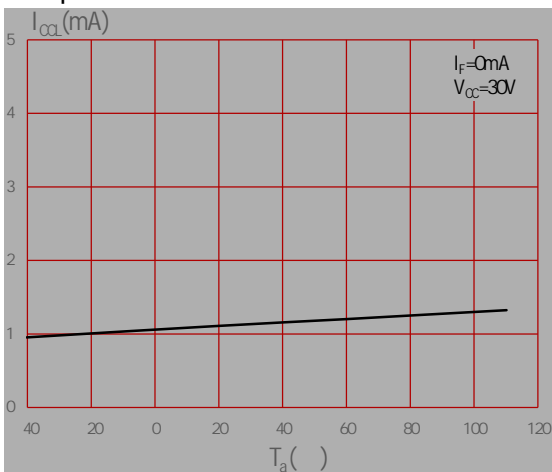


FIG.6: High-level Supply Current vs. Ambient Temperature

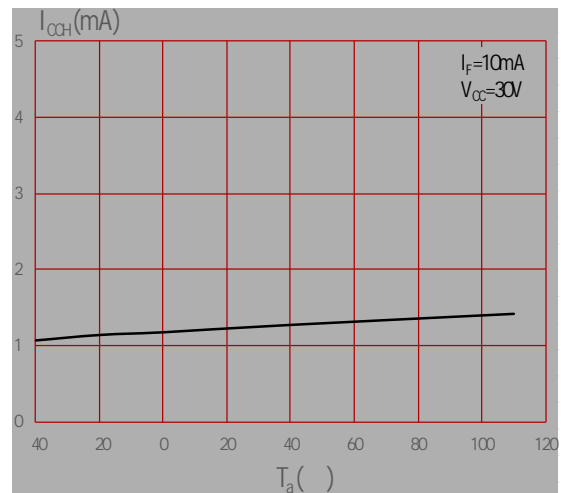


FIG.7: Low-level Output Voltage vs. Ambient Temperature

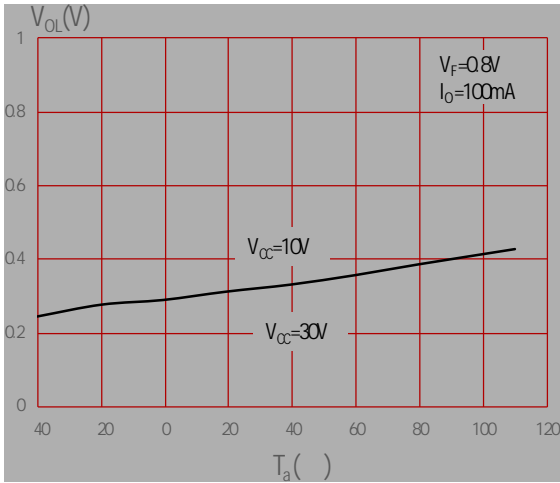


FIG.8: High-level Output Voltage vs. Ambient Temperature

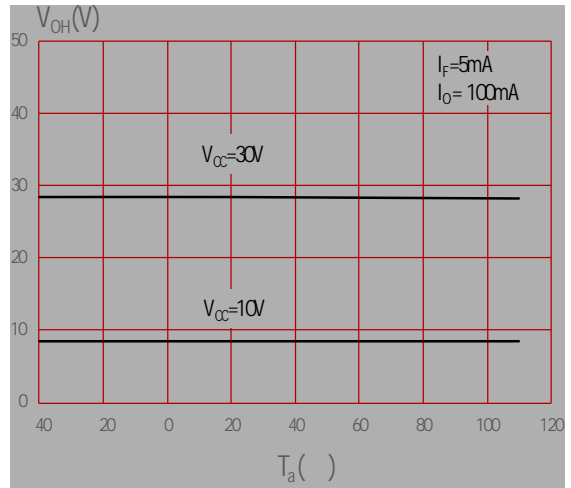


FIG.9: Low-level Output Voltage vs. Peak Low-level Output Current

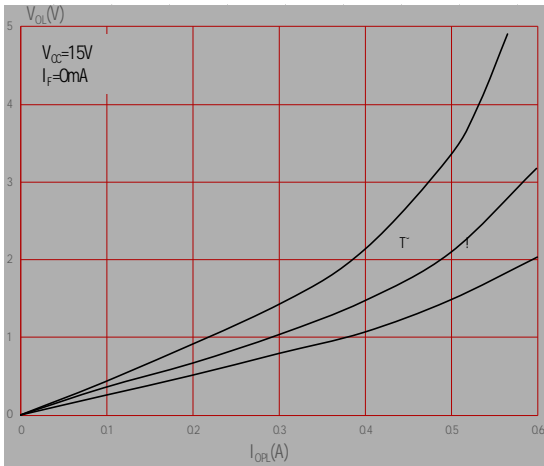
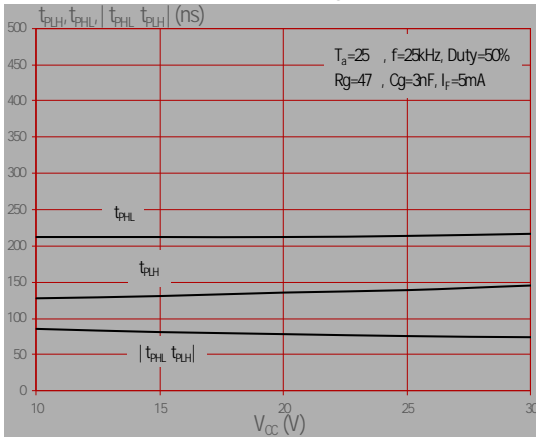


FIG.10: High-level Output Voltage Drop vs. Peak High-level Output Current

FIG.13: Propagation Delay Time, Pulse Width Distortion vs. Supply Voltage



Test Circuits

FIG.14: Switching Time Test Circuit and Waveform

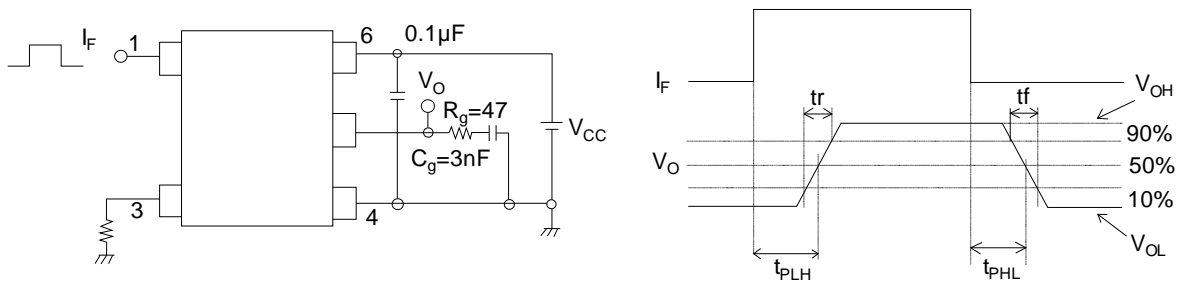
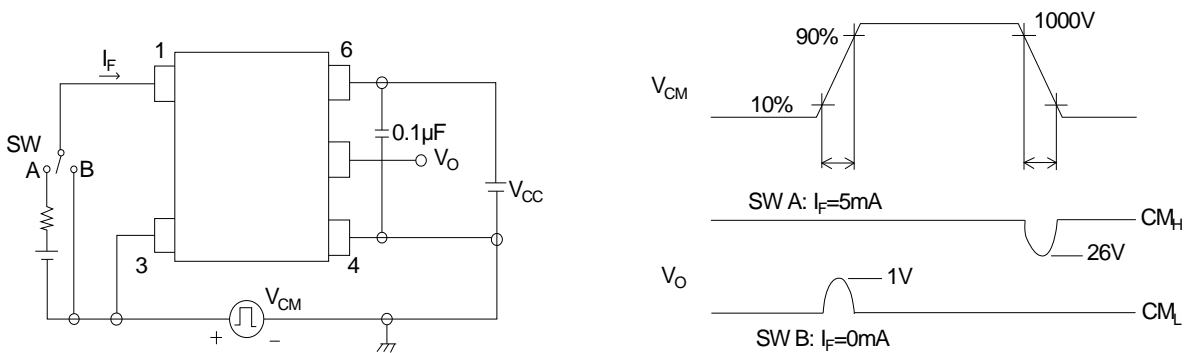
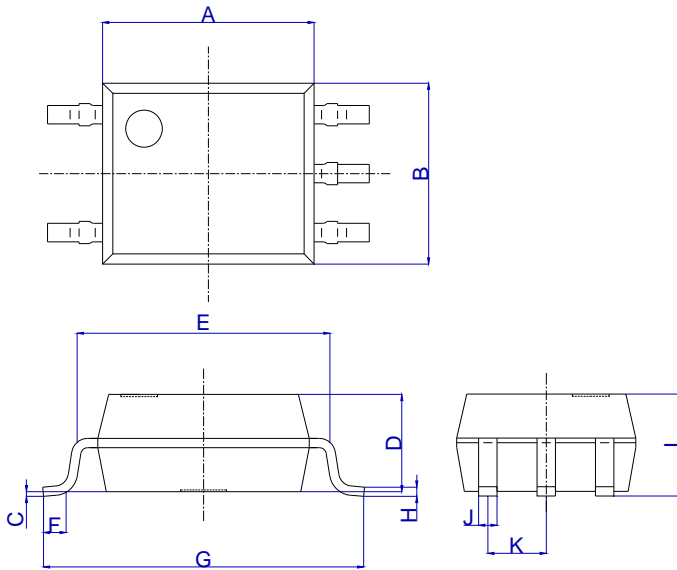


FIG.15: Common-Mode Transient Immunity Test Circuit and Waveform

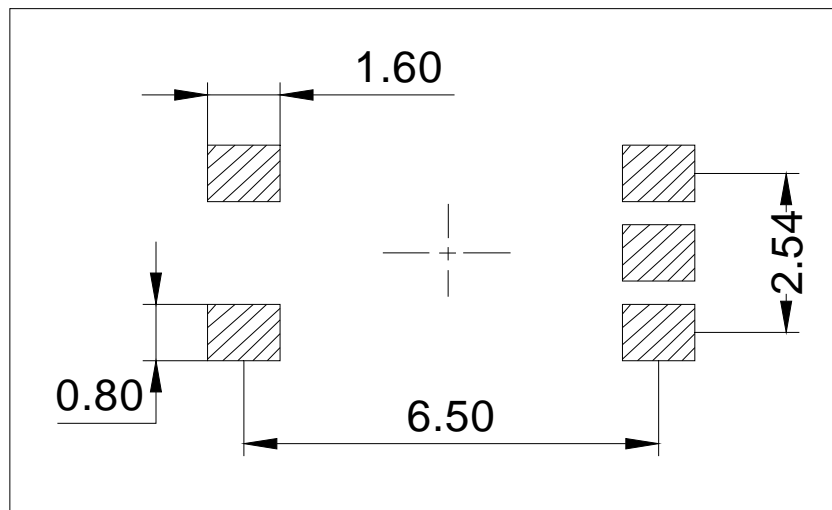


Package Dimension (Unit: mm)

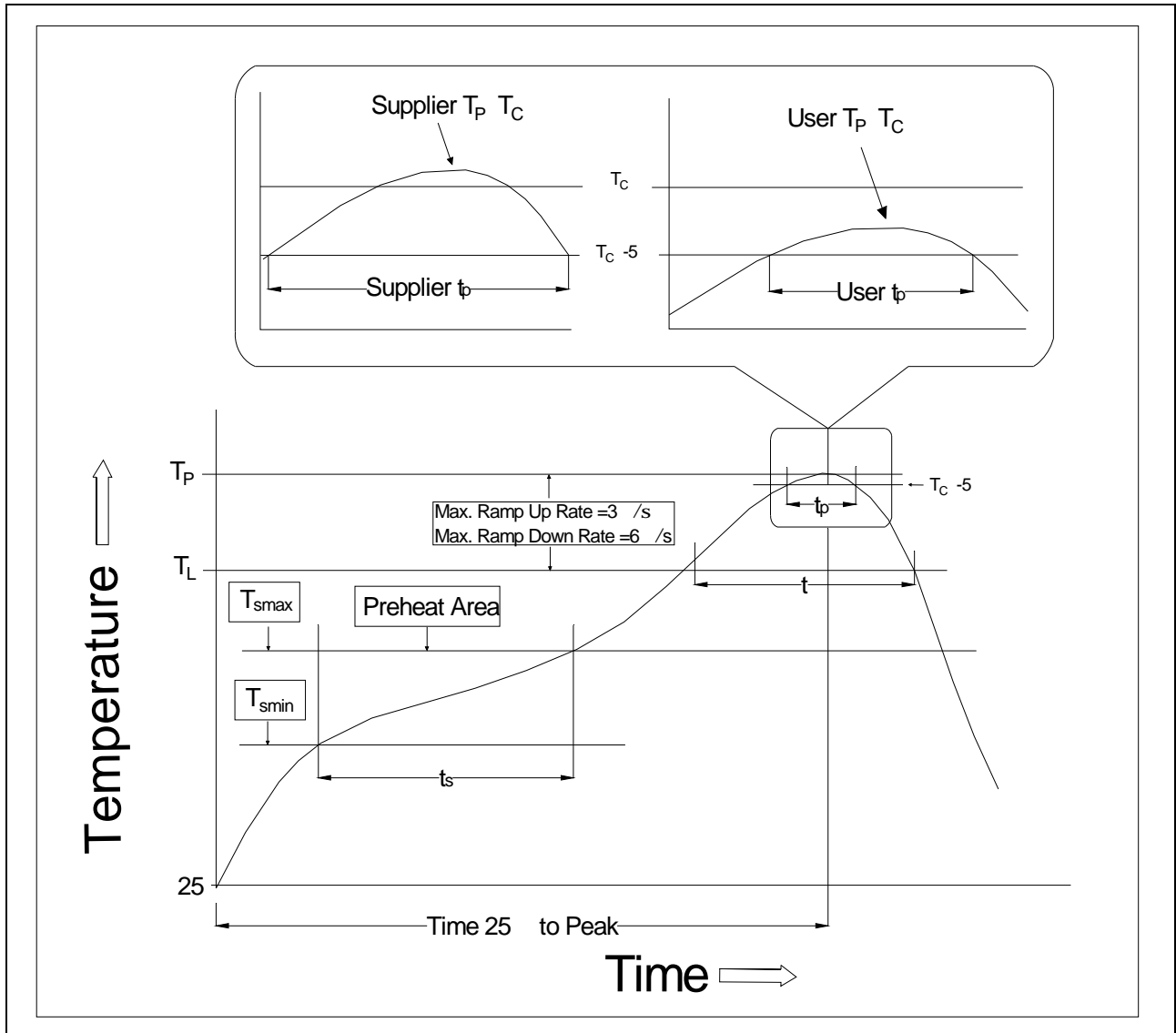


Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.80	0.173		0.189
B	3.60		4.20	0.142		0.165
C	0.00		0.20	0.000		0.008
D	1.90		2.30	0.075		0.091
E	5.00		5.60	0.197		0.220
F	0.34		0.94	0.013		0.037
G	6.70		7.30	0.264		0.287
H	0.10		0.30	0.004		0.012
I	2.00		2.40	0.079		0.094
J	0.25		0.55	0.010		0.022
K	1.02		1.52	0.040		0.060

RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)



REFLOW INFORMATION




Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T _{min})	100	150
Temperature Max. (T _{smax})	150	200
Time (t _s) from (T _{min} 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.
Liquidus Temperature (T _L)	183	217
Time (t _L) Maintained Above (T _L)	60-150 seconds	60-150 seconds
Peak Body Package Temperature	235 +0 /-5	260 +0 /-5
Time (t _P) within 5 °C of 260	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.

Note:

1. Reflow soldering is recommended at the temperatures and times shown, no more than three times.
2. Avoid direct contact between the epoxy body and any tools or surfaces exceeding its maximum storage temperature.
3. Application of pressure on the epoxy body is prohibited at elevated temperatures. In specific scenarios, any applied force must not exceed 2.5N.
4. Ensure the component has cooled to ambient temperature before proceeding with any subsequent manufacturing steps.
5. The component has a shelf life of one year when stored under standard conditions.
6. Recommend storage Temp.: 0~40°C;
Recommend storage humidity: <60%;
MSL level: MSL 1

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