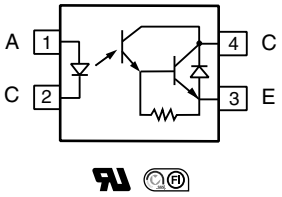
Optocoupler, Photodarlington Output, High Gain, 300 V BV_{CEO}

23095



FEATURES

- High collector emitter voltage, V_{CEO} = 300 V
- Low coupling capacitance
- High common mode transient immunity
- Isolation rated voltage 5000 V_{RMS}
- Standard plastic DIP-4 package
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

DESIGN SUPPORT TOOLS AVAILABLE

3D Models | Design Tools | Related Documents

DESCRIPTION

The SFH619A has a GaAs infrared emitting diode emitter, which is optically coupled to a silicon photodarlington detector, and is incorporated in a plastic DIP-4 package.

It features a high current transfer ratio, low coupling capacitance, and high isolation voltage.

The coupling device is designed for signal transmission between two electrically separated circuits.

APPLICATIONS

- Telecom
- Industrial controls
- Battery powered equipment
- Office machines
- Programmable controllers

AGENCY APPROVALS

- UL
- cUL
- CQC

ORDERING INFORMATION

S	F	H	6	1	9	A	-	X	0	0	#	T
PART NUMBER								PACKAGE OPTION				TAPE AND REEL

AGENCY CERTIFIED / PACKAGE	CTR (%)
UL, BSI, FIMKO	**≥ 1000**
DIP-4	SFH619A
SMD-4, option 7	SFH619A-X007T (1)
SMD-4, option 9	SFH619A-X009T (1)

Notes

- Additional options may be possible, please contact sales office

(1) Also available in tubes; do not put T on the end

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
INPUT				
Reverse voltage		V_R	6	V
Forward current		I_F	50	mA
Power dissipation		P_{diss}	70	mW
OUTPUT				
Collector emitter voltage		V_{CEO}	300	V
Emitter collector voltage		V_{ECO}	0.3	V
Collector current		I_C	125	mA
Power dissipation		P_{diss}	150	mW
COUPLER				
Total power dissipation		P_{tot}	200	mW
Storage temperature		T_{stg}	-55 to +125	°C
Operating temperature		T_{amb}	-55 to +100	°C
Soldering temperature	t = 10 s	T_{sld}	260	°C

Note

- Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability

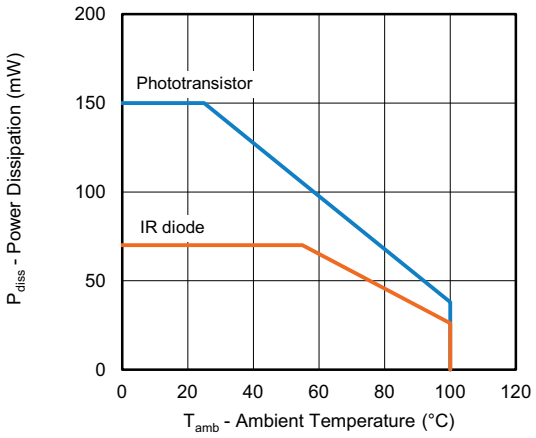


Fig. 1 - Power Dissipation vs. Ambient Temperature

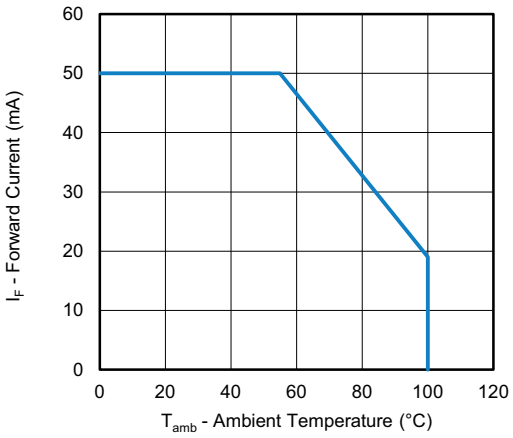


Fig. 2 - Maximum Forward Current vs. Ambient Temperature

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT						
Forward voltage	I_F = 10 mA	V_F	-	1.2	1.5	V
Reverse current	V_R = 6 V	I_R	-	0.02	10	µA
Capacitance	V_R = 0 V	C_I	-	30	-	pF
OUTPUT						
Collector emitter breakdown voltage	I_{CE} = 100 µA	BV_{CEO}	300	-	-	V
Emitter collector breakdown voltage	I_{EC} = 100 µA	BV_{ECO}	0.3	-	-	V
Collector emitter leakage current	V_{CE} = 200 V, T_{amb} = 25 °C	I_{CEO}	-	10	200	nA
	V_{CE} = 200 V, T_{amb} = 100 °C	I_{CEO}	-	-	20	µA
COUPLER						
Collector emitter saturation voltage	I_F = 1 mA, I_C = 10 mA	V_{CEsat}	-	-	1	V
Coupling capacitance	V_{I-O} = 0 V, f = 1 MHz	C_{IO}	-	0.6	-	pF

Note

- Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements

CURRENT TRANSFER RATIO						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
I_C/I_F	I_F = 1 mA, V_{CE} = 1 V	CTR	1000	-	-	%

SWITCHING CHARACTERISTICS						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Turn-on time	V_{CC} = 10 V, I_F = 5 mA, R_L = 100 Ω	t_{on}	-	6.5	-	µs
Turn-off time	V_{CC} = 10 V, I_F = 5 mA, R_L = 100 Ω	t_{off}	-	72	-	µs

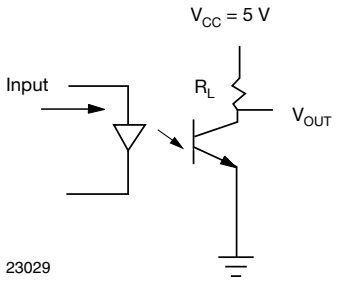


Fig. 3 - Test Circuit for Switching Characteristics

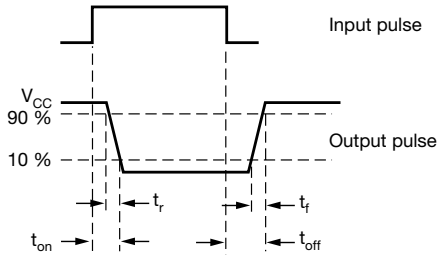


Fig. 4 - Parameter and Limit Definition

SAFETY AND INSULATION RATINGS				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Climatic classification	According to IEC 68 part 1		55 / 115 / 21	
Pollution degree	According to DIN VDE 0109		2	
Comparative tracking index	Insulation group IIIa	CTI	175	
Maximum rated withstanding isolation voltage	According to UL1577, t = 1 min	V_{ISO}	5000	V_{RMS}
Maximum transient isolation voltage	According to DIN EN 60747-5-5	V_{IOTM}	8000	V_{peak}
Maximum repetitive peak isolation voltage	According to DIN EN 60747-5-5	V_{IORM}	890	V_{peak}
Isolation resistance	V_{IO} = 500 V, T_{amb} = 25 °C	R_{IO}	≥ 10^{12}	Ω
	V_{IO} = 500 V, T_{amb} = 100 °C	R_{IO}	≥ 10^{11}	Ω
Output safety power		P_{SO}	700	mW
Input safety current		I_{SI}	400	mA
Input safety temperature		T_S	175	°C
Creepage distance			≥ 7	mm
Clearance distance			≥ 7	mm
Insulation thickness		DTI	≥ 0.4	mm

Note

- As per IEC 60747-5-5, § 7.4.3.8.2, this optocoupler is suitable for “safe electrical insulation” only within the safety ratings. Compliance with the safety ratings shall be ensured by means of protective circuits.

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

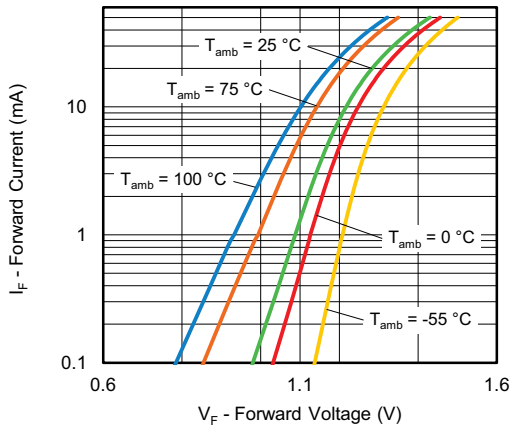


Fig. 5 - Forward Current vs. Forward Voltage

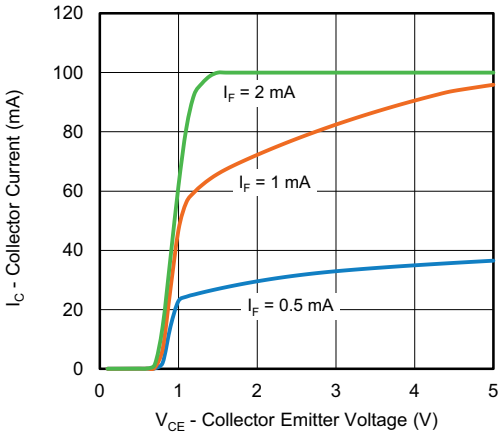


Fig. 6 - Collector Current vs. Collector Emitter Voltage (non-saturated)

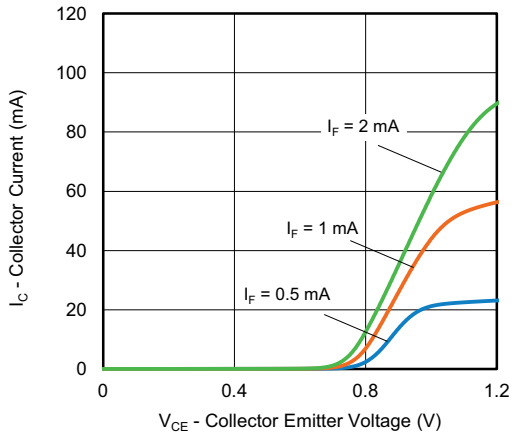


Fig. 7 - Collector Current vs. Collector Emitter Voltage (saturated)

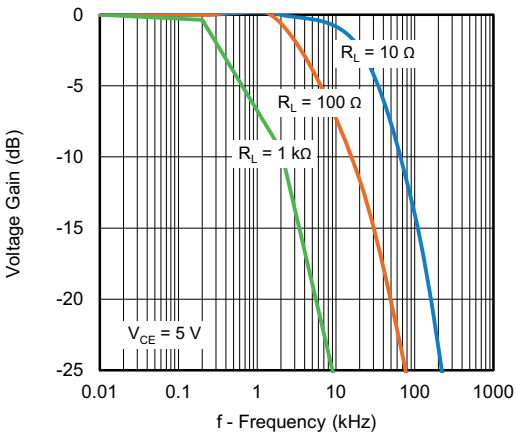


Fig. 10 - Voltage Gain vs. Frequency

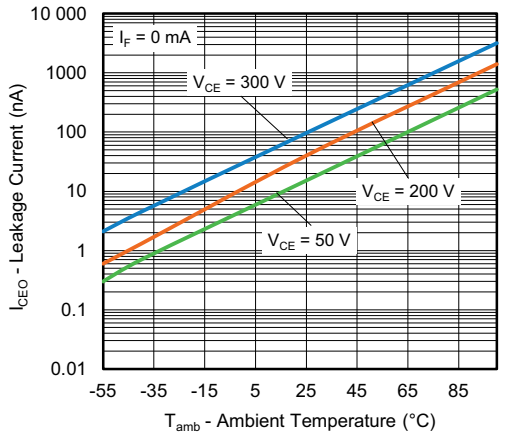


Fig. 8 - Leakage Current vs. Ambient Temperature

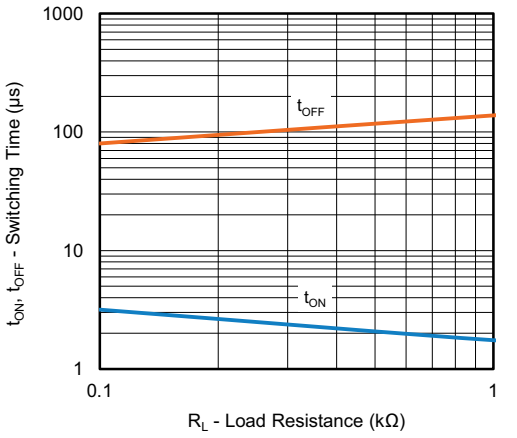


Fig. 11 - Switching Time vs. Load Resistance

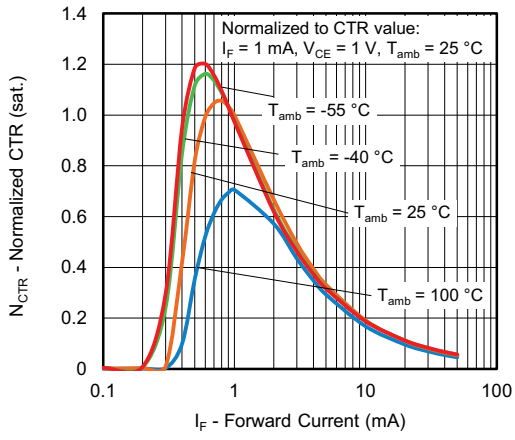
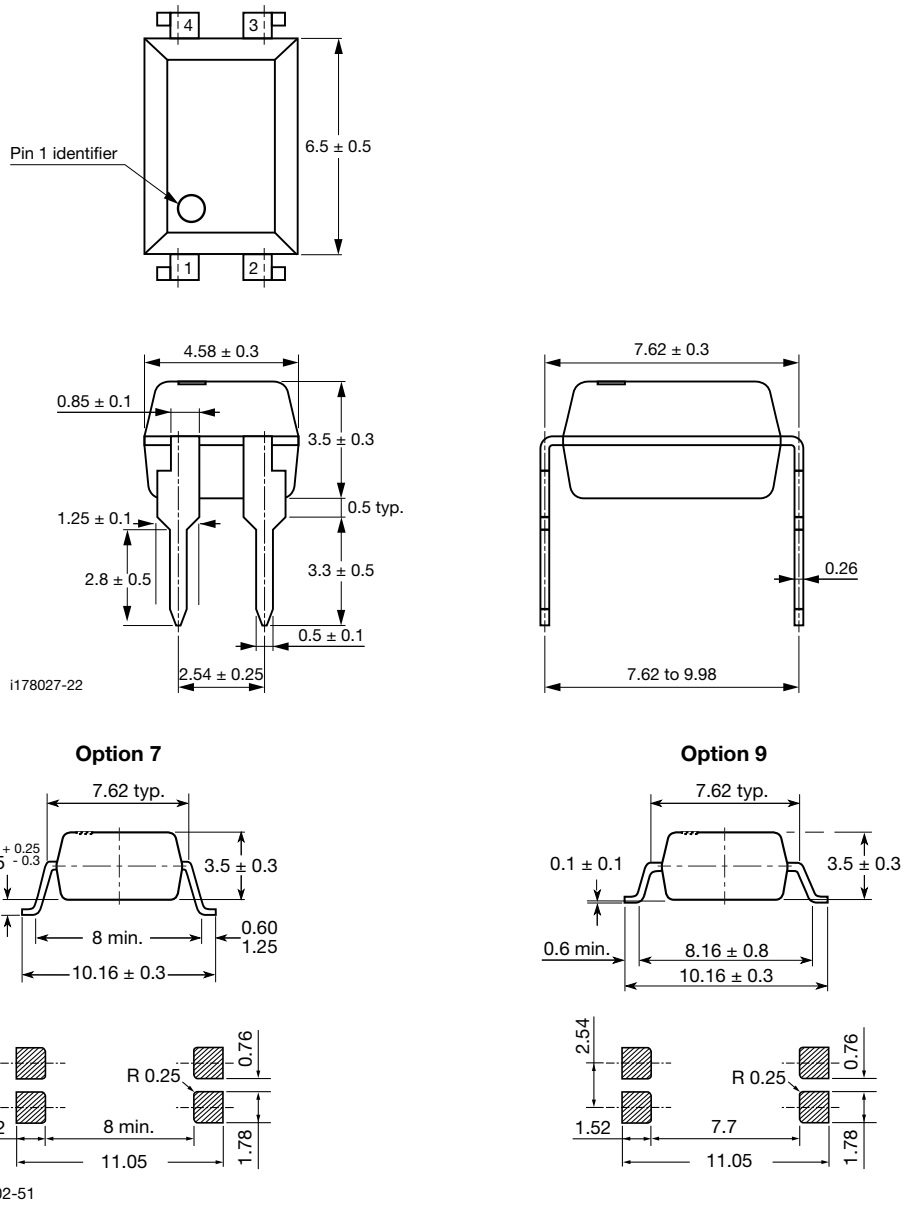


Fig. 9 - Normalized CTR vs. Forward Current

PACKAGE DIMENSIONS in millimeters

4 Pin Package



PACKAGE MARKING

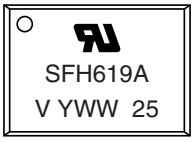


Fig. 12 - Example of SFH619A

Note

- Tape and reel suffix (T) is not part of the package marking

PACKAGING INFORMATION

DEVICES PER TUBE			
TYPE	**UNITS/TUBE**	**TUBES/BOX**	**UNITS/BOX**
DIP-4	100	40	4000
SMD-4, option 7	100	40	4000
SMD-4, option 9	100	40	4000

DIP-4 Tube

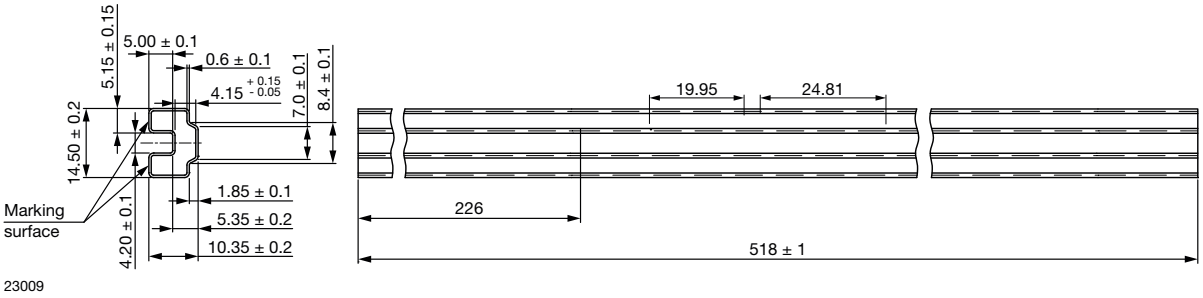


Fig. 13 - Tube

SMD-4 Tape

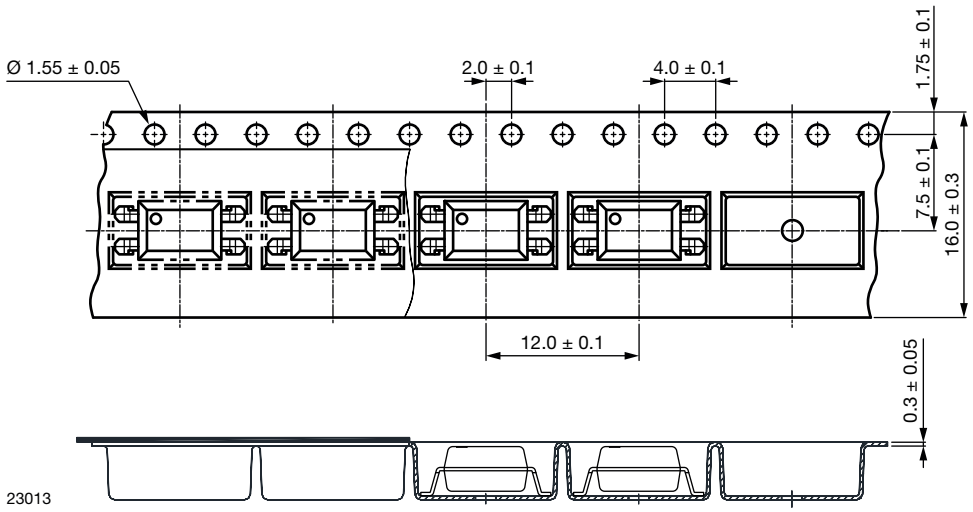


Fig. 14 - Tape and Reel Packaging (1000 pieces on reel)

Reel

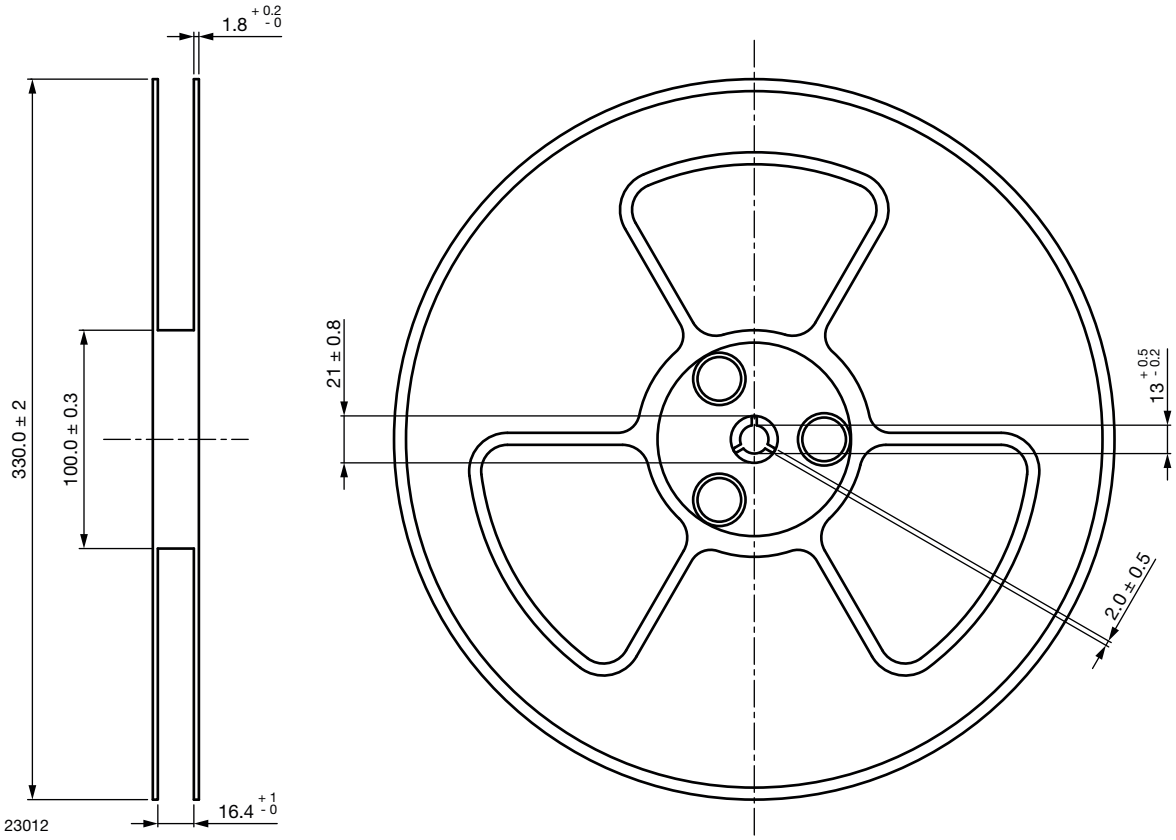


Fig. 15 - Tape and Reel Shipping Medium

SOLDER PROFILES

IR Reflow Soldering (JEDEC® J-STD-020C compliant)

One time soldering reflow is recommended within the condition of temperature and time profile shown below. Do not solder more than three times.

PROFILE ITEM	CONDITIONS
Preheat	
- Temperature minimum ($T_{S\ min.}$)	150 °C
- Temperature maximum ($T_{S\ max.}$)	200 °C
- Time (min. to max.) (t_S)	90 s ± 30 s
Soldering zone	
- Temperature (T_L)	217 °C
- Time (t_L)	60 s
Peak temperature (T_p)	260 °C
Ramp-up rate	3 °C/s max.
Ramp-down rate	3 °C/s to 6 °C/s

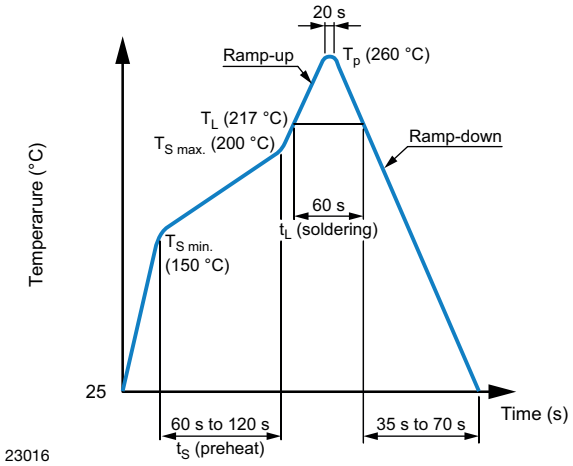


Fig. 16

Wave Soldering (JEDEC JESD22-A111 compliant)

One time soldering is recommended within the condition of temperature.

Temperature: 260 °C + 0 °C / - 5 °C

Time: 10 s

Preheat temperature: 25 °C to 140 °C

Preheat time: 30 s to 80 s

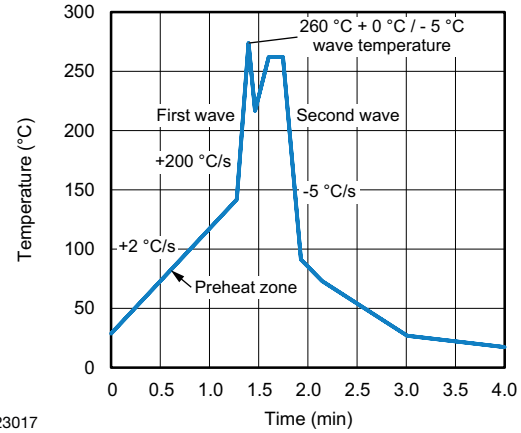


Fig. 17

Hand Soldering by Soldering Iron

Allow single lead soldering in every single process. One time soldering is recommended.

Temperature: 380 °C + 0 °C / - 5 °C

Time: 3 s max.

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