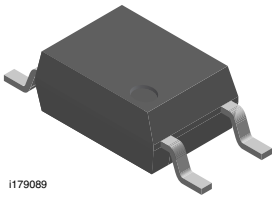
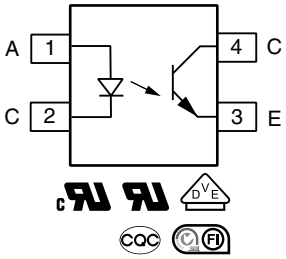
Low Input Current, Phototransistor Output, SOP-4, Mini-Flat Package





FEATURES

- Operating temperature from -55 °C to +110 °C
- SOP-4 mini-flat package
- Isolation test voltage, 3750 V_{RMS}
- Low saturation voltage
- Fast switching times
- Low coupling capacitance
- End-stackable, 0.100" (2.54 mm) spacing
- CTR range 50 % to 600 %, I_F = 5 mA
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE GREEN (5-2008)

LINKS TO ADDITIONAL RESOURCES

3D Models | Design Tools | Related Documents

DESCRIPTION

The 110 °C rated VOM617A has a GaAs infrared emitting diode emitter, which is optically coupled to a silicon planar phototransistor detector, and is incorporated in a 4 pin 100 mil lead pitch miniflat package. It features a high current transfer ratio, low coupling capacitance, and high isolation voltage.

These coupling devices are designed for signal transmission between two electrically separated circuits.

APPLICATIONS

- PLCs
- Telecommunication
- Lighting control system
- Solar inverters
- AC drives

AGENCY APPROVALS

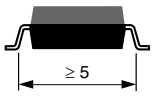
(All parts are certified under base model VOM617A)

- UL1577
- cUL
- DIN EN 60747-5-5 (VDE 0884-5), available with option 1
- CQC
- FIMKO

ORDERING INFORMATION

V	O	M	6	1	7	A	-	#	X	0	0	1	T	#
PART NUMBER								CTR BIN	VDE OPTION				TAPE AND REEL	

SOP-4



AGENCY CERTIFIED/ PACKAGE	CTR (%) 5 mA							
UL, cUL, FIMKO, CQC	**50 to 600**	**63 to 125**	**100 to 200**	**160 to 320**	**250 to 500**	**80 to 160**	**130 to 260**	**200 to 400**
SOP-4, mini-flat	VOM617AT	VOM617A-2T	VOM617A-3T	VOM617A-4T	VOM617A-6T	VOM617A-7T	VOM617A-8T	VOM617A-9T
VDE, UL, cUL, FIMKO, CQC (option 1)	**50 to 600**	**63 to 125**	**100 to 200**	**160 to 320**	**250 to 500**	**80 to 160**	**130 to 260**	**200 to 400**
SOP-4, mini-flat	VOM617A-X001T	VOM617A-2X001T	VOM617A-3X001T	VOM617A-4X001T	VOM617A-6X001T	VOM617A-7X001T	VOM617A-8X001T, VOM617A-8X001T2 (1)	VOM617A-9X001T

Notes

- Available only on tape and reel

(1) Product is rotated 180° in tape and reel cavity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
INPUT				
DC forward current		I_F	60	mA
Reverse voltage		V_R	6	V
Power dissipation		P_{diss}	70	mW
Surge forward current	$t_p \leq 10$ µs	I_{FSM}	2.5	A
OUTPUT				
Collector emitter voltage		V_{CEO}	80	V
Emitter collector voltage		V_{ECO}	7	V
Collector current		I_C	50	mA
	$t_p \leq 1$ ms		100	mA
Power dissipation		P_{diss}	150	mW
COUPLER				
Total power dissipation		P_{tot}	170	mW
Operating temperature range		T_{amb}	-55 to +110	°C
Storage temperature range		T_{stg}	-55 to +150	°C
Junction temperature		T_j	125	°C
Soldering temperature [1]		T_{sld}	260	°C

Notes

- 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

(2) See “Assembly Instructions” for surface mounted devices (www.vishay.com/doc?80054)

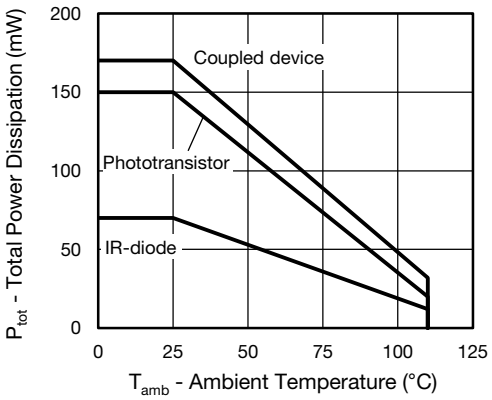


Fig. 1 - Total Power Dissipation vs. Ambient Temperature

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT						
Forward voltage	I_F = 5 mA	V_F	-	1.1	1.6	V
Reverse current	V_R = 6 V	I_R	-	0.01	10	µA
Capacitance	V_R = 0 V, f = 1 MHz	C_j	-	9	-	pF
OUTPUT						
Collector emitter leakage current	V_{CE} = 20 V	I_{CEO}	-	0.3	100	nA
Collector emitter breakdown voltage	I_C = 100 µA	BV_{CEO}	80	-	-	V
Emitter collector breakdown voltage	I_E = 10 µA	BV_{ECO}	7	-	-	V
Collector emitter capacitance	V_{CE} = 5 V, f = 1 MHz	C_{CE}	-	2.8	-	pF
COUPLER						
Coupling capacitance	f = 1 MHz	C_{IO}	-	0.3	-	pF
Collector emitter saturation voltage	I_F = 10 mA, I_C = 2.5 mA	V_{CEsat}	-	0.12	0.4	V
Cut-off frequency	I_F = 10 mA, V_{CC} = 5 V, R_L = 100 Ω	f_{ctr}	-	110	-	kHz

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 (T_{amb} = 25 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
I_C/I_F	I_F = 5 mA, V_{CE} = 5 V	VOM617A	CTR	50	-	600	%
		VOM617A-2	CTR	63	-	125	%
		VOM617A-3	CTR	100	-	200	%
		VOM617A-4	CTR	160	-	320	%
		VOM617A-6	CTR	250	-	500	%
		VOM617A-7	CTR	80	-	160	%
		VOM617A-8	CTR	130	-	260	%
		VOM617A-9	CTR	200	-	400	%

SWITCHING CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
NON-SATURATED						
Rise and fall time	I_C = 2 mA, V_{CC} = 5 V, R_L = 100 Ω	t_r	-	3	-	µs
Fall time		t_f	-	3	-	µs
Turn-on time		t_{on}	-	6	-	µs
Turn-off time		t_{off}	-	4	-	µs
SATURATED						
Rise and fall time	I_F = 1.6 mA, V_{CC} = 5 V, R_L = 1.9 kΩ	t_r	-	7	-	µs
Fall time		t_f	-	12	-	µs
Turn-on time		t_{on}	-	9	-	µs
Turn-off time		t_{off}	-	15	-	µs

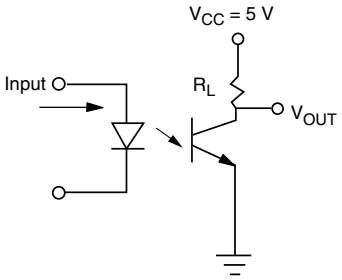


Fig. 2 - Test Circuit

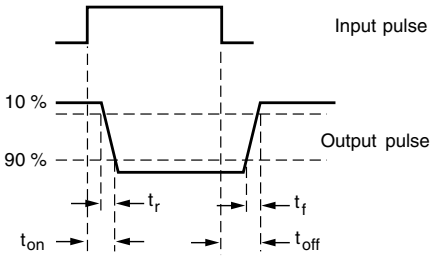


Fig. 3 - Test Circuit and Waveforms

SAFETY AND INSULATION RATINGS				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Climatic classification	According to IEC 68 part 1		55 / 110 / 21	
Pollution degree	According to DIN VDE 0109		2	
Comparative tracking index		CTI	175	
Maximum rated withstanding isolation voltage	According to UL1577, t = 1 min	V_{ISO}	3750	V_{RMS}
Maximum transient isolation voltage	According to DIN EN 60747-5-5	V_{IOTM}	6000	V_{peak}
Maximum repetitive peak isolation voltage	According to DIN EN 60747-5-5	V_{IORM}	565	V_{peak}
Isolation resistance	V_{IO} = 500 V, T_{amb} = 25 °C	R_{IO}	$\geq 10^{12}$	Ω
	V_{IO} = 500 V, T_{amb} = 100 °C	R_{IO}	$\geq 10^{11}$	Ω
Output safety power		P_{SO}	300	mW
Input safety current		I_{SI}	200	mA
Input safety temperature		T_S	175	°C
Creepage distance			≥ 5	mm
Clearance distance			≥ 5	mm
Insulation thickness		DTI	≥ 0.4	mm

Note

- As per DIN EN 60747-5-5 (VDE 0884), § 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)

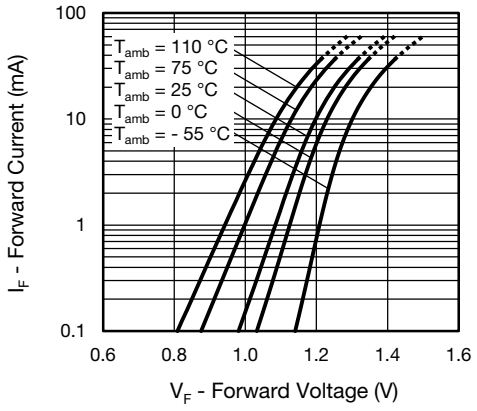


Fig. 4 - Forward Voltage vs. Forward Current

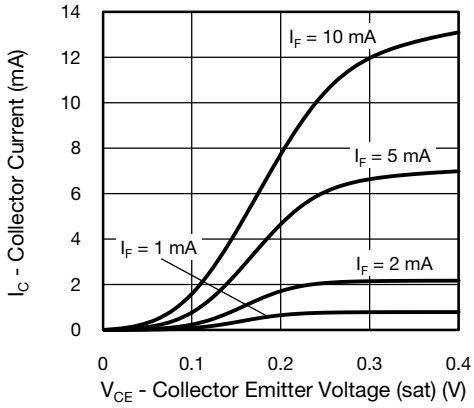


Fig. 7 - Collector Current vs. Collector Emitter Voltage (saturated)

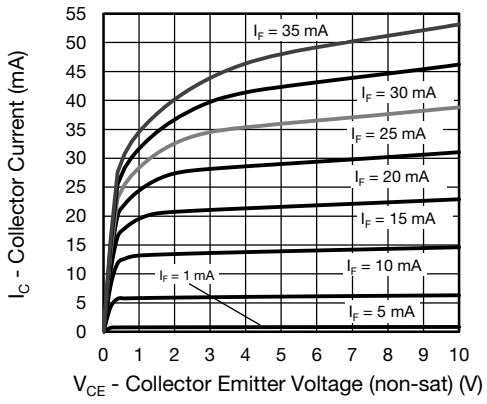


Fig. 5 - Collector Current vs. Collector Emitter Voltage (non-saturated)

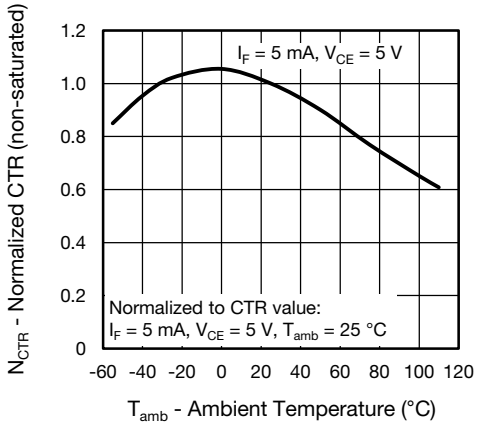


Fig. 8 - Normalized Current Transfer Ratio (non-saturated) vs. Ambient Temperature

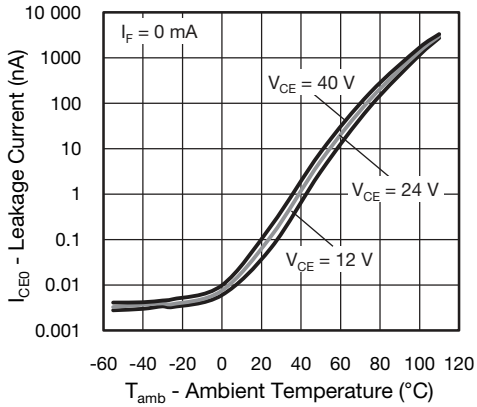


Fig. 6 - Leakage Current vs. Ambient Temperature

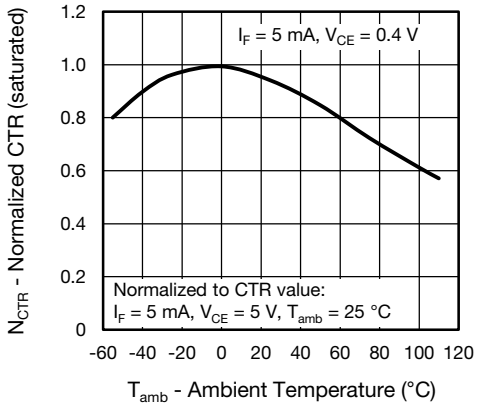


Fig. 9 - Normalized Current Transfer Ratio (saturated) vs. Ambient Temperature

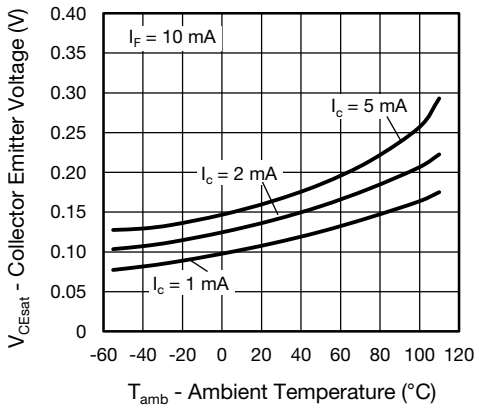


Fig. 10 - Collector Emitter Voltage vs. Ambient Temperature (saturated)

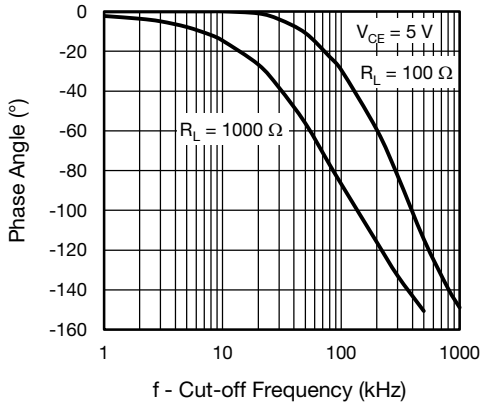


Fig. 13 - F_{CTR} vs. Phase Angle

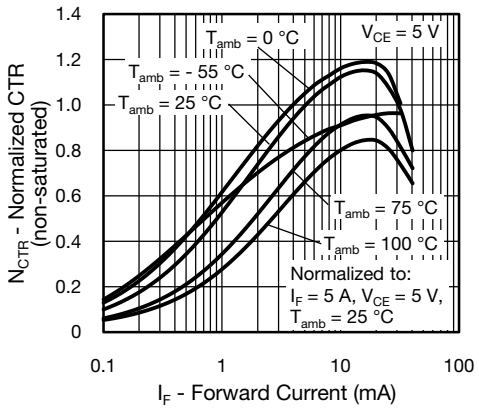


Fig. 11 - Normalized CTR (non-saturated) vs. Forward Current

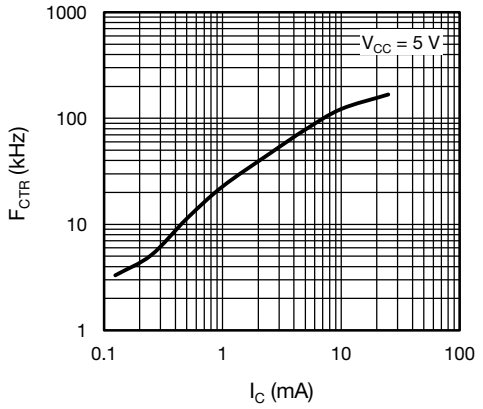


Fig. 14 - F_{CTR} vs. Collector Current

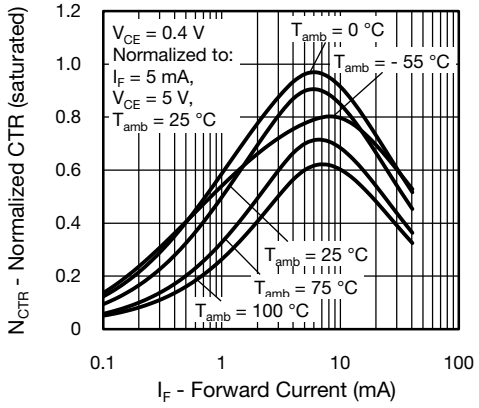


Fig. 12 - Normalized CTR (saturated) vs. Forward Current

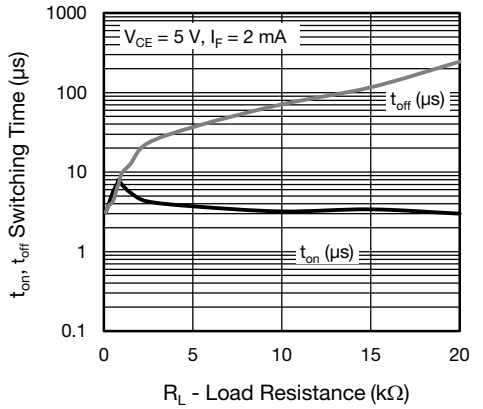
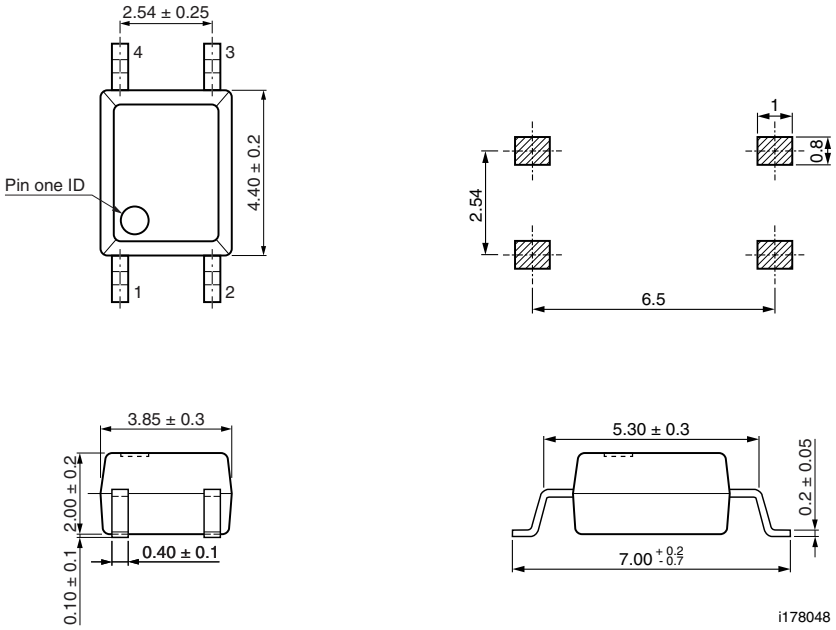
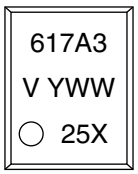


Fig. 15 - Switching Time vs. Load Resistance

PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING (example of VOM617A-3X001T)



Notes

- Only option 1 is reflected in the package marking with the characters “X”
- Tape and reel suffix (T) is not part of the package marking

TAPE AND REEL DIMENSIONS in millimeters

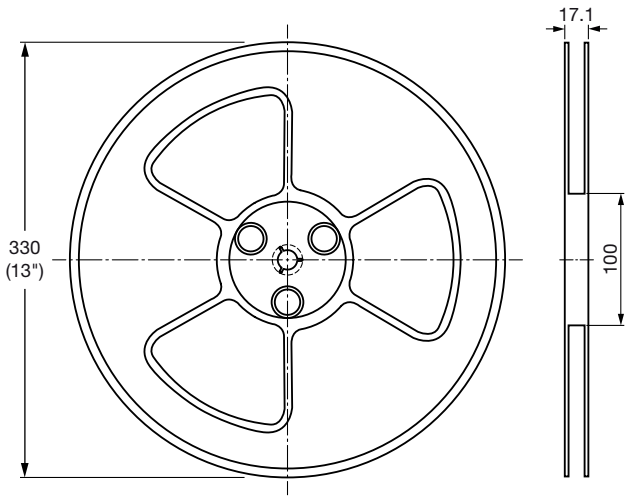


Fig. 16 - Reel Dimensions (3000 units per reel)

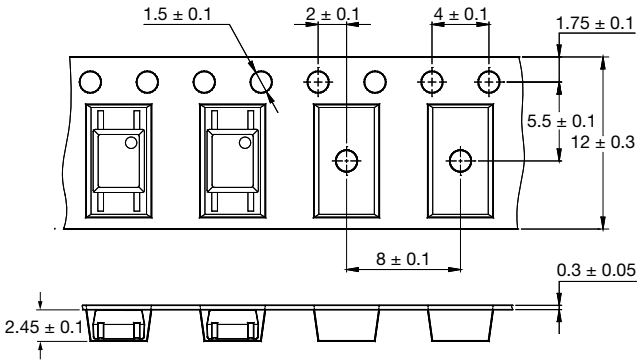


Fig. 17 - Tape Dimensions

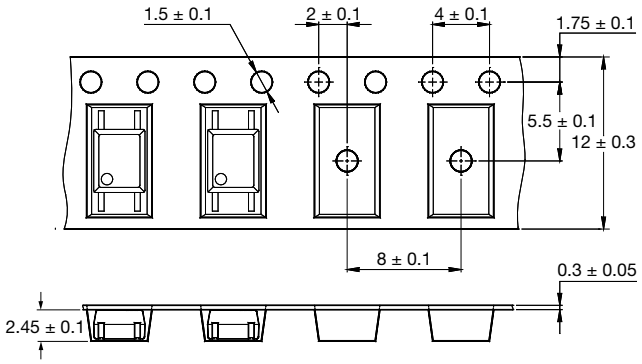


Fig. 18 - Tape Dimensions for 180° Rotation (T2)

SOLDER PROFILE

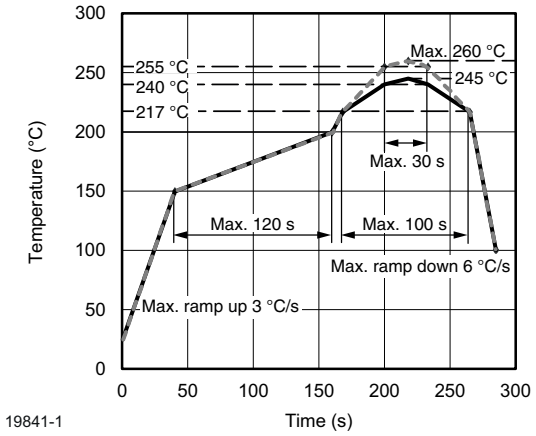


Fig. 19 - Lead (Pb)-free Reflow Solder Profile
According to J-STD-020

HANDLING AND STORAGE CONDITIONS

ESD level: HBM class 2

Floor life: unlimited

Conditions: T_{amb} < 30 °C, RH < 85 %

Moisture sensitivity level 1, according to J-STD-020

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