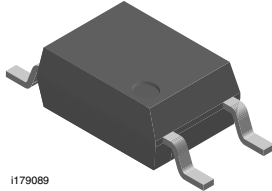




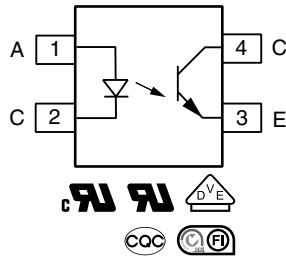
**THE DATASHEET OF  
VOM617A-9T**



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



1179089



### 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.

### FEATURES

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



**RoHS**  
COMPLIANT  
**HALOGEN**  
**FREE**  
**GREEN**  
(5-2008)

### 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																																					
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <table border="1" style="border-collapse: collapse;"> <tr> <td>V</td><td>O</td><td>M</td><td>6</td><td>1</td><td>7</td><td>A</td><td>-</td><td>#</td><td>X</td><td>0</td><td>0</td><td>1</td><td>T</td><td>#</td> </tr> <tr> <td colspan="7">PART NUMBER</td> <td>CTR BIN</td> <td colspan="3">VDE OPTION</td> <td colspan="3">TAPE AND REEL</td> </tr> </table> </div> <div style="text-align: center;"> <p>SOP-4 ≥ 5</p> </div> </div>									V	O	M	6	1	7	A	-	#	X	0	0	1	T	#	PART NUMBER							CTR BIN	VDE OPTION			TAPE AND REEL		
V	O	M	6	1	7	A	-	#	X	0	0	1	T	#																							
PART NUMBER							CTR BIN	VDE OPTION			TAPE AND REEL																										
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 <sup>(1)</sup>	VOM617A-9X001T																													

### Notes

- Available only on tape and reel
- <sup>(1)</sup> Product is rotated 180° in tape and reel cavity



ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>INPUT</b>				
DC forward current		I <sub>F</sub>	60	mA
Reverse voltage		V <sub>R</sub>	6	V
Power dissipation		P <sub>diss</sub>	70	mW
Surge forward current	t <sub>p</sub> ≤ 10 μs	I <sub>FSM</sub>	2.5	A
<b>OUTPUT</b>				
Collector emitter voltage		V <sub>CEO</sub>	80	V
Emitter collector voltage		V <sub>ECO</sub>	7	V
Collector current		I <sub>C</sub>	50	mA
	t <sub>p</sub> ≤ 1 ms		100	mA
Power dissipation		P <sub>diss</sub>	150	mW
<b>COUPLER</b>				
Total power dissipation		P <sub>tot</sub>	170	mW
Operating temperature range		T <sub>amb</sub>	-55 to +110	°C
Storage temperature range		T <sub>stg</sub>	-55 to +150	°C
Junction temperature		T <sub>j</sub>	125	°C
Soldering temperature <sup>(1)</sup>		T <sub>slid</sub>	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
- See "Assembly Instructions" for surface mounted devices ([www.vishay.com/doc?80054](http://www.vishay.com/doc?80054))

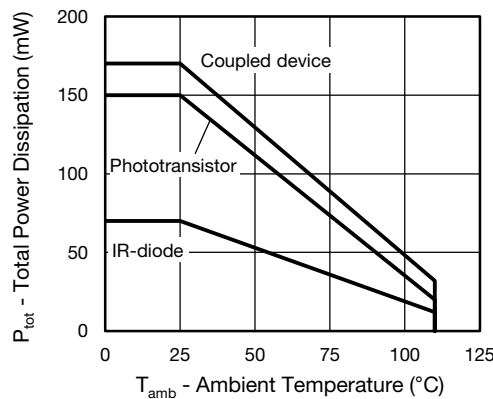


Fig. 1 - Total Power Dissipation vs. Ambient Temperature



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

<b>CURRENT TRANSFER RATIO</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
$I_C/I_F$	$I_F = 5\text{ mA}$ , $V_{CE} = 5\text{ V}$	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	%

<b>SWITCHING CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>NON-SATURATED</b>						
Rise and fall time	$I_C = 2\text{ mA}$ , $V_{CC} = 5\text{ V}$ , $R_L = 100\text{ }\Omega$	$t_r$	-	3	-	$\mu\text{s}$
Fall time		$t_f$	-	3	-	$\mu\text{s}$
Turn-on time		$t_{on}$	-	6	-	$\mu\text{s}$
Turn-off time		$t_{off}$	-	4	-	$\mu\text{s}$
<b>SATURATED</b>						
Rise and fall time	$I_F = 1.6\text{ mA}$ , $V_{CC} = 5\text{ V}$ , $R_L = 1.9\text{ k}\Omega$	$t_r$	-	7	-	$\mu\text{s}$
Fall time		$t_f$	-	12	-	$\mu\text{s}$
Turn-on time		$t_{on}$	-	9	-	$\mu\text{s}$
Turn-off time		$t_{off}$	-	15	-	$\mu\text{s}$

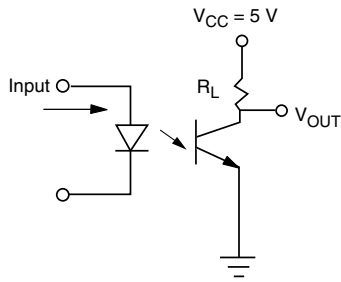


Fig. 2 - Test Circuit

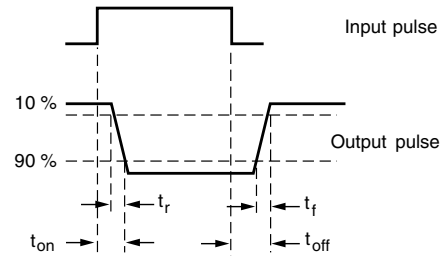


Fig. 3 - Test Circuit and Waveforms

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	$V_{IO} = 500\text{ V}, T_{amb} = 25\text{ }^{\circ}\text{C}$	$R_{IO}$	$\geq 10^{12}$	$\Omega$
	$V_{IO} = 500\text{ V}, T_{amb} = 100\text{ }^{\circ}\text{C}$	$R_{IO}$	$\geq 10^{11}$	$\Omega$
Output safety power		$P_{SO}$	300	mW
Input safety current		$I_{SI}$	200	mA
Input safety temperature		$T_S$	175	$^{\circ}\text{C}$
Creepage distance			$\geq 5$	mm
Clearance distance			$\geq 5$	mm
Insulation thickness		DTI	$\geq 0.4$	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** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

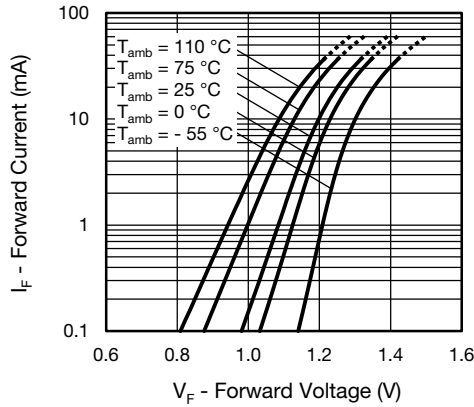


Fig. 4 - Forward Voltage vs. Forward Current

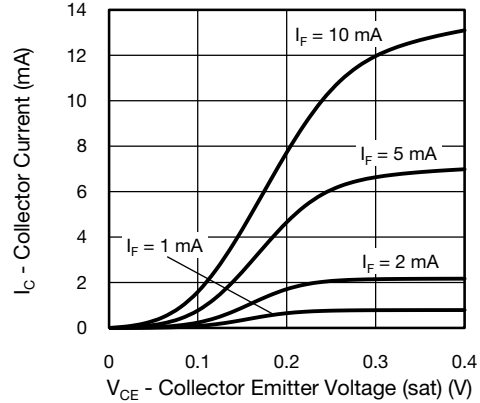


Fig. 7 - Collector Current vs. Collector Emitter Voltage (saturated)

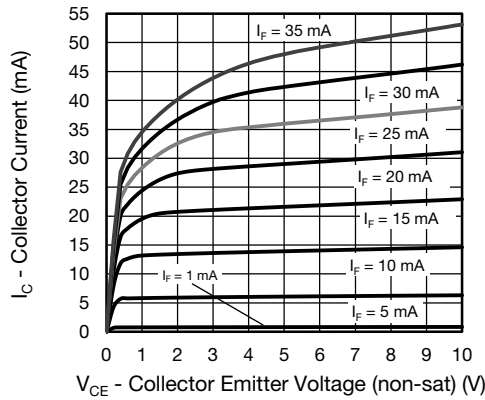


Fig. 5 - Collector Current vs. Collector Emitter Voltage (non-saturated)

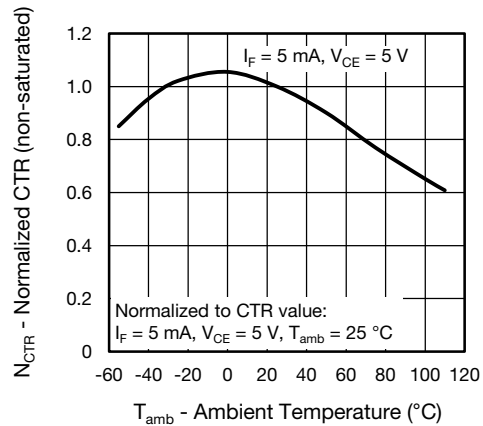


Fig. 8 - Normalized Current Transfer Ratio (non-saturated) vs. Ambient Temperature

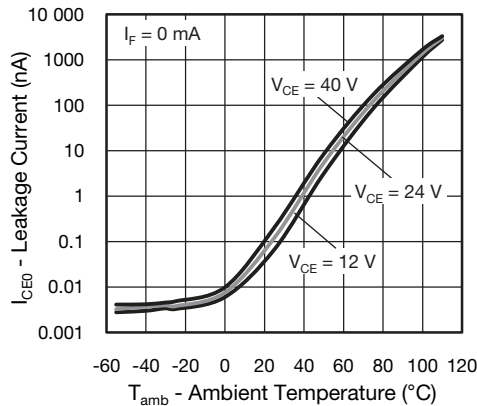


Fig. 6 - Leakage Current vs. Ambient Temperature

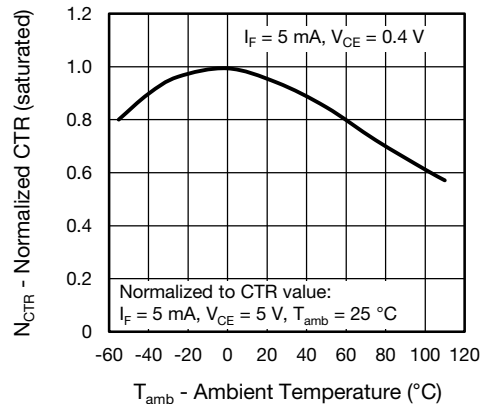


Fig. 9 - Normalized Current Transfer Ratio (saturated) vs. Ambient Temperature

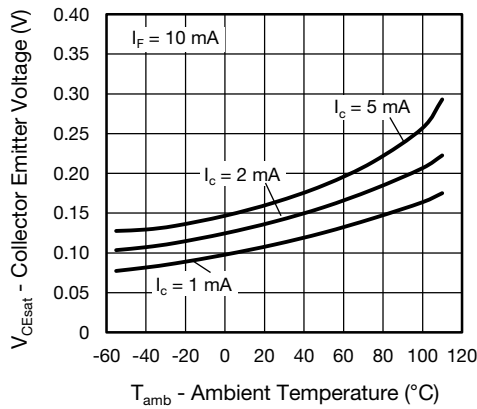


Fig. 10 - Collector Emitter Voltage vs. Ambient Temperature (saturated)

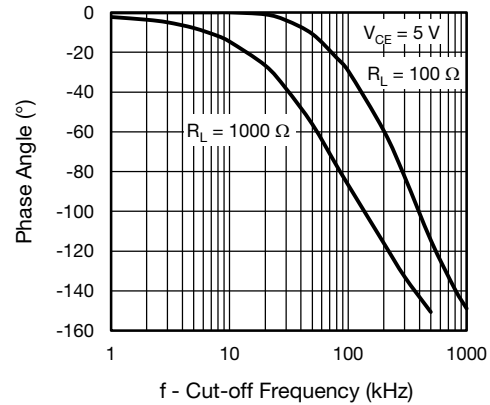


Fig. 13 -  $F_{CTR}$  vs. Phase Angle

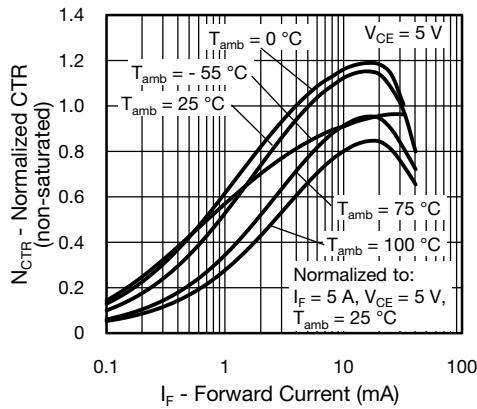


Fig. 11 - Normalized CTR (non-saturated) vs. Forward Current

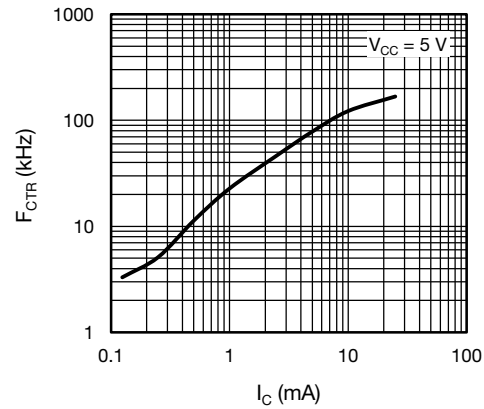


Fig. 14 -  $F_{CTR}$  vs. Collector Current

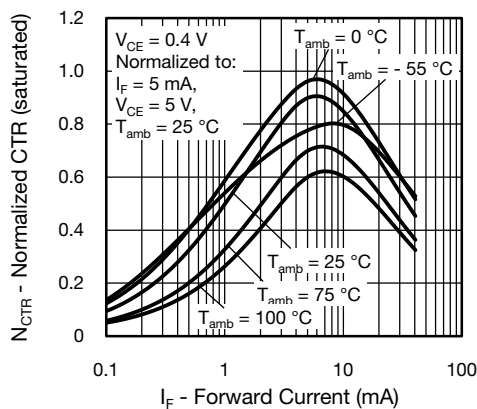


Fig. 12 - Normalized CTR (saturated) vs. Forward Current

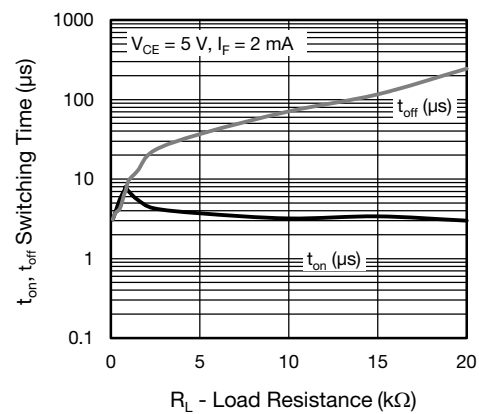
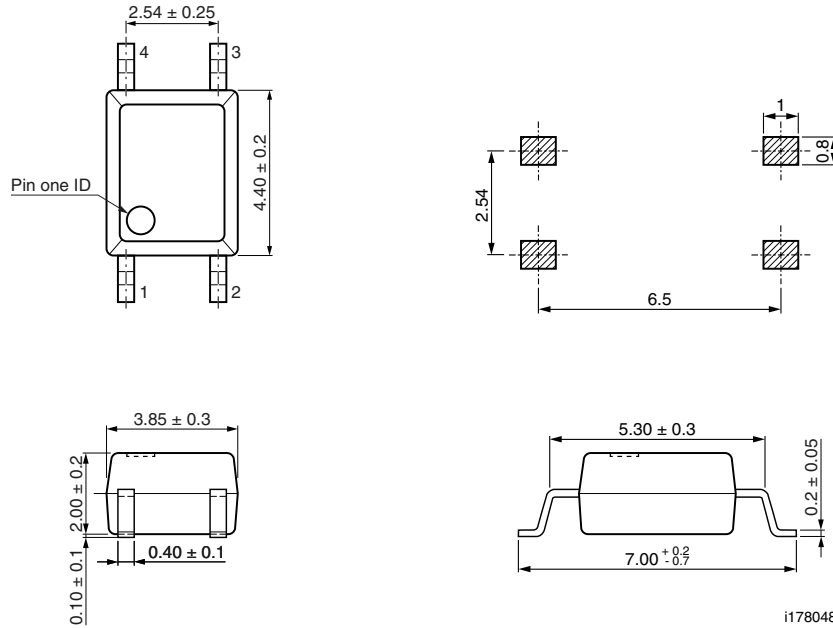


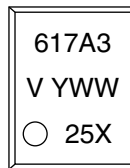
Fig. 15 - Switching Time vs. Load Resistance

**PACKAGE DIMENSIONS** in millimeters



i178048

**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

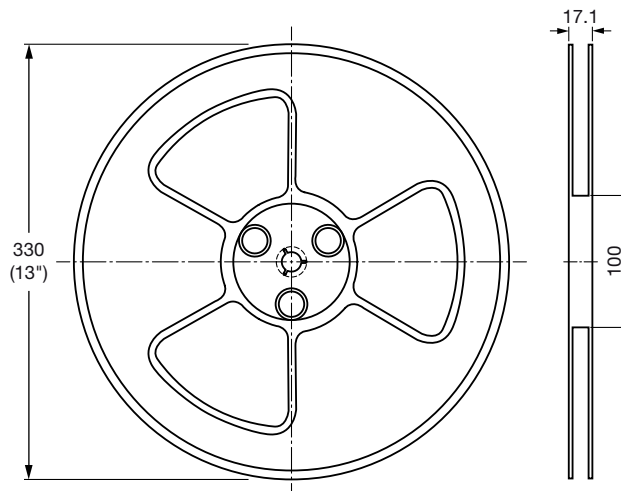


Fig. 16 - Reel Dimensions (3000 units per reel)

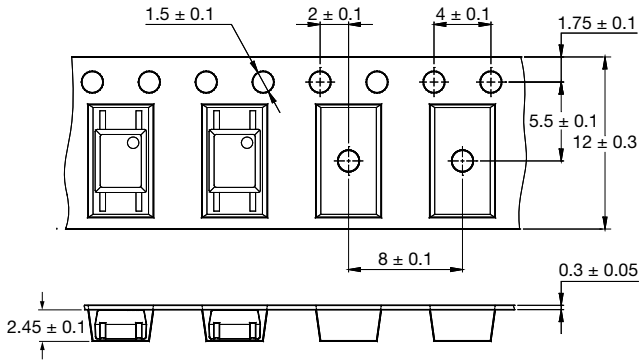


Fig. 17 - Tape Dimensions

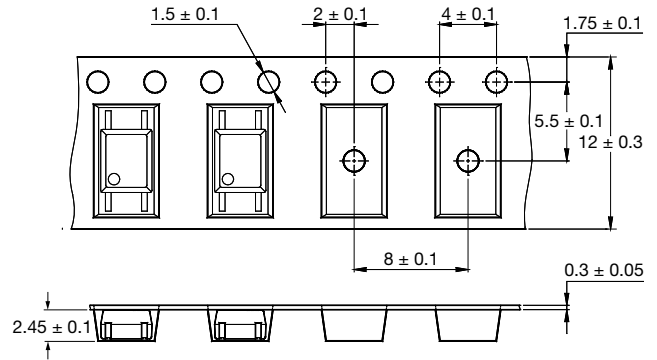


Fig. 18 - Tape Dimensions for 180° Rotation (T2)

**SOLDER PROFILE**

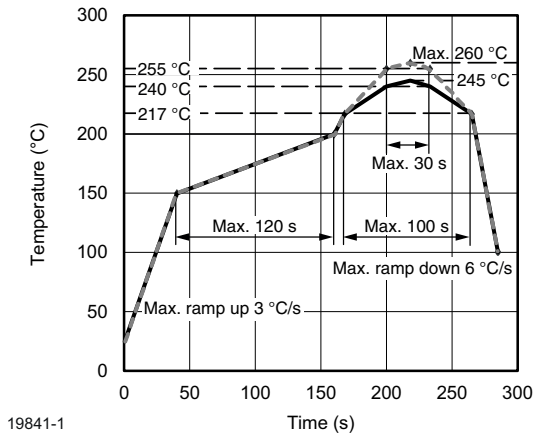


Fig. 19 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020

**HANDLING AND STORAGE CONDITIONS**

ESD level: HBM class 2

Floor life: unlimited

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

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



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