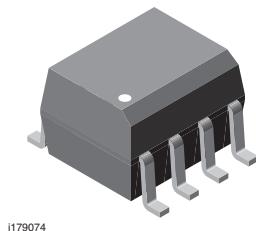
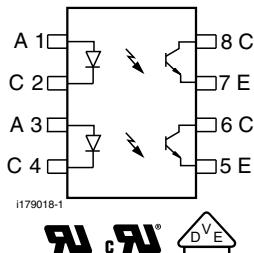


## Optocoupler, Phototransistor Output, Dual Channel, SOIC-8 Package



i179074


*i179018-1*
**SPICE**

Models



Footprints


**RoHS**  
COMPLIANT

### FEATURES

- Dual channel coupler
- SOIC-8 surface mountable package
- Standard lead spacing of 0.05"
- Available only on tape and reel option (conforms to EIA standard 481-2)
- Isolation test voltage, 4000 V<sub>RMS</sub>
- Compatible with dual wave, vapor phase and IR reflow soldering
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

### LINKS TO ADDITIONAL RESOURCES



Product Page



Design Tools



3D Models

**SPICE**

Models



Footprints



Schematics

### DESCRIPTION

The VOD205T, VOD206T, VOD207T, VOD211T, VOD213T, VOD217T are optically coupled pairs with a GaAs infrared LED and a silicon NPN phototransistor. Signal information, including a DC level, can be transmitted by the device while maintaining a high degree of electrical isolation between input and output.

### AGENCY APPROVALS

- [UL](#)
- [cUL](#)
- [DIN EN 60747-5-5 \(VDE 0884-5\)](#), approved, contact customer service if this option is required

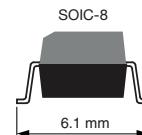
### ORDERING INFORMATION








PART NUMBER



#### AGENCY CERTIFIED / PACKAGE

#### CTR (%)

UL, cUL, VDE, CQC	40 to 80	63 to 125	100 to 200	> 20	> 100 <sup>(1)</sup>	> 100 <sup>(2)</sup>
SOIC-8	VOD205T	VOD206T	VOD207T	VOD211T	VOD213T	VOD217T

#### Notes

- Additional options may be possible, please contact sales office.

<sup>(1)</sup> I<sub>F</sub> = 10 mA

<sup>(2)</sup> I<sub>F</sub> = 1 mA

<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25^{\circ}\text{C}$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>INPUT</b>				
Peak reverse voltage		$V_R$	6	V
Peak pulsed current	1 $\mu\text{s}$ , 300 pps	$I_{FM}$	1	A
Continuous forward current per channel		$I_F$	30	mA
Power dissipation		$P_{diss}$	50	mW
Derate linearly from 25 $^{\circ}\text{C}$			0.66	mW/ $^{\circ}\text{C}$
<b>OUTPUT</b>				
Collector emitter breakdown voltage		$BV_{CEO}$	70	V
Emitter collector breakdown voltage		$BV_{ECO}$	7	V
Continuous output current		$I_{Cmax.}$	50	mA
Power dissipation per channel		$P_{diss}$	125	mW
Derate linearly from 25 $^{\circ}\text{C}$			1.67	mW/ $^{\circ}\text{C}$
<b>COUPLER</b>				
Isolation test voltage	$t = 1\text{ s}$	$V_{ISO}$	4000	V <sub>RMS</sub>
Total package dissipation ambient (2 LEDs and 2 detectors, 2 channels)		$P_{tot}$	300	mW
Derate linearly from 25 $^{\circ}\text{C}$			4	mW/ $^{\circ}\text{C}$
Storage temperature		$T_{stg}$	-40 to +150	$^{\circ}\text{C}$
Operating temperature		$T_{amb}$	-40 to +100	$^{\circ}\text{C}$
Soldering time from 260 $^{\circ}\text{C}$ <sup>(1)</sup>		$T_{sld}$	10	s

**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.

<sup>(3)</sup> Refer to reflow profile for soldering conditions for surface mounted devices

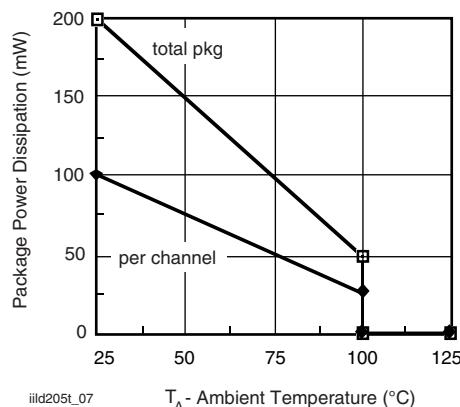


Fig. 1 - Power Dissipation vs. Ambient Temperature

<b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25^\circ C$ , unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>							
Forward voltage	$I_F = 10 \text{ mA}$		$V_F$	-	1.2	1.55	V
Reverse current	$V_R = 6 \text{ V}$		$I_R$	-	0.1	100	$\mu\text{A}$
Capacitance	$V_R = 0 \text{ V}$		$C_O$	-	25	-	pF
<b>OUTPUT</b>							
Collector emitter breakdown voltage	$I_C = 100 \mu\text{A}$		$BV_{CEO}$	70	-	-	V
Emitter collector breakdown voltage	$I_E = 100 \mu\text{A}$		$BV_{ECO}$	7	-	-	V
Collector emitter leakage current	$V_{CE} = 10 \text{ V}, I_F = 0 \text{ A}$		$I_{CEO}$	-	5	50	nA
Collector emitter capacitance	$V_{CE} = 0 \text{ V}$		$C_{CE}$	-	10	-	pF
Collector emitter saturation voltage	$I_F = 10 \text{ mA}, I_C = 2.5 \text{ mA}$		$V_{CEsat}$	-	-	0.4	V
<b>COUPLER</b>							
Capacitance (input to output)			$C_{IO}$	-	0.5	-	pF

**Note**

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

<b>CURRENT TRANSFER RATIO</b>							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
$I_C/I_F$	$V_{CE} = 5 \text{ V}, I_F = 10 \text{ mA}$	VOD205T	$CTR_{DC}$	40	-	80	%
		VOD206T	$CTR_{DC}$	63	-	125	%
		VOD207T	$CTR_{DC}$	100	-	200	%
		VOD211T	$CTR_{DC}$	20	-	-	%
		VOD213T	$CTR_{DC}$	100	-	-	%
	$V_{CE} = 5 \text{ V}, I_F = 1 \text{ mA}$	VOD205T	$CTR_{DC}$	13	30	-	%
		VOD206T	$CTR_{DC}$	22	45	-	%
		VOD207T	$CTR_{DC}$	34	70	-	%
		VOD217T	$CTR_{DC}$	100	120	-	%

<b>SWITCHING CHARACTERISTICS</b>							
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT	
Turn-on time	$I_C = 2 \text{ mA}, R_L = 100 \Omega, V_{CC} = 5 \text{ V}$	$t_{on}$	-	5	-	$\mu\text{s}$	
Turn-off time	$I_C = 2 \text{ mA}, R_L = 100 \Omega, V_{CC} = 5 \text{ V}$	$t_{off}$	-	4	-	$\mu\text{s}$	
Rise time	$I_C = 2 \text{ mA}, R_L = 100 \Omega, V_{CC} = 5 \text{ V}$	$t_r$	-	5	-	$\mu\text{s}$	
Fall time	$I_C = 2 \text{ mA}, R_L = 100 \Omega, V_{CC} = 5 \text{ V}$	$t_f$	-	4	-	$\mu\text{s}$	

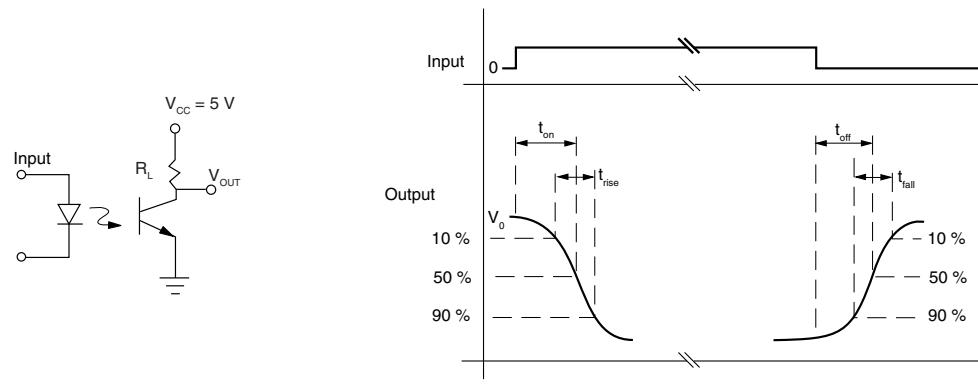


Fig. 2 - Switching Test Circuit

**COMMON MODE TRANSIENT IMMUNITY**

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Common mode transient immunity at logic high	$V_{CM} = 1000 \text{ V}_{P-P}$ , $R_L = 1 \text{ k}\Omega$ , $I_F = 0 \text{ mA}$	$ C_{MH} $	-	10 000	-	$\text{V}/\mu\text{s}$
Common mode transient immunity at logic low	$V_{CM} = 1000 \text{ V}_{P-P}$ , $R_L = 1 \text{ k}\Omega$ , $I_F = 10 \text{ mA}$	$ C_{ML} $	-	10 000	-	$\text{V}/\mu\text{s}$

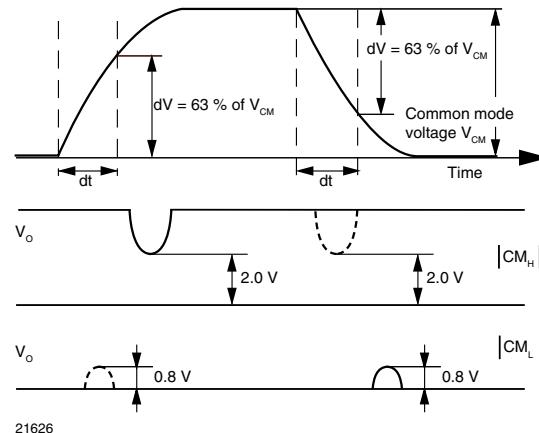
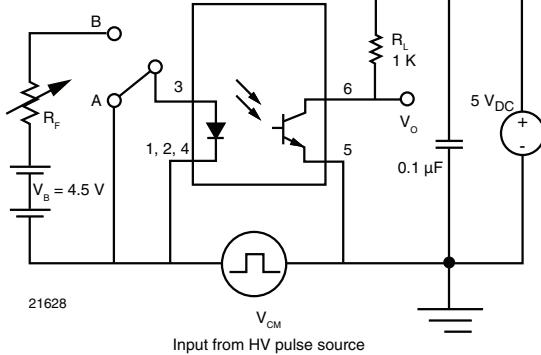


Fig. 3 - Test Circuit for Common Mode Transient Immunity

**SAFETY AND INSULATION RATINGS ( $T_{amb} = 25 \text{ }^{\circ}\text{C}$ , unless otherwise specified)**

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Climatic classification	According to IEC 68 part 1		40 / 100 / 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, $t = 1 \text{ min}$	$V_{ISO}$	3333	$\text{V}_{RMS}$
Tested withstanding isolation voltage	According to UL1577, $t = 1 \text{ s}$	$V_{ISO}$	4000	$\text{V}_{RMS}$
Maximum transient isolation voltage	According to DIN EN 60747-5-5	$V_{IOTM}$	6000	$\text{V}_{peak}$
Maximum repetitive peak isolation voltage	According to DIN EN 60747-5-5	$V_{IORM}$	560	$\text{V}_{peak}$
Isolation resistance	$T_{amb} = 25 \text{ }^{\circ}\text{C}$ , $V_{IO} = 500 \text{ V}$	$R_{IO}$	$\geq 10^{12}$	$\Omega$
	$T_{amb} = 100 \text{ }^{\circ}\text{C}$ , $V_{IO} = 500 \text{ V}$	$R_{IO}$	$\geq 10^{11}$	$\Omega$
Output safety power		$P_{SO}$	350	$\text{mW}$
Input safety current		$I_{SI}$	150	$\text{mA}$
Input safety temperature		$T_S$	165	$^{\circ}\text{C}$
Creepage distance			$\geq 4$	$\text{mm}$
Clearance distance			$\geq 4$	$\text{mm}$
Insulation thickness		$DTI$	$\geq 0.2$	$\text{mm}$

**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 ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified)

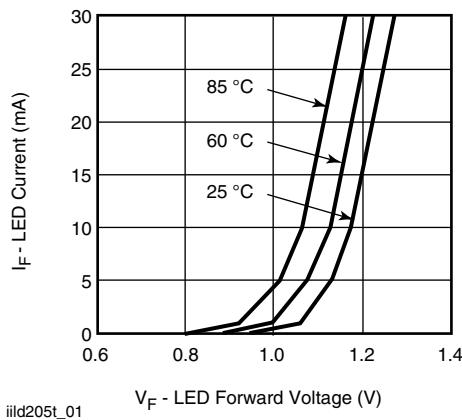


Fig. 4 - Forward Current vs. Forward Voltage

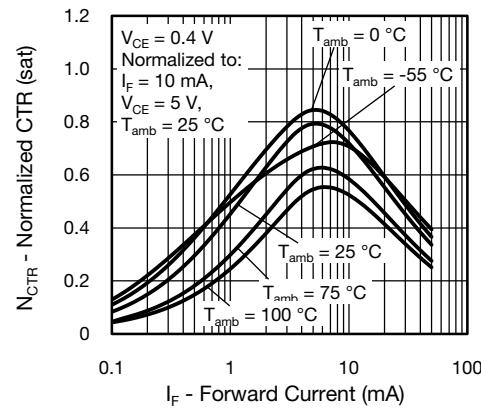


Fig. 7 - Normalized CTR (saturated) vs. Forward Current

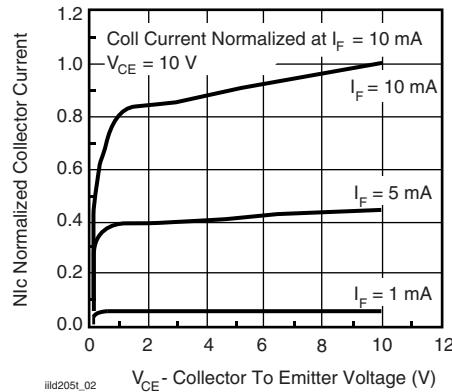


Fig. 5 - Collector Emitter Current vs.  $V_{CE}$

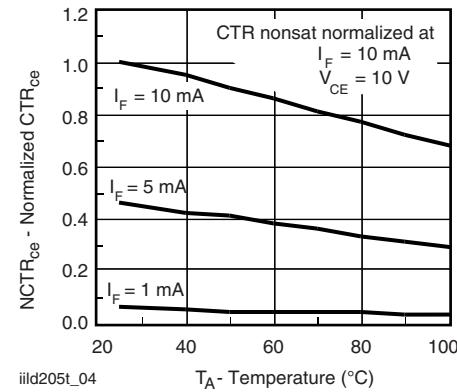


Fig. 8 - Current Transfer Ratio (normalized) vs. Ambient Temperature

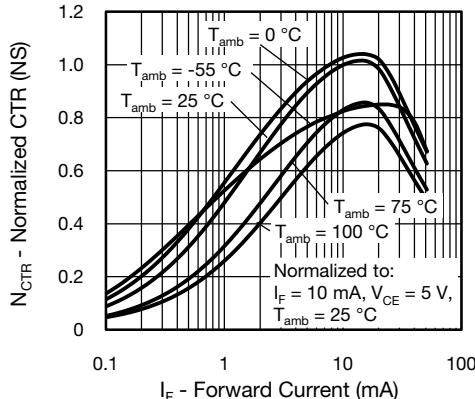


Fig. 6 - Normalized CTR (non-saturated) vs. Forward Current

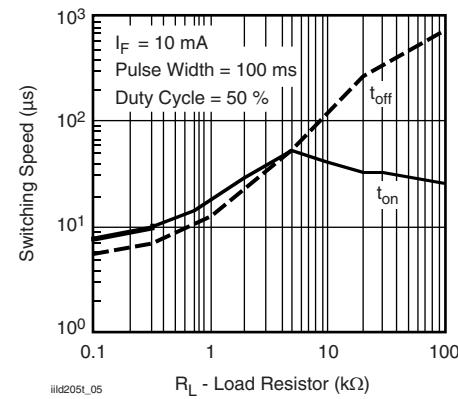


Fig. 9 - Switching Speed vs. Load Resistor

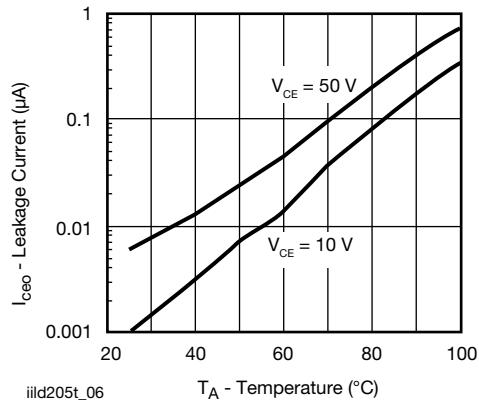
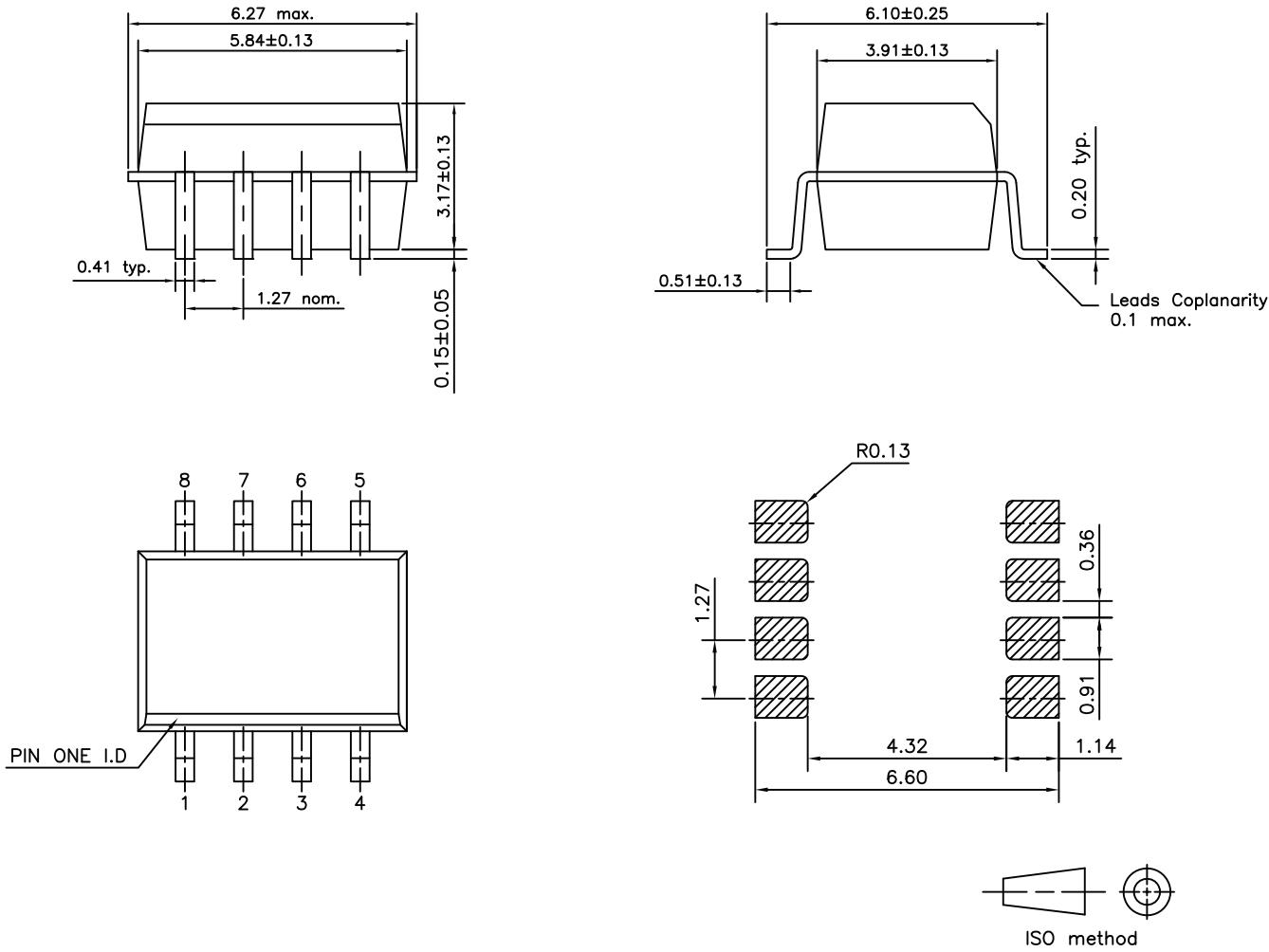
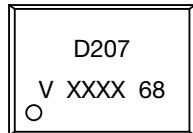


Fig. 10 - Collector Current vs. Ambient Temperature

#### PACKAGE DIMENSIONS (in millimeters)

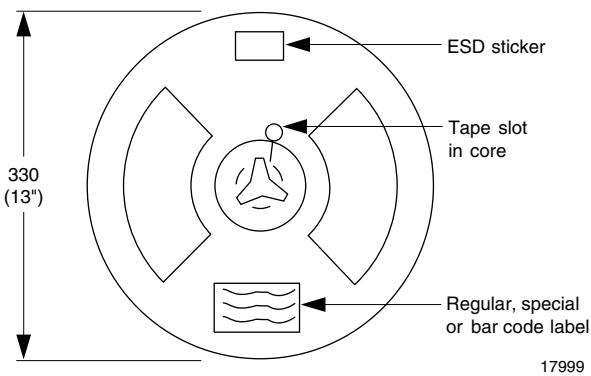


**PACKAGE MARKING** (example of VOD207T)

**Notes**

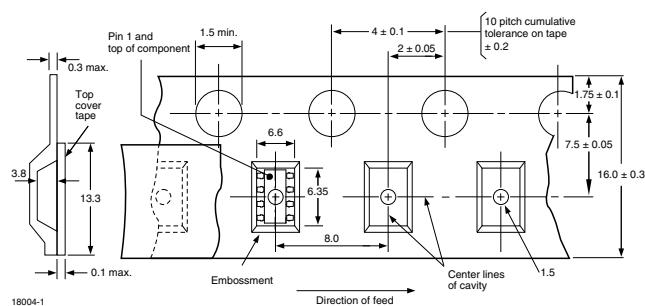
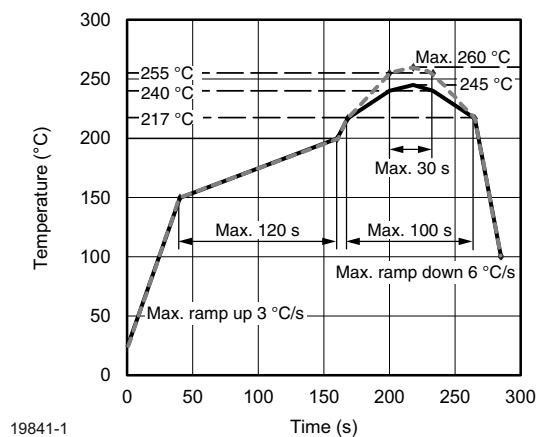
- XXXX = LMC (lot marking code)
- Tape and reel suffix (T) is not part of the package marking

**TAPE AND REEL PACKAGING**

Dimensions in millimeters



17999


**Fig. 12 - Tape Dimensions, 2000 Parts per Reel**
**SOLDER PROFILE**


19841-1

**Fig. 13 - Lead (Pb)-free Reflow Solder Profile**  
according to J-STD-020

**HANDLING AND STORAGE CONDITIONS**

ESD level: HBM class 2

Floor life: unlimited

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

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

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