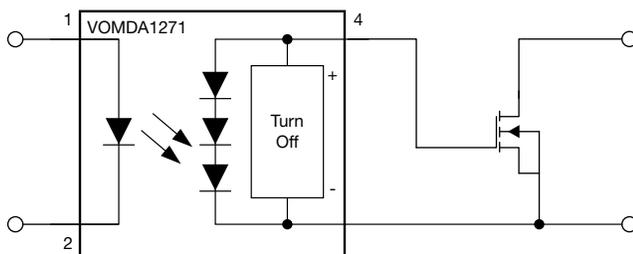
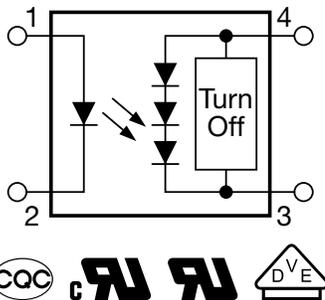
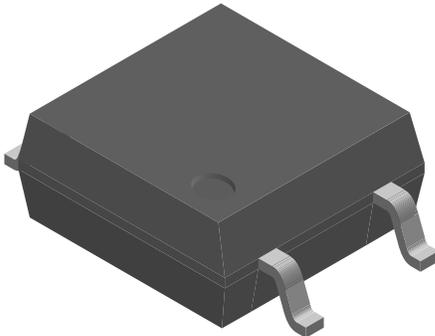


Automotive Photovoltaic MOSFET Driver With Integrated Fast Turn-Off



Single MOSFET Driver Application

DESCRIPTION

The VOMDA1271 is an automotive qualified optically isolated MOSFET driver. The VOMDA1271 obtains all the required current to drive its internal circuitry from the infrared emitter on the low voltage, primary side of the isolation barrier. No power supply is needed to provide V_{CC} . The VOMDA1271 features a turn-off circuit to achieve a fast turn off of the MOSFET.

FEATURES

- AEC-Q102 qualified
- Open circuit voltage of 8.5 V typical at $I_F = 10$ mA
- Short circuit current at 15 μ A typical at $I_F = 10$ mA
- Isolation test voltage 3750 V_{RMS}
- Operating temperature from -40 °C to $+125$ °C
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912

 AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

APPLICATIONS

- Automotive pre-charge relay
- Powerwall chargers
- Gate driver for High Voltage MOSFETs
- BMS
- Custom solid-state relays

AGENCY APPROVALS

- [UL](#)
- [cUL](#)
- [VDE](#)
- [CQC](#)

LINKS TO ADDITIONAL RESOURCES



ORDERING INFORMATION	
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">V</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">O</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">M</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">D</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">A</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">1</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">2</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">7</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">1</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">T</div> </div> <p style="text-align: center; margin-top: 5px;">PART NUMBER</p>	<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">T</div> TAPE AND REEL
<p style="text-align: center; margin-top: 5px;">SOP-4</p>	
PACKAGE	UL, cUL, VDE, CQC
SOP-4	VOMDA1271T

Note

- The product is available only on tape and reel

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
LED continuous forward current		I_F	50	mA
LED reverse voltage		V_R	5	V
Power dissipation		P_{diss}	80	mW
Power derating	$T_{amb} > 80\text{ }^{\circ}\text{C}$	$\Delta P_D / \Delta T_{amb}$	-1.3	mW/ $^{\circ}\text{C}$
MOSFET DRIVER				
Power dissipation		P_{diss}	2	mW
Ambient operating temperature range		T_{amb}	-40 to +125	$^{\circ}\text{C}$
Storage temperature range		T_{stg}	-40 to +150	$^{\circ}\text{C}$
Pin soldering temperature	$t = 10\text{ s}$	T_{sld}	260	$^{\circ}\text{C}$

Note

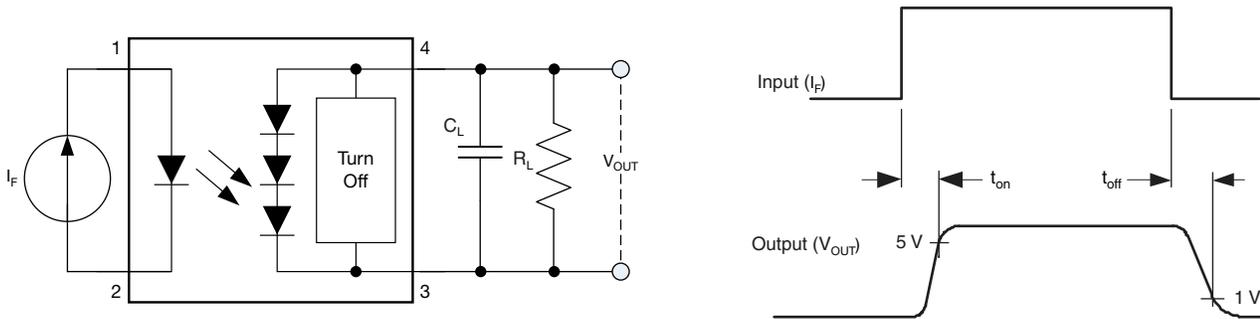
- Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods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

ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
LED forward voltage	$I_F = 10\text{ mA}$	V_F	1.3	1.4	1.5	V
Open circuit voltage	$I_F = 5\text{ mA}$	V_{OC}	-	8.2	-	V
	$I_F = 10\text{ mA}$	V_{OC}	6.5	8.5	-	V
	$I_F = 20\text{ mA}$	V_{OC}	-	8.8	-	V
	$I_F = 5\text{ mA}$	I_{SC}	-	7	-	μA
Short circuit current	$I_F = 10\text{ mA}$	I_{SC}	8	15	-	μA
	$I_F = 20\text{ mA}$	I_{SC}	-	35	-	μA

Note

- Minimum and maximum values are testing 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.

SWITCHING CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn-on time	$C_L = 200\text{ pF}$, $R_L = 10\text{ M}\Omega$, $I_F = 20\text{ mA}$, $P_W = 2\text{ ms}$, duty cycle = 50 %	t_{on}	-	32	-	μs
Turn-off time		t_{off}	-	80	-	μs

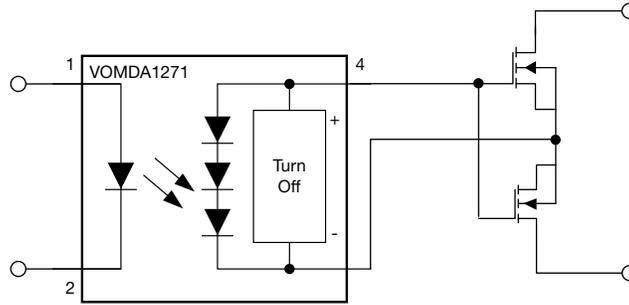

 Fig. 1 - t_{on} , t_{off} Test Circuit and Waveforms

SAFETY AND INSULATION RATINGS				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Climatic classification	According to IEC 68 part 1		40 / 125 / 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}	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}	707	V_{peak}
Isolation resistance	$T_{amb} = 125\text{ }^{\circ}\text{C}$, $V_{IO} = 500\text{ V}$	R_{IO}	$\geq 10^{12}$	Ω
	$T_{amb} = T_S$, $V_{IO} = 500\text{ V}$	R_{IO}	$\geq 10^{11}$	Ω
Output safety power		P_{SO}	350	mW
Input safety current		I_{SI}	150	mA
Input safety temperature		T_S	175	$^{\circ}\text{C}$
Creepage distance	SOP-4		≥ 5	mm
Clearance distance			≥ 5	mm
Input to output test voltage, method B	$V_{IORM} \times 1.875 = V_{PR}$, 100 % production test with $t_M = 1$ s, partial discharge < 5 pC	V_{PR}	1326	V_{peak}
Input to output test voltage, method A	$V_{IORM} \times 1.6 = V_{PR}$, 100 % production test with $t_M = 10$ s, partial discharge < 5 pC	V_{PR}	1131	V_{peak}

Note

- As per DIN EN 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.

APPLICATION EXAMPLES



Bidirectional MOSFET Driver Application

Fig. 2 - Typical MOSFET Driver Applications With Integrated Turn-Off Functionality

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

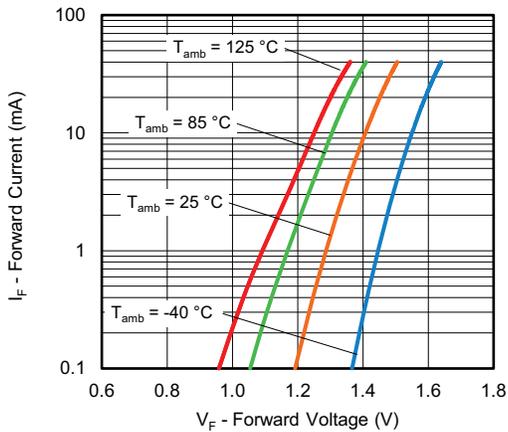


Fig. 3 - Forward Current vs. Forward Voltage

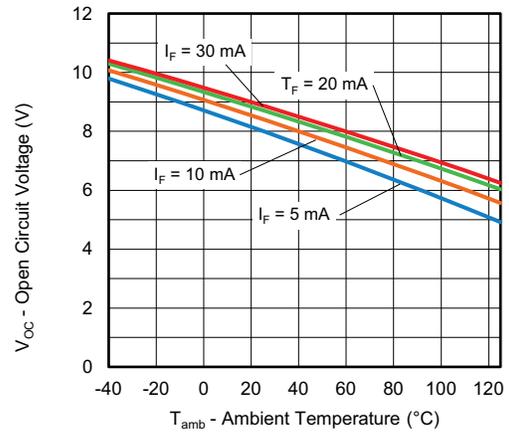


Fig. 5 - Open Circuit Voltage vs. Ambient Temperature

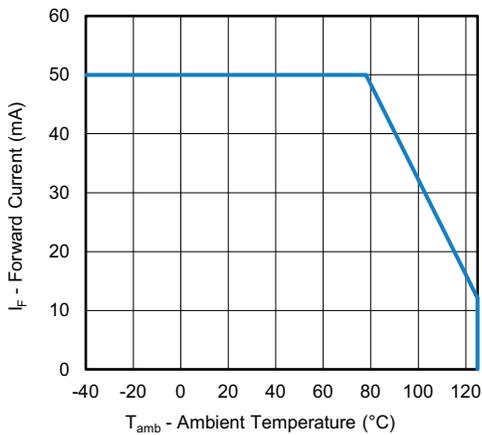


Fig. 4 - Forward Current vs. Ambient Temperature

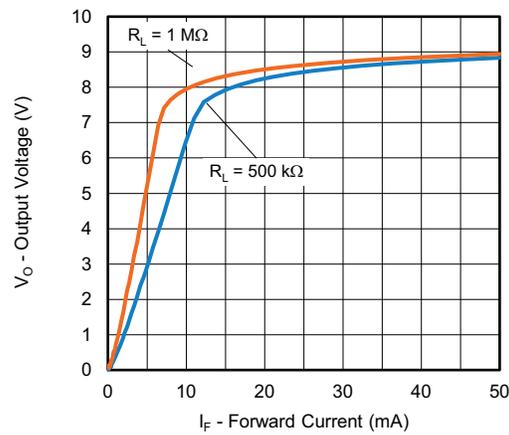


Fig. 6 - Output Voltage vs. Forward Current

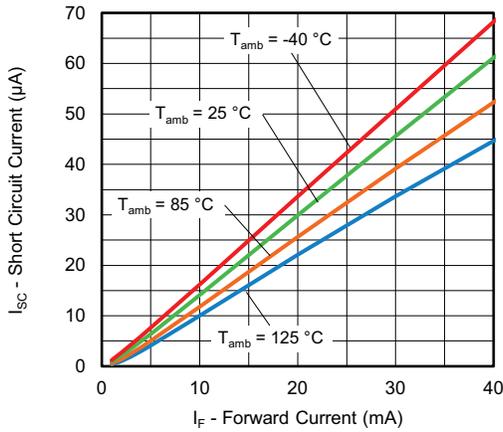


Fig. 7 - Short Circuit Current vs. Forward Current

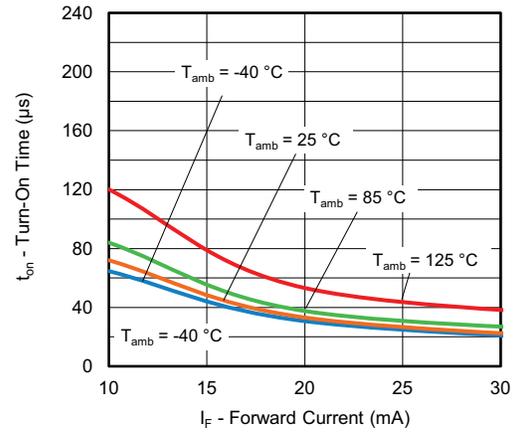


Fig. 10 - Turn-On Time vs. Forward Current

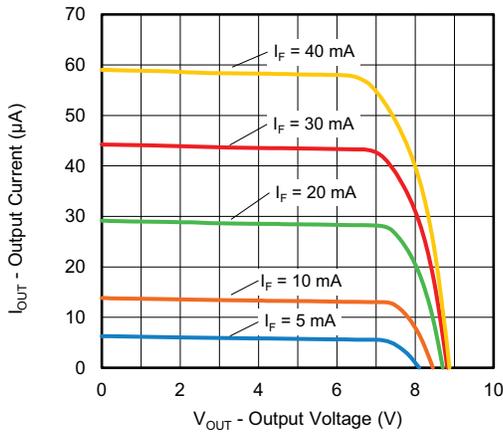


Fig. 8 - Output Current vs. Output Voltage

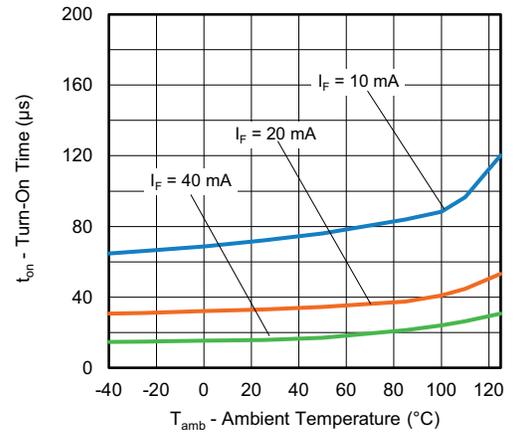


Fig. 11 - Turn-On Time vs. Ambient Temperature

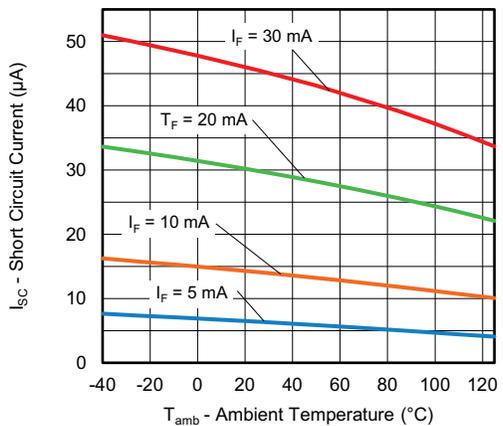


Fig. 9 - Short Circuit Current vs. Ambient Temperature

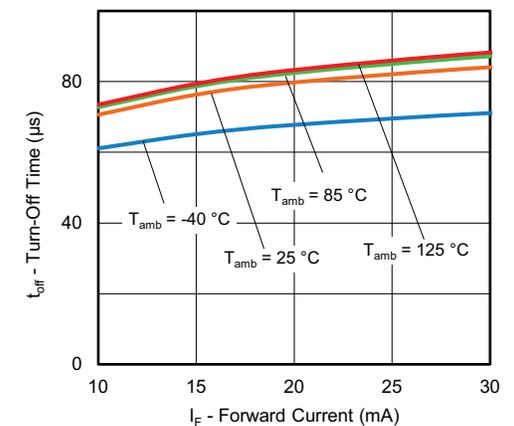


Fig. 12 - Turn-Off Time vs. Forward Current

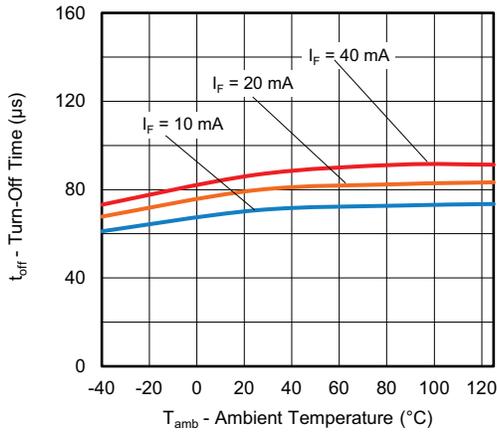


Fig. 13 - Turn-Off Time vs. Ambient Temperature

PACKAGE DIMENSIONS (in millimeters)

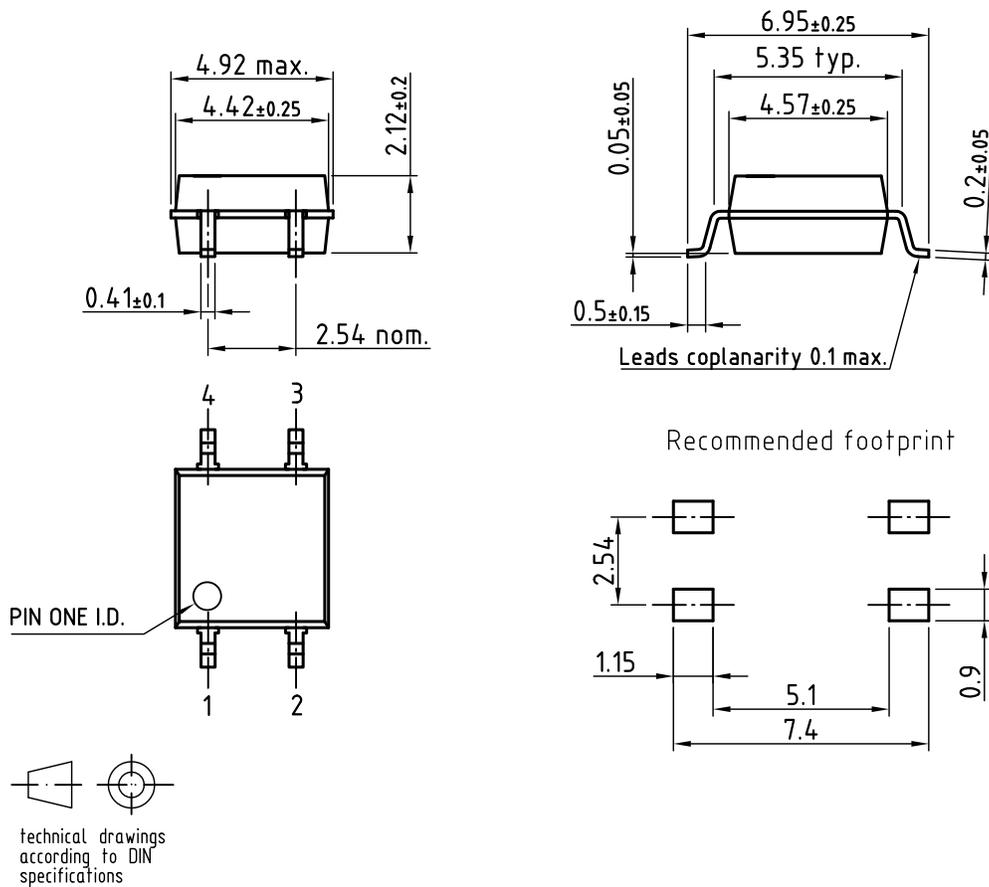


Fig. 14 - Package Drawing

PACKAGE MARKING

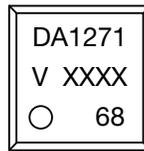


Fig. 15 - VOMDA1271

Notes

- XXXX = LMC (lot marking code)
- Package configuration (T, M) are not part of the package marking

TAPE AND REEL PACKAGING

Dimensions in millimeters

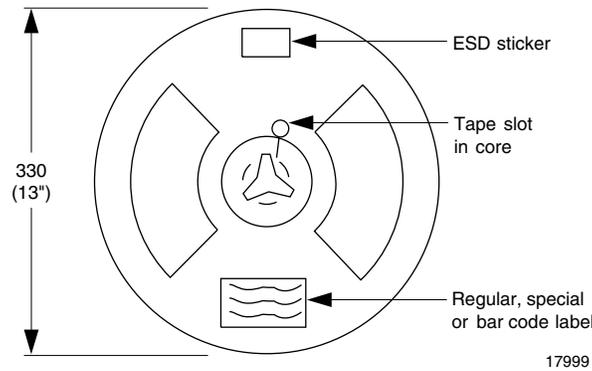
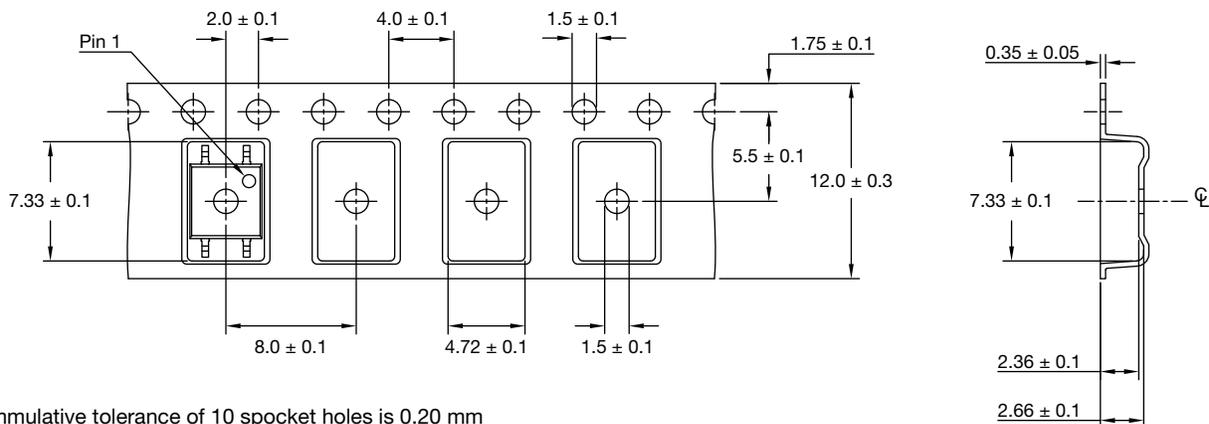


Fig. 16 - Tape and Reel Shipping Medium (EIA-481, revision A, and IEC 60286), 2000 units per reel



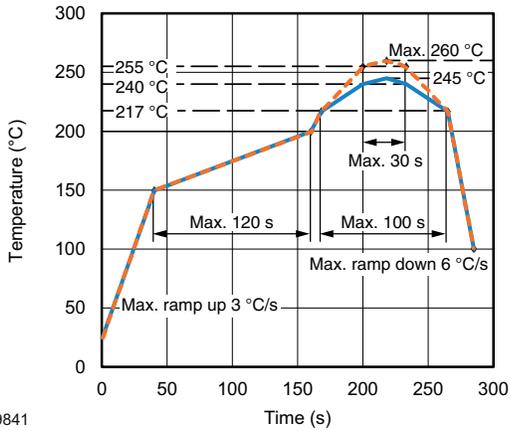
Note:

- Cumulative tolerance of 10 spocket holes is 0.20 mm

Fig. 17 - Tape and Reel Packing (2000 pieces on reel)



SOLDER PROFILES



19841

Fig. 18 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020 for SMD Devices

HANDLING AND STORAGE CONDITIONS

ESD level: HBM class 2

Floor life: 168 h

Conditions: $T_{amb} < 30\text{ °C}$, $RH \leq 60\%$

Moisture sensitivity level 3, according to J-STD-020



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.