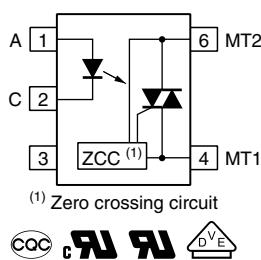


Optocoupler, Phototriac Output, Zero Crossing, High dV/dt, Low Input Current



23167



FEATURES

- High isolation distance on output
- High static dV/dt 1000 V/ μ s
- High input sensitivity $I_{FT} = 5$ mA
- 100 mA on-state current
- Zero voltage crossing detector
- 800 V peak off-state blocking voltage
- Isolation rated voltage 5300 V_{RMS}
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

APPLICATIONS

- Power TRIAC driver in solid-state relays
- 3-phase AC equipment
- Motor control
- Industrial control
- White goods / household equipment

AGENCY APPROVALS

- [UL 1577](#)
- [cUL](#)
- [DIN EN 60747-5-5 \(VDE 0884-5\), available with option "V"](#)
- [CQC](#)

LINKS TO ADDITIONAL RESOURCES



DESCRIPTION

The VOT8025A consists of a GaAs IRLED optically coupled to a photosensitive zero crossing TRIAC packaged in a DIP-6 package featuring a high isolation distance on output.

The VOT8025A isolates low-voltage logic from 120 V_{AC}, 240 V_{AC}, and 380 V_{AC} lines to control resistive, inductive, or capacitive loads including motors, solenoids, high current thyristors or TRIAC and relays.

ORDERING INFORMATION

PART NUMBER	PACKAGE OPTION	VDE OPTION	TAPE AND REEL
V O T 8 0 2 5 A	# - V T #		
PART NUMBER			
PACKAGE OPTION			
VDE OPTION			
TAPE AND REEL			
AGENCY CERTIFIED/PACKAGE		TRIGGER CURRENT, I_{FT} (mA)	
UL, cUL, CQC		5	
DIP-6		VOT8025AD	
DIP-6, 400 mil		VOT8025AG	
SMD-6		VOT8025AB-T (1)	
SMD-6, 90° orientation		VOT8025AB-T1	
SMD-6, 180° orientation		VOT8025AB-T2	
VDE, UL, cUL, CQC		5	
DIP-6		VOT8025AD-V	
DIP-6, 400 mil		VOT8025AG-V	
SMD-6		VOT8025AB-VT (1)	
SMD-6, 90° orientation		VOT8025AB-VT1	
SMD-6, 180° orientation		VOT8025AB-VT2	

Note

(1) Also available in tubes; do not add T to end

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25 \text{ }^{\circ}\text{C}$, 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}	120	mW
OUTPUT				
Peak off-state voltage		V_{DRM}	800	V
Peak repetitive surge current	$PW = 1 \text{ ms, 120 pps}$	I_{TSM}	1	A
On-state current		$I_{T(RMS)}$	100	mA
Power dissipation		P_{diss}	150	mW
COUPLER				
Storage temperature range		T_{stg}	-55 to +150	$^{\circ}\text{C}$
Ambient temperature range		T_{amb}	-40 to +110	$^{\circ}\text{C}$
Total power dissipation		P_{diss}	250	mW
Soldering temperature	For 10 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. This phototriac should not be used to drive a load directly. It is intended to be a trigger device only.

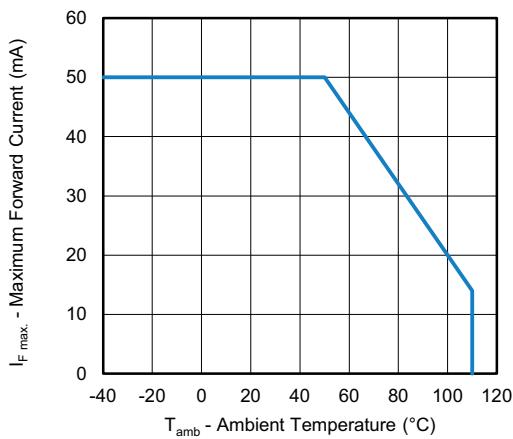


Fig. 1 - Maximum Forward Current vs. Ambient Temperature

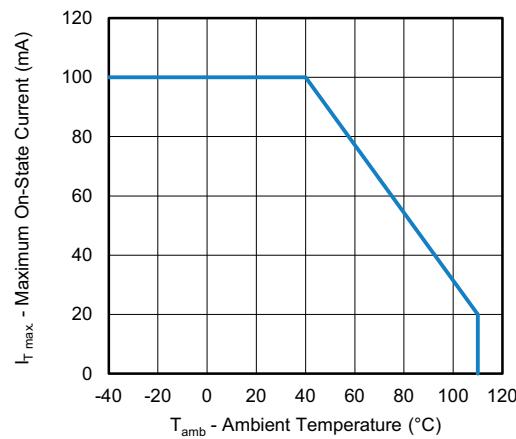


Fig. 2 - Maximum On-State Current vs. Ambient Temperature

ELECTRICAL CHARACTERISTICS ($T_{amb} = 25^{\circ}C$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT						
Forward voltage	$I_F = 20 \text{ mA}$	V_F	-	1.2	1.4	V
Reverse current	$V_R = 6 \text{ V}$	I_R	-	0.05	10	μA
OUTPUT						
Off-state current	$V_{DRM} = 800 \text{ V}$	I_{DRM}	-	-	0.5	μA
On-state voltage	$I_T = 100 \text{ mA}$ peak	V_{TM}	-	-	3	V
Holding current		I_H	-	400	-	μA
Zero cross inhibit voltage	$I_F = \text{rated } I_{FT}$	V_{INH}	-	5	20	V
Critical rate of rise of off-state voltage		dV/dt (1)	1000	-	-	$\text{V}/\mu\text{s}$
Leakage in inhibit state	$I_F = \text{rated } I_{FT}$, rated V_{DRM} , off-state	I_{DRM2}	-	-	500	μA
COUPLER						
Trigger current	$V_{TM} = 3 \text{ V}$	I_{FT}	-	-	5	mA

Notes

- 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

(1) Static dV/dt

SAFETY AND INSULATION RATINGS ($T_{amb} = 25^{\circ}C$, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Climatic classification	According to IEC 68 part 1		55 / 115 / 21	
Comparative tracking index	Insulation group IIIa	CTI	175	
Maximum rated withstanding isolation voltage	According to UL1577, $t = 1 \text{ min}$	V_{ISO}	5300	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, DIP-4, SMD-4	V_{IORM}	890	V_{peak}
	According to DIN EN 60747-5-5, DIP-4, 400 mil	V_{IORM}	1140	V_{peak}
Isolation resistance	$V_{IO} = 500 \text{ V}$, $T_{amb} = 25^{\circ}C$	R_{IO}	$\geq 10^{12}$	Ω
	$V_{IO} = 500 \text{ V}$, $T_{amb} = 100^{\circ}C$	R_{IO}	$\geq 10^{11}$	Ω
Output safety power		P_{SO}	700	mW
Input safety current		I_{SI}	400	mA
Input safety temperature		T_S	175	$^{\circ}C$
Creepage distance	DIP-6, SMD-6		≥ 7	mm
Clearance distance			≥ 7	mm
Creepage distance	DIP-6, 400 mil		≥ 8	mm
Clearance distance			≥ 8	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

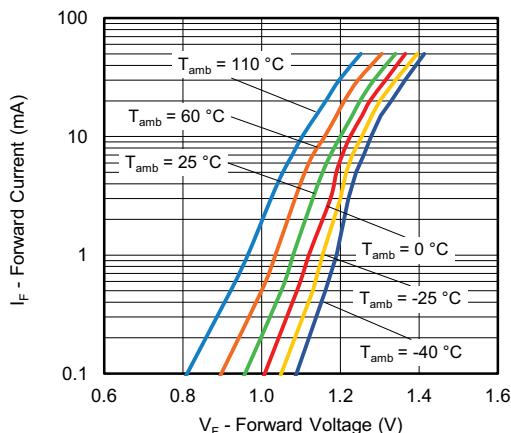
TYPICAL CHARACTERISTICS ($T_{amb} = 25^\circ\text{C}$, unless otherwise specified)


Fig. 3 - Forward Current vs. Forward Voltage

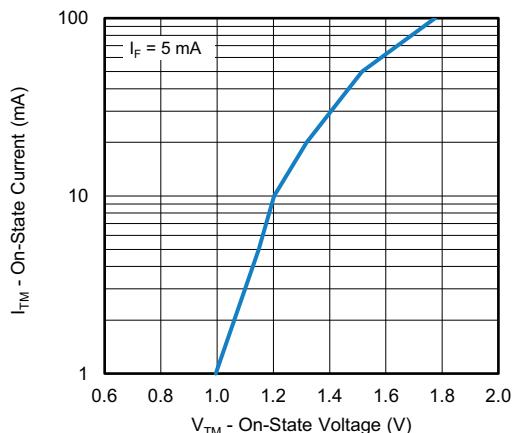


Fig. 6 - On State Current vs. On State Voltage

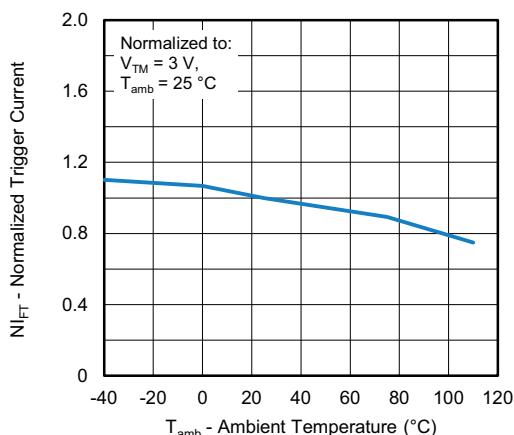


Fig. 4 - Normalized Trigger Current vs. Ambient Temperature

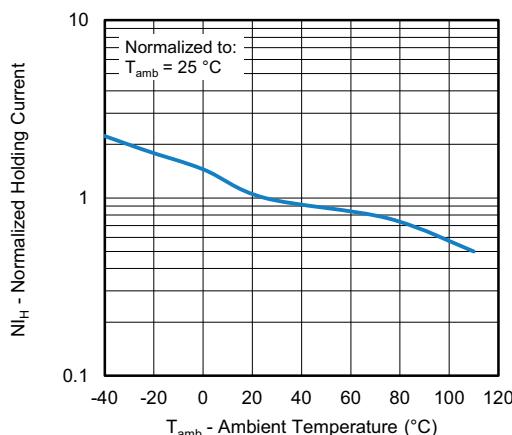


Fig. 7 - Normalized Holding Current vs. Ambient Temperature

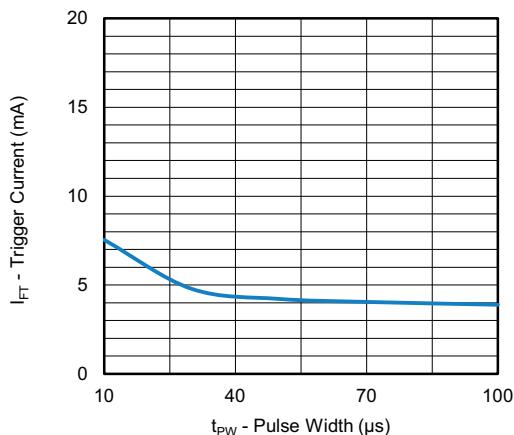


Fig. 5 - Trigger Current vs. Pulse Width

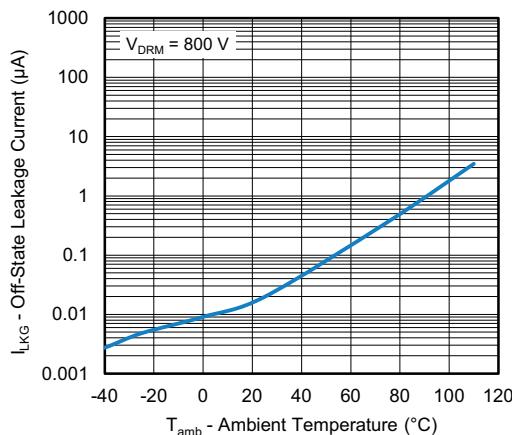


Fig. 8 - Off-State Leakage Current vs. Ambient Temperature

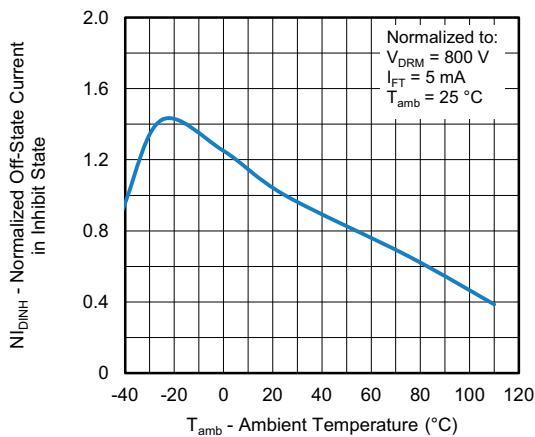


Fig. 9 - Normalized Off-State Current in Inhibit State vs.
Ambient Temperature

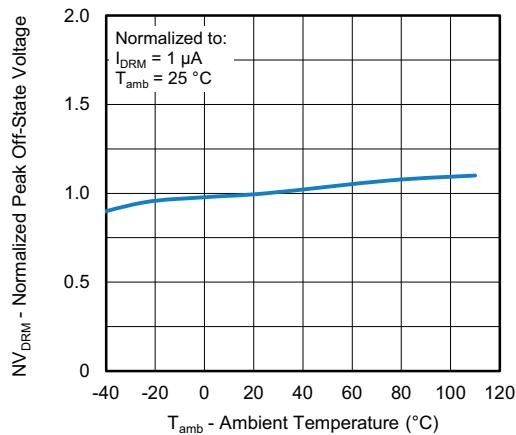


Fig. 10 - Normalized Peak Off-State Voltage vs.
Ambient Temperature

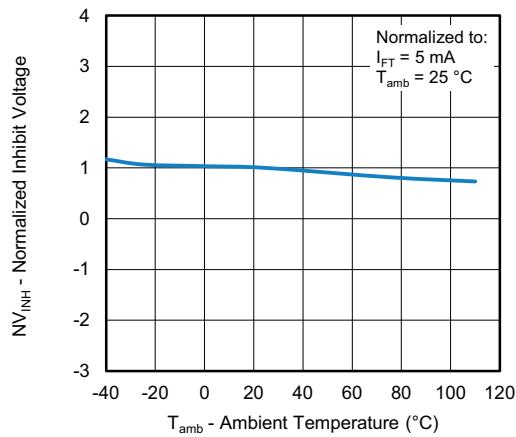
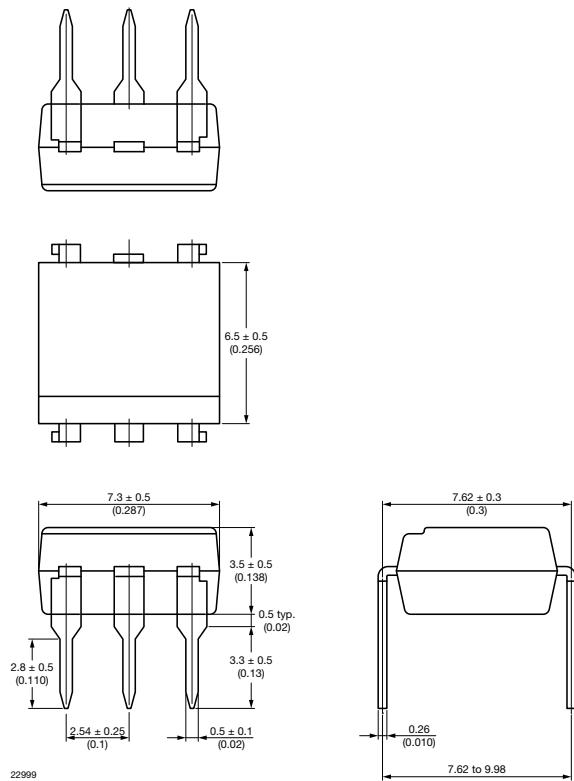
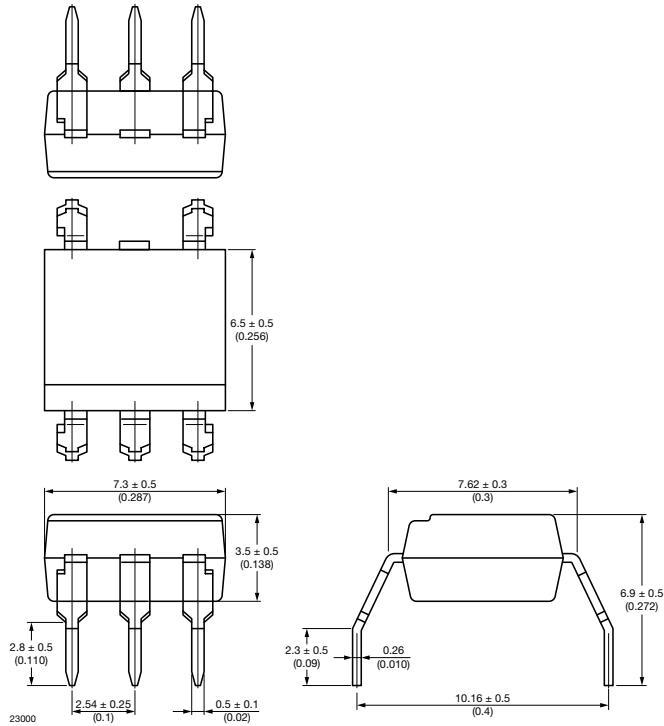
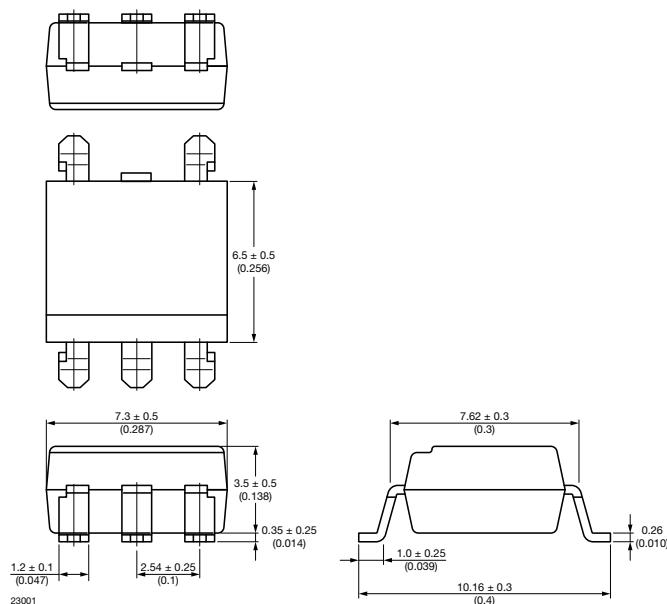
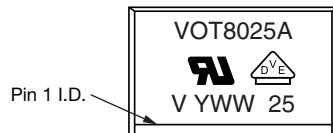


Fig. 11 - Normalized Inhibit Voltage vs. Ambient Temperature

PACKAGE DIMENSIONS (in millimeters)

DIP-6

Fig. 12
DIP-6, 400 mil

Fig. 13

SMD-6

Fig. 14
PACKAGE MARKING

Fig. 15 - Example of VOT8025AD-VT
Notes

- "YWW" is the date code marking (Y = year code, WW = week code)
- VDE logo is only marked on VDE option parts
- Tape and reel suffix (T) is not part of the package marking

PACKAGING INFORMATION (in millimeters)

DEVICES PER TUBE			
TYPE	UNITS/TUBE	TUBES/BOX	UNITS/BOX
DIP-6	50	40	2000
DIP-6, 400 mil	50	40	2000

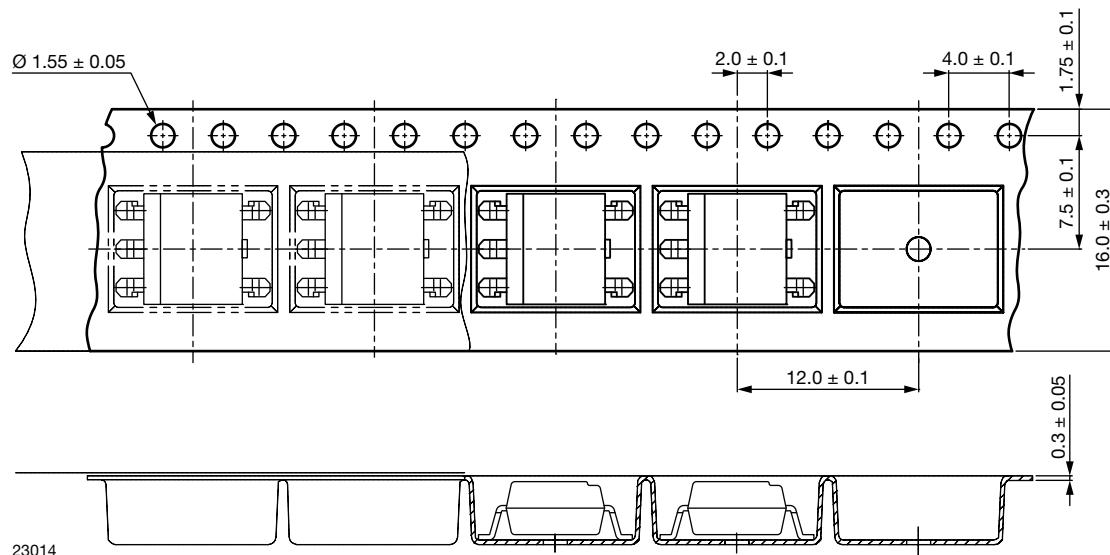
SMD-6 Tape


Fig. 16 - Tape and Reel Packaging (1000 pieces on reel)

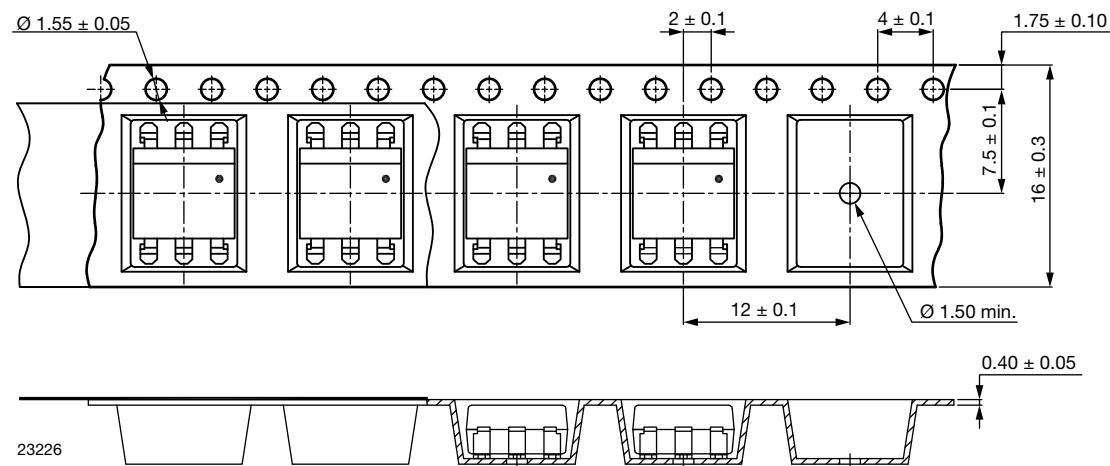
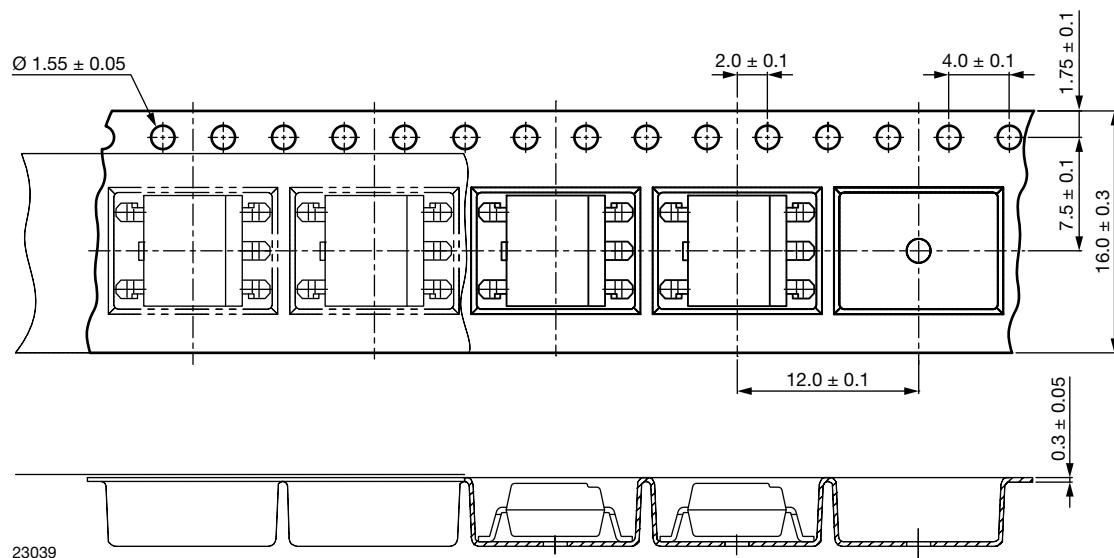
SMD-6 Tape, 90° Orientation


Fig. 17 - Tape and Reel Packaging (1000 pieces on reel)

SMD-6 Tape, 180° Orientation

Fig. 18 - Tape and Reel Packaging (1000 pieces on reel)

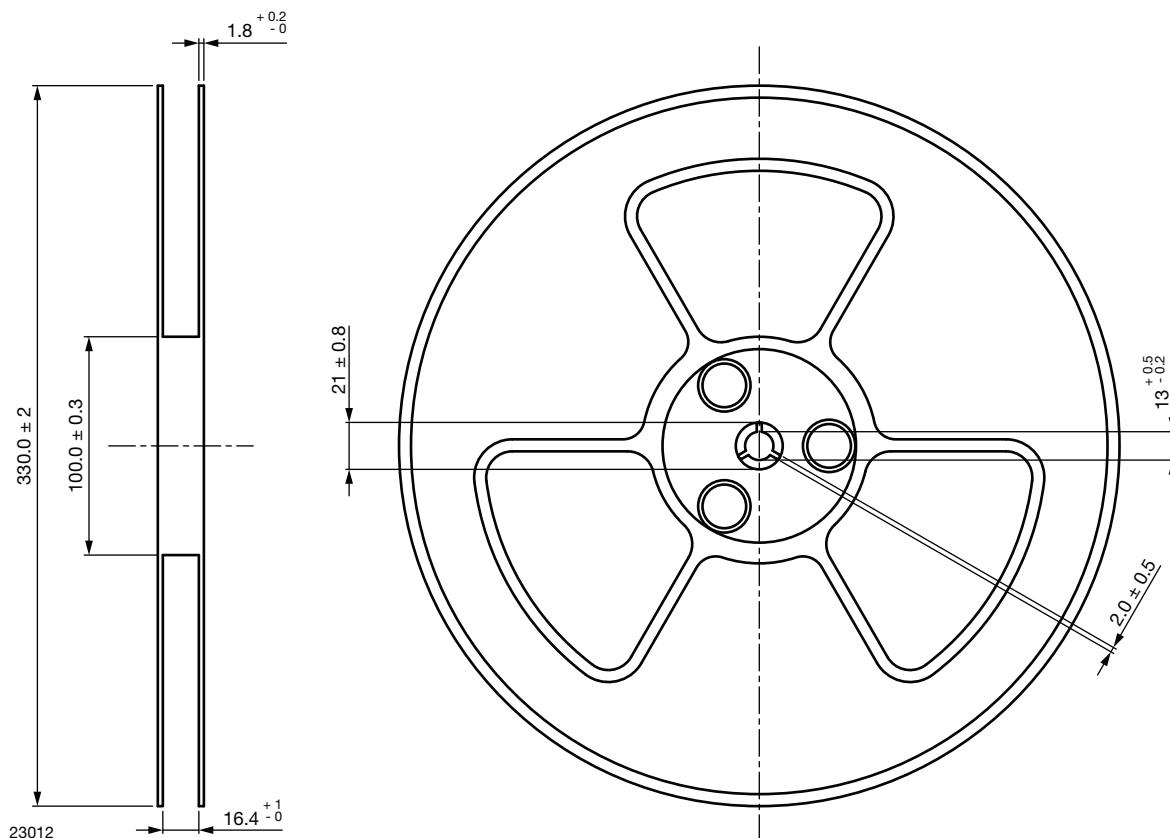
Reel


Fig. 19 - 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

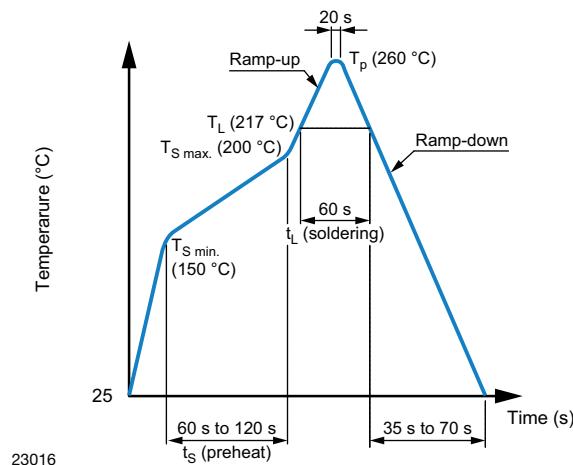


Fig. 20

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

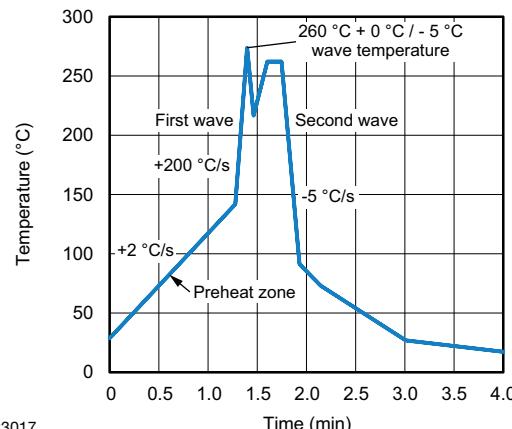


Fig. 21

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.

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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