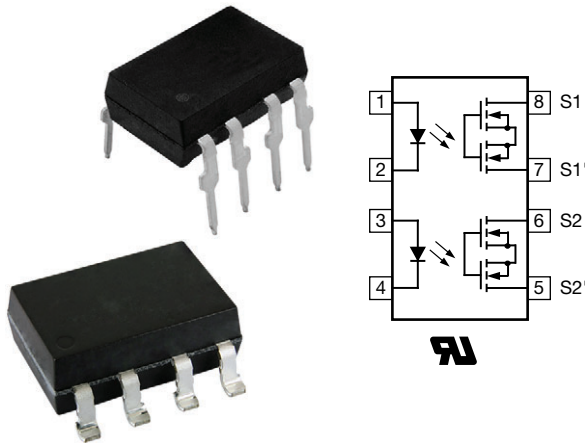


## Dual 1 Form A Solid-State Relay



### FEATURES

- Dual channel
- Extremely low operating current
- High speed operation
- Isolation test voltage 5300 V<sub>RMS</sub>
- Current limit protection
- Load voltage 400 V
- Load current 125 mA
- Clean bounce free switching
- Low power consumption
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### LINKS TO ADDITIONAL RESOURCES



### DESCRIPTION

The LH1526 dual 1 Form A relays are SPST normally open switches that can replace electromechanical relays in many applications. The relays require a minimal amount of LED drive current to operate, making it ideal for battery powered and power consumption sensitive applications. The relay is constructed using a GaAlAs LED for actuation control and MOSFET switches for the output. In addition, the relay employs current-limiting circuitry to provide overvoltage protection.

### APPLICATIONS

- General telecom switching
- Battery powered switch applications
- Instrumentation
- Industrial controls

### AGENCY APPROVALS

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

ORDERING INFORMATION												
L	H	1	5	2	6	A	#	#	T	R	 DIP	 SMD
PART NUMBER						ELECTR. VARIATION	PACKAGE CONFIG.		TAPE AND REEL			
<b>PACKAGE</b>						<b>UL</b>						
SMD-8, tube						LH1526AAC						
SMD-8, tape and reel						LH1526AACTR						
DIP-8, tube						LH1526AB						



ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)				
PARAMETER	CONDITIONS	SYMBOL	VALUE	UNIT
<b>INPUT</b>				
IRED continuous forward current		$I_F$	50	mA
IRED reverse voltage		$V_R$	5	V
Input power dissipation		$P_{diss}$	80	mW
<b>OUTPUT</b>				
DC or peak AC load voltage		$V_L$	400	V
Continuous DC load current at 25 °C, one channel		$I_L$	125	mA
Continuous DC load current at 25 °C, two channels		$I_L$	100	mA
SSR output power dissipation		$P_{diss}$	550	mW
<b>SSR</b>				
Ambient temperature range		$T_{amb}$	-40 to +85	°C
Storage temperature range		$T_{stg}$	-40 to +150	°C
Soldering temperature	t = 10 s max.	$T_{sld}$	260	°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
<b>INPUT</b>						
IRED forward current, switch turn-on	$I_L = 100\text{ mA}$ , t = 10 ms	$I_{Fon}$	-	-	0.9	mA
IRED forward current, switch turn-off	$V_L = \pm 350\text{ V}$	$I_{Foff}$	0.001	0.150	-	mA
IRED forward voltage	$I_F = 1.5\text{ mA}$	$V_F$	0.80	1.28	1.40	V
IRED reverse current	$V_R = 5\text{ V}$	$I_R$	-	-	10	$\mu\text{A}$
<b>OUTPUT</b>						
On-resistance	$I_F = 1.5\text{ mA}$ , $I_L = 50\text{ mA}$	$R_{ON}$	-	22	36	$\Omega$
Off-resistance	$I_F = 0\text{ mA}$ , $V_L = \pm 100\text{ V}$	$R_{OFF}$	-	5000	-	G $\Omega$
Off-state leakage current	$I_F = 0\text{ mA}$ , $V_L = \pm 100\text{ V}$	$I_O$	-	< 1	200	nA
	$I_F = 0\text{ mA}$ , $V_L = \pm 350\text{ V}$	$I_O$	-	6	1000	nA
Output capacitance	$I_F = 0\text{ mA}$ , $V_L = 1\text{ V}$ , f = 1 MHz	$C_O$	-	39	-	pF
	$I_F = 0\text{ mA}$ , $V_L = 50\text{ V}$ , f = 1 MHz	$C_O$	-	6	-	pF
Current limit AC/DC	$I_F = 1.5\text{ mA}$ , t = 5 ms, $V_L = \pm 6\text{ V}$	$I_{limit}$	170	350	450	mA
<b>TRANSFER</b>						
Capacitance (input to output)	$V_{IO} = 1\text{ V}$ , f = 1 MHz	$C_{IO}$	-	0.7	-	pF

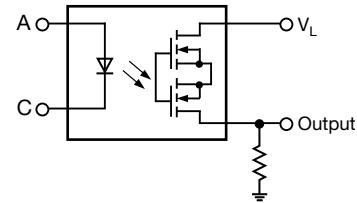
**Note**

- 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	$I_F = 1.5\text{ mA}$ , $I_L = 50\text{ mA}$ , $R_L = 1\text{ k}\Omega$	$t_{on}$	-	0.6	-	ms
	$I_F = 5\text{ mA}$ , $I_L = 50\text{ mA}$ , $R_L = 1\text{ k}\Omega$	$t_{on}$	-	0.15	1	ms
Turn-off time	$I_F = 1.5\text{ mA}$ , $I_L = 50\text{ mA}$ , $R_L = 1\text{ k}\Omega$	$t_{off}$	-	0.04	-	ms
	$I_F = 5\text{ mA}$ , $I_L = 50\text{ mA}$ , $R_L = 1\text{ k}\Omega$	$t_{off}$	-	0.05	1.5	ms



Fig. 1 - Timing Schematic



SAFETY AND INSULATION RATINGS				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Climatic classification	According to IEC 68 part 1		40 / 85 / 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	$V_{ISO}$	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	$V_{IORM}$	890	$V_{peak}$
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		$P_{SO}$	600	mW
Input safety current		$I_{SI}$	240	mA
Safety temperature		$T_S$	175	$^{\circ}\text{C}$
Creepage distance			$\geq 7$	mm
Clearance distance			$\geq 7$	mm
Insulation thickness		DTI	$\geq 0.4$	mm
Input to output test voltage, method B	$V_{IORM} \times 1.875 = V_{PR}$ , 100 % production test with $t_M = 1\text{ s}$ , partial discharge $< 5\text{ pC}$	$V_{PR}$	1669	$V_{peak}$
Input to output test voltage, method A	$V_{IORM} \times 1.6 = V_{PR}$ , 100 % sample test with $t_M = 10\text{ s}$ , partial discharge $< 5\text{ pC}$	$V_{PR}$	1424	$V_{peak}$

**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.

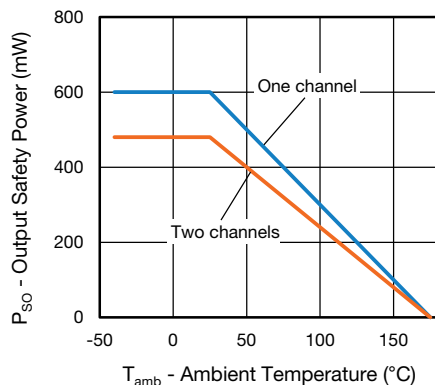


Fig. 2 - Safety Power Dissipation vs. Ambient Temperature

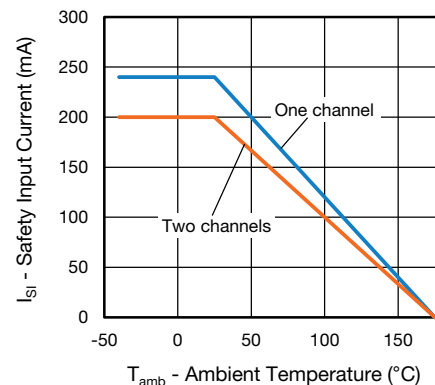


Fig. 3 - Safety Input Current vs. Ambient Temperature



## TYPICAL CHARACTERISTICS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

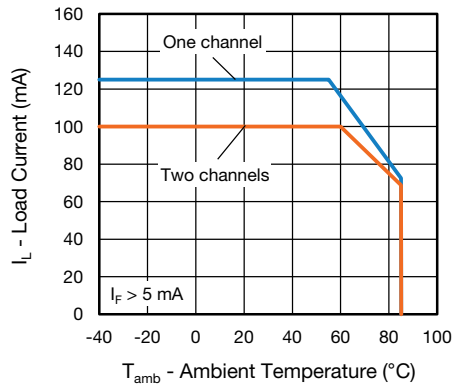


Fig. 4 - Maximum Load Current vs. Ambient Temperature

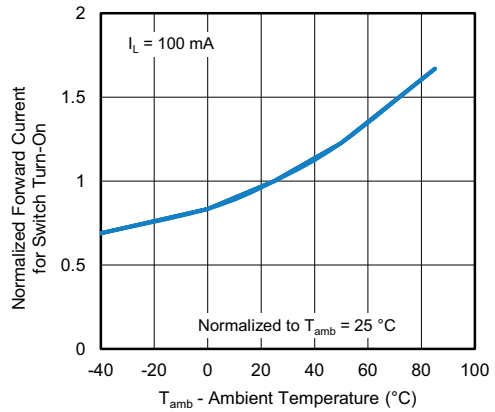


Fig. 7 - Normalized Forward Current for Switch Turn-On vs. Ambient Temperature

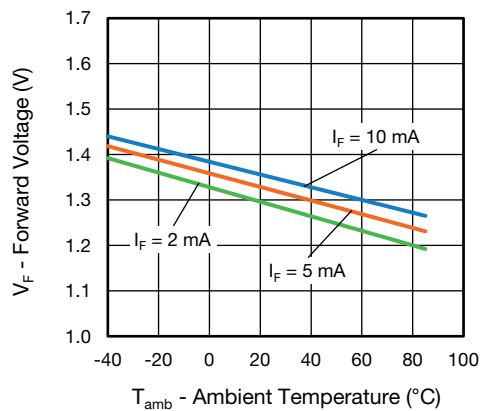


Fig. 5 - Forward Voltage vs. Ambient Temperature

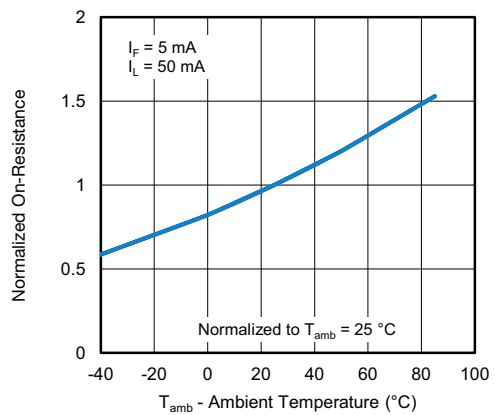


Fig. 8 - Normalized On-Resistance vs. Ambient Temperature

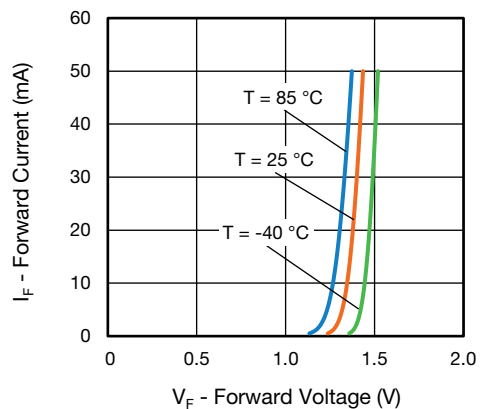


Fig. 6 - Forward Current vs. Forward Voltage

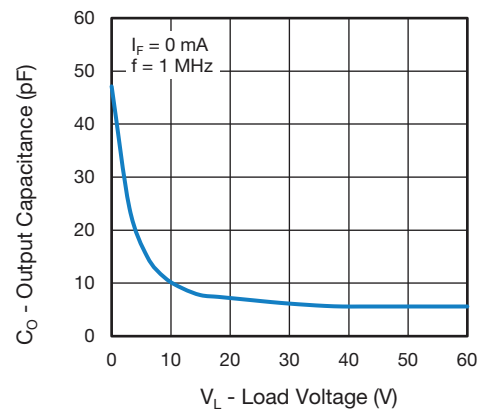


Fig. 9 - Output Capacitance vs. Load Voltage

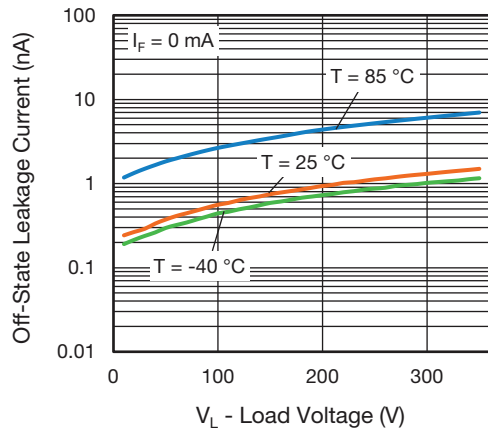


Fig. 10 - Off-State Leakage Current vs. Load Voltage

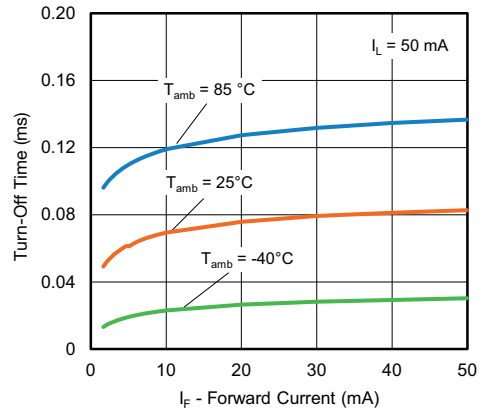


Fig. 13 - Turn-Off Time vs. Forward Current

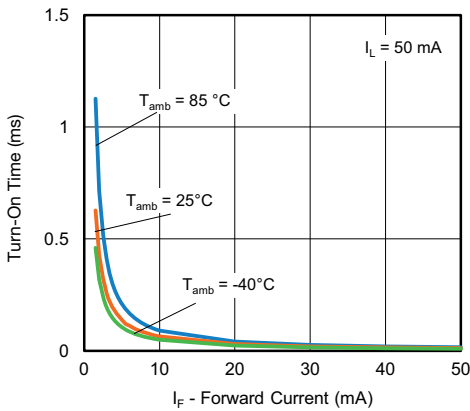


Fig. 11 - Turn-On Time vs. Forward Current

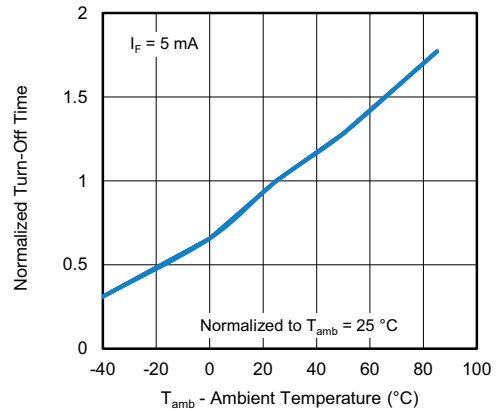


Fig. 14 - Normalized Turn-Off Time vs. Ambient Temperature

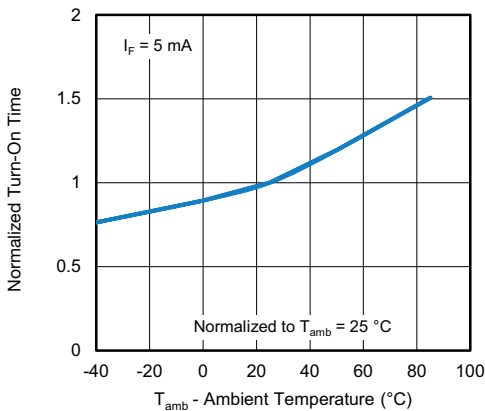
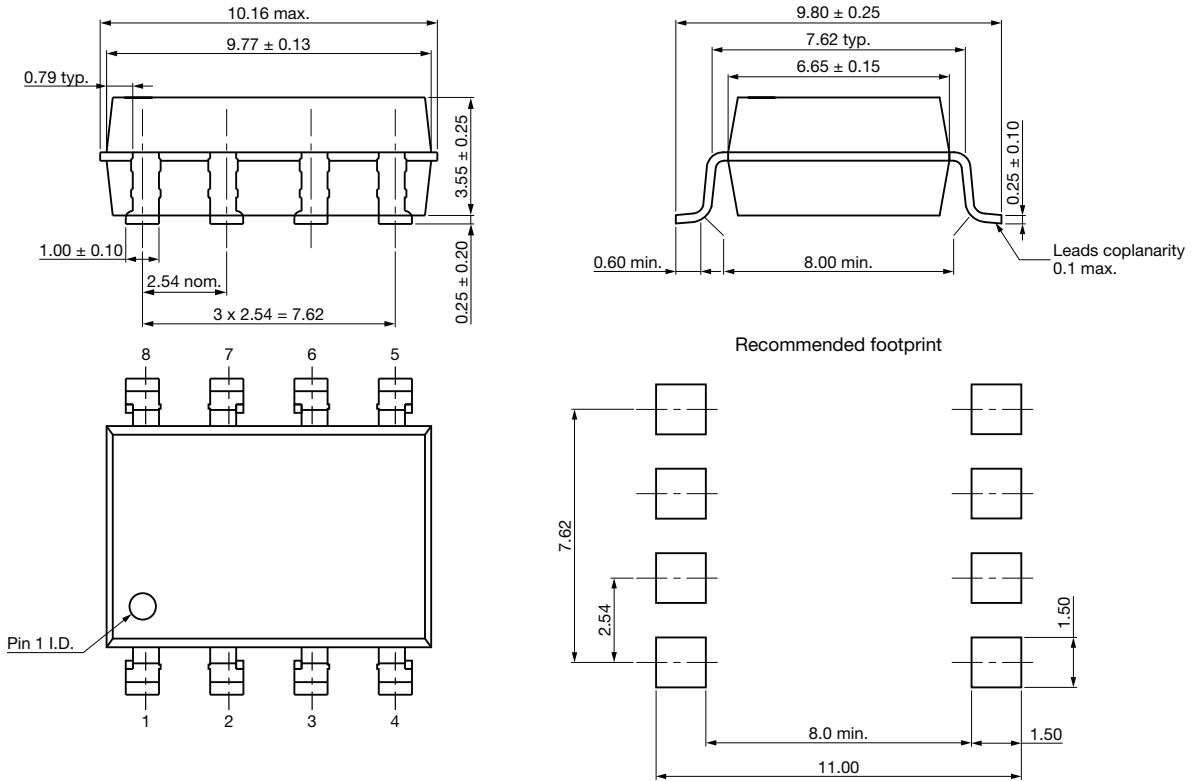


Fig. 12 - Normalized Turn-On Time vs. Ambient Temperature

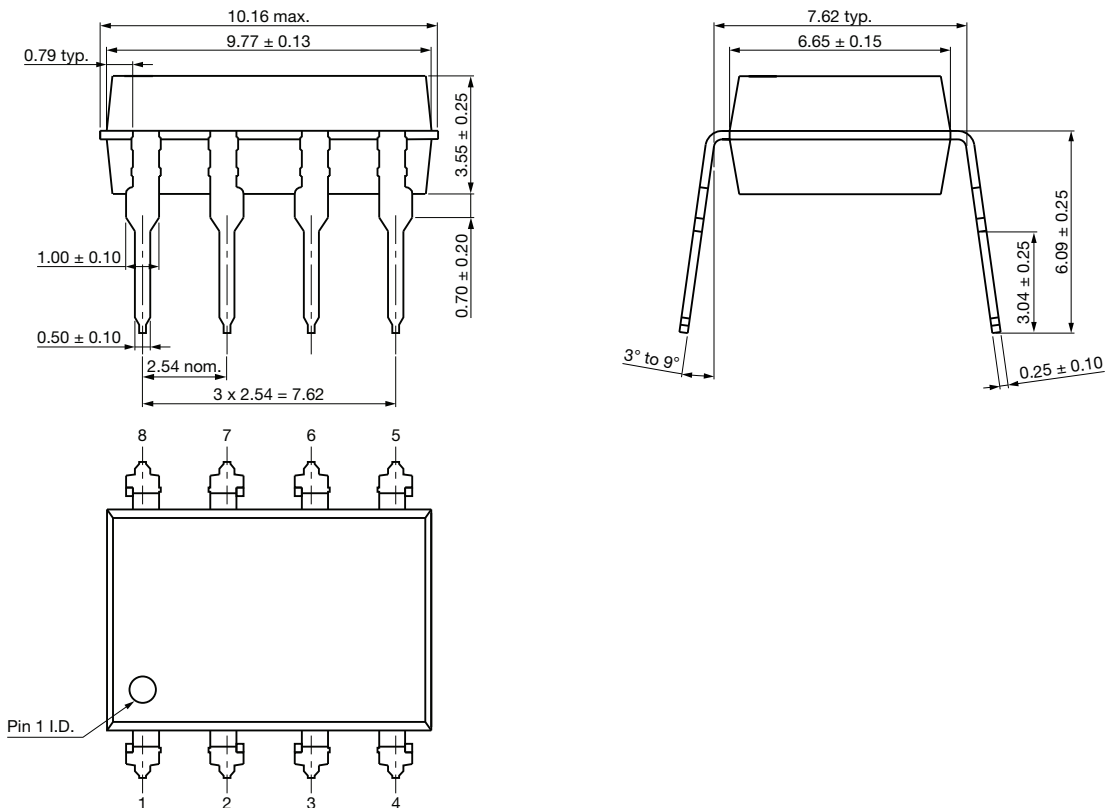


## PACKAGE DIMENSIONS (in millimeters)

### SMD-8



### DIP-8





**PACKAGE MARKING** (example)

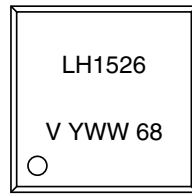


Fig. 15 - LH1526

**Note**

- Tape and reel suffix (TR) is not part of the package marking

**PACKING INFORMATION** (in millimeters)

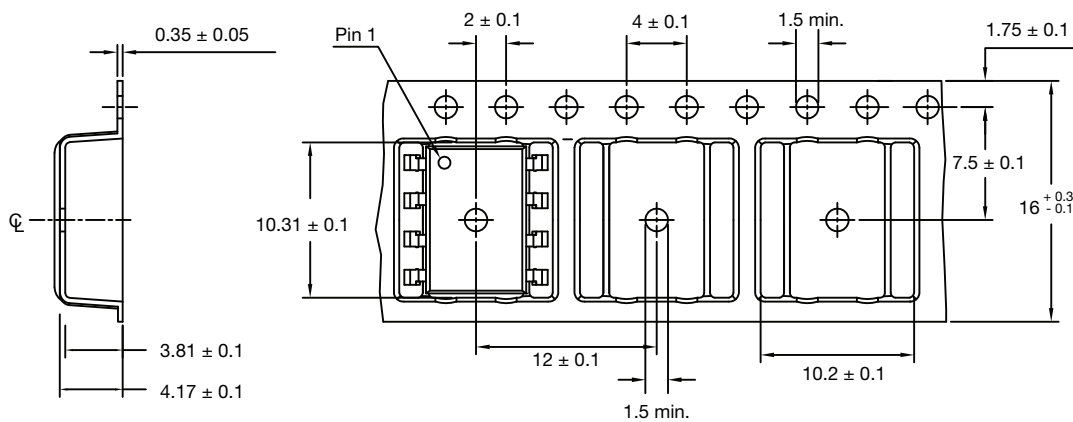
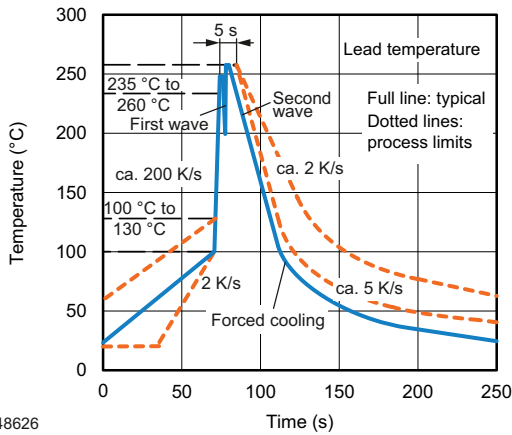


Fig. 16 - Tape and Reel Packing

TAPE AND REEL PACKING	
TYPE	UNITS/REEL
SMD-8	1000

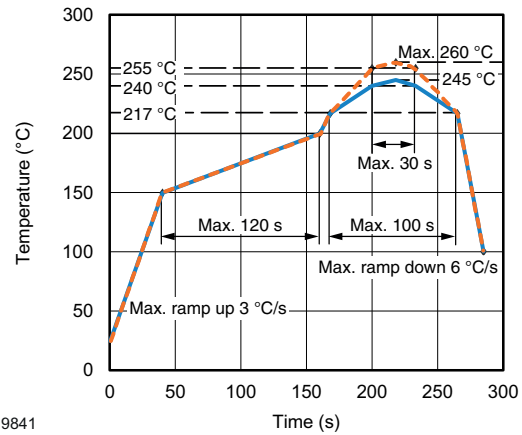
TUBE PACKING			
TYPE	UNITS/TUBE	TUBES/BOX	UNITS/BOX
SMD-8	50	40	2000
DIP-8	50	40	2000

## SOLDER PROFILES



948626

Fig. 17 - Wave Soldering Double Wave Profile According to J-STD-020 for DIP Devices



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: unlimited

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

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





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