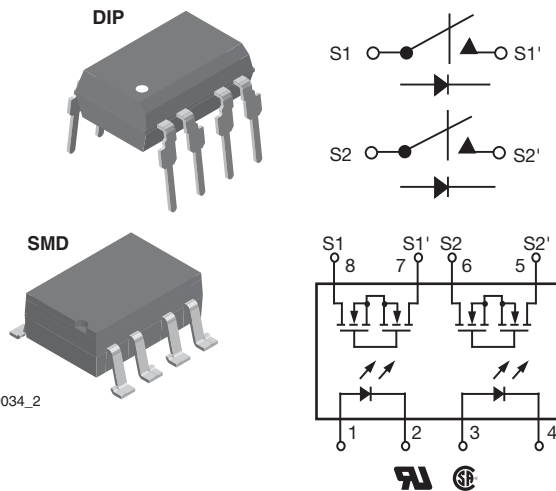


Dual 1 Form A Solid-State Relay



FEATURES

- Dual channel (LH1546)
- Current limit protection
- Isolation test voltage 5300 V_{RMS}
- Typical R_{ON} 28 Ω
- Load voltage 350 V
- Load current 120 mA
- High surge capability
- Clean bounce free switching
- Low power consumption
- SMD lead available on tape and reel
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



RoHS COMPLIANT

APPLICATIONS

- General telecom switching
 - On/off hook control
 - Ring relay
 - Dial pulse
 - Ground start
 - Ground fault protection
- Instrumentation
- Industrial controls

AGENCY APPROVALS

UL1577: file no. E52744 system code H, double protection
 CSA: certification no. 093751

DESCRIPTION

The LH1556 dual 1 form A relays are SPST normally open switches that can replace electromechanical relays in many applications. They are constructed using a GaAlAs LED for actuation control and an integrated monolithic die for the switch output. The die, fabricated in a high-voltage dielectrically isolated technology is comprised of a photodiode array, switch control circuitry, and MOSFET switches. In addition, the LH1556 SSRs employ current-limiting circuitry, enabling them to pass lightning surge testing as per ANSI/TIA-968-B and other regulatory surge requirements when overvoltage protection is provided.

ORDERING INFORMATION												
L	H	1	5	5	6	A	#	#	T	R	DIP	SMD
PART NUMBER						ELECTR. VARIATION	PACKAGE CONFIG.		TAPE AND REEL		7.62 mm	> 0.1 mm
PACKAGE						UL, CSA						
SMD-8, tubes						LH1556AAC						
SMD-8, tape and reel						LH1556AACTR						
DIP-8, tubes						LH1556AB						



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	$I_R \leq 10\text{ }\mu\text{A}$	V_R	8.0	V
OUTPUT				
DC or peak AC load voltage	$I_L \leq 50\text{ }\mu\text{A}$	V_L	350	V
Continuous DC load current, one pole operating		I_L	120	mA
Continuous DC load current, two poles operating		I_L	110	mA
SSR				
Peak load current (single shot)	$t = 100\text{ ms}$	I_P	(1)	mA
Ambient temperature range		T_{amb}	- 40 to + 85	$^{\circ}\text{C}$
Storage temperature range		T_{stg}	- 40 to + 150	$^{\circ}\text{C}$
Pin soldering temperature (2)	$t = 10\text{ s max.}$	T_{sld}	260	$^{\circ}\text{C}$
Input to output isolation voltage		V_{ISO}	5300	V_{RMS}
Output power dissipation (continuous)		P_{diss}	550	mW

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.

(1) Refer to current limit performance application note for a discussion on relay operation during transient currents.

(2) Refer to reflow profile for soldering conditions for surface mounted devices (SMD). Refer to wave profile for soldering conditions for through hole devices (DIP).

ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT						
LED forward current, switch turn-on	$I_L = 100\text{ mA}$, $t = 10\text{ ms}$	I_{Fon}		1.1	2.0	mA
LED forward current, switch turn-off	$V_L = \pm 350\text{ V}$	I_{Foff}	0.2	1.0		mA
LED forward voltage	$I_F = 10\text{ mA}$	V_F	1.15	1.26	1.45	V
OUTPUT						
On-resistance AC/DC: pin 4 (\pm) to 6 (\pm)	$I_F = 5.0\text{ mA}$, $I_L = 50\text{ mA}$	R_{ON}		28	35	Ω
On-resistance DC: pin 4, 6 (+) to 5 (-)	$I_F = 5.0\text{ mA}$, $I_L = 100\text{ mA}$	R_{ON}		7.0	10	Ω
Off-resistance	$I_F = 0\text{ mA}$, $V_L = \pm 100\text{ V}$	R_{OFF}	0.5	300		$G\Omega$
Current limit AC/DC	$I_F = 5.0\text{ mA}$, $V_L = \pm 6.0\text{ V}$, $t = 5.0\text{ ms}$	I_{LMT}	170	210	250	mA
Off-state leakage current	$I_F = 0\text{ mA}$, $V_L = \pm 100\text{ V}$	I_O		0.35	200	nA
	$I_F = 0\text{ mA}$, $V_L = \pm 350\text{ V}$	I_O		0.096	1.0	μA
Output capacitance pin 4 to 6	$I_F = 0\text{ mA}$, $V_L = 1.0\text{ V}$	C_O		18		pF
	$I_F = 0\text{ mA}$, $V_L = 50\text{ V}$	C_O		6.7		pF
Switch offset	$I_F = 5.0\text{ mA}$	V_{OS}		0.3		μV
TRANSFER						
Capacitance (input to output)	$V_{ISO} = 1.0\text{ V}$	C_{IO}		0.67		pF

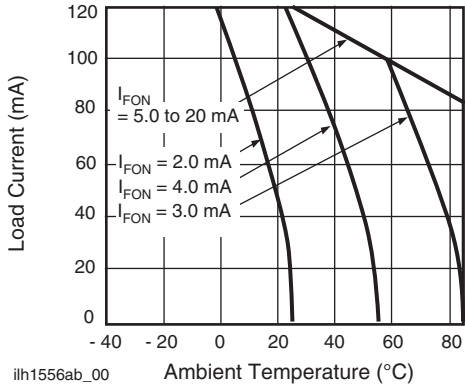
Note

- 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	$I_F = 5.0\text{ mA}$, $I_L = 50\text{ mA}$	t_{on}		1.14	3.0	ms
Turn-off time	$I_F = 5.0\text{ mA}$, $I_L = 50\text{ mA}$	t_{off}		0.71	3.0	ms

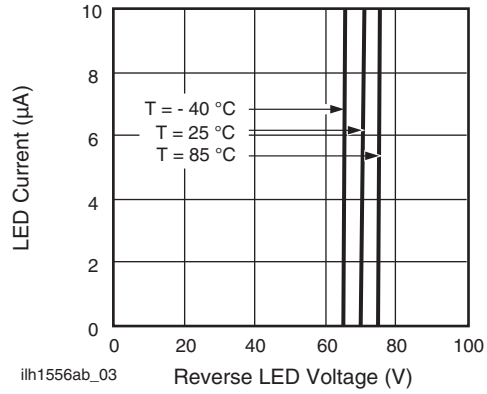


TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)



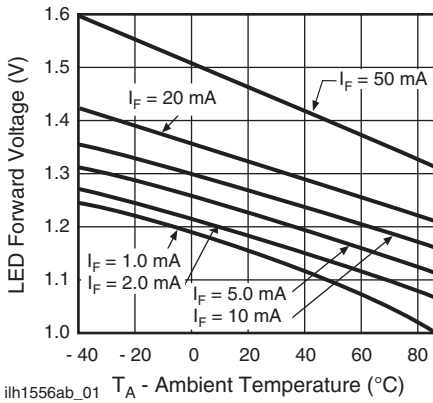
ilh1556ab_00

Fig. 1 - Recommended Operating Conditions



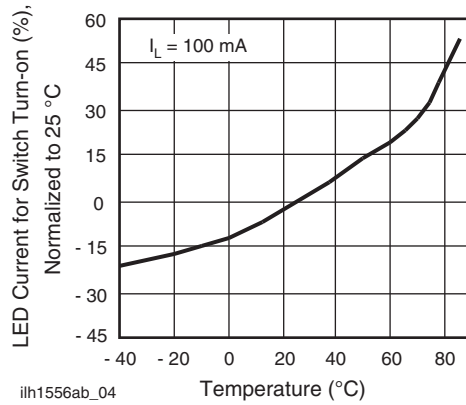
ilh1556ab_03

Fig. 4 - LED Reverse Current vs. LED Reverse Voltage



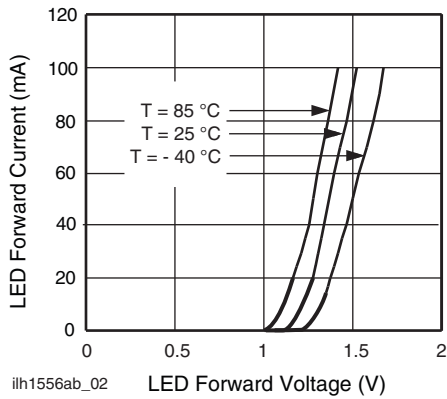
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Fig. 2 - LED Voltage vs. Temperature



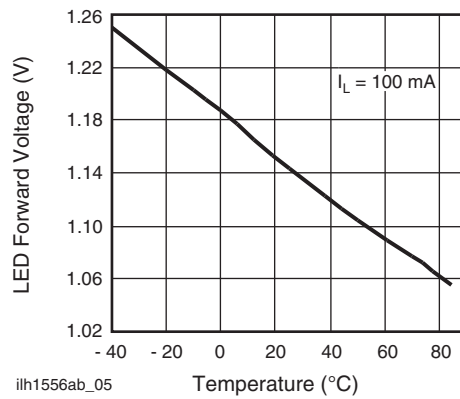
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Fig. 5 - LED Current for Switch Turn-on vs. Temperature



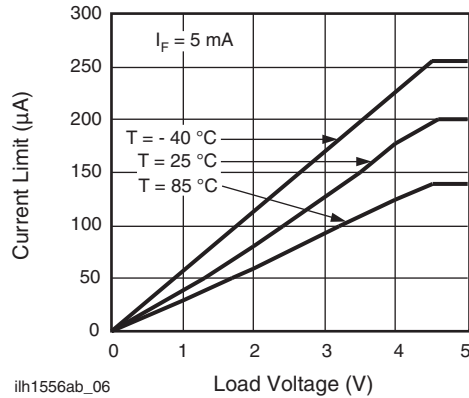
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Fig. 3 - LED Forward Current vs. LED Forward Voltage



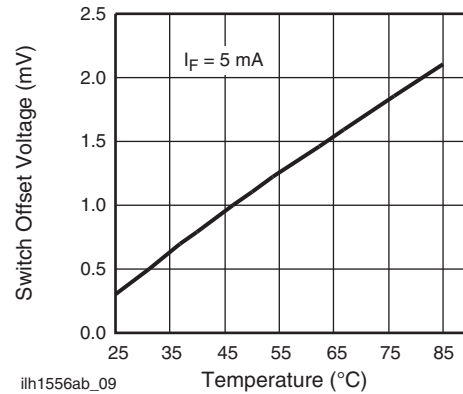
ilh1556ab_05

Fig. 6 - LED Dropout Voltage vs. Temperature



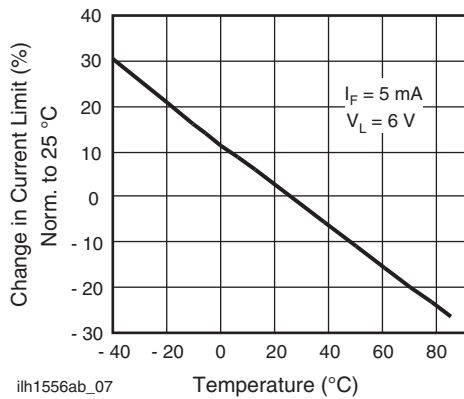
ih1556ab_06

Fig. 7 - Load Current vs. Load Voltage



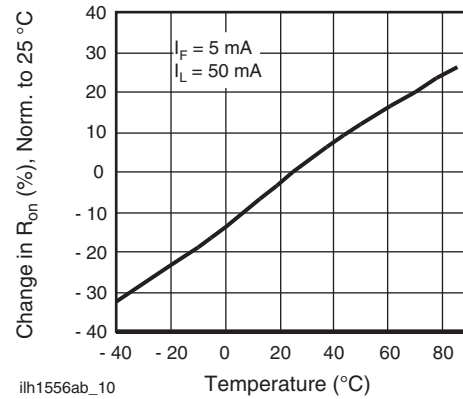
ih1556ab_09

Fig. 10 - Switch Offset Voltage vs. LED Current



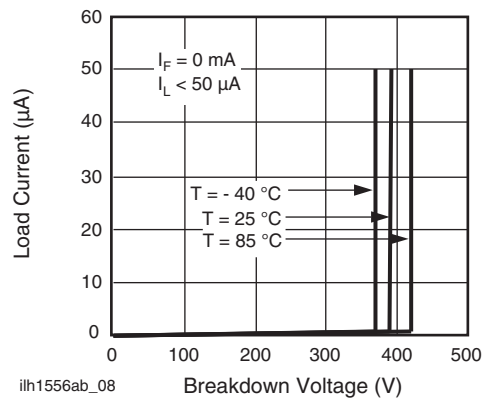
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Fig. 8 - Current Limit vs. Temperature



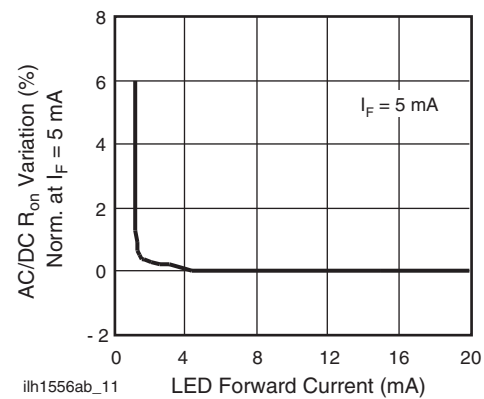
ih1556ab_10

Fig. 11 - On-Resistance vs. Temperature



ih1556ab_08

Fig. 9 - Switch Breakdown Voltage vs. Load Current



ih1556ab_11

Fig. 12 - Variation in On-Resistance vs. LED Current

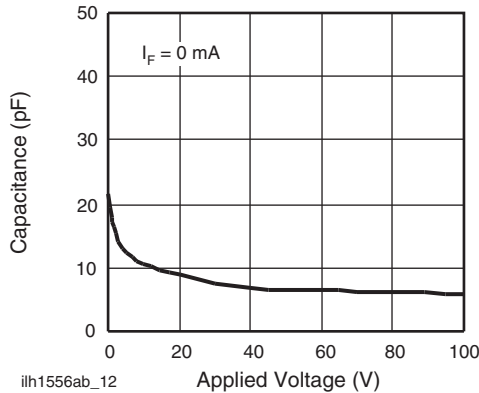


Fig. 13 - Switch Capacitance vs. Applied Voltage

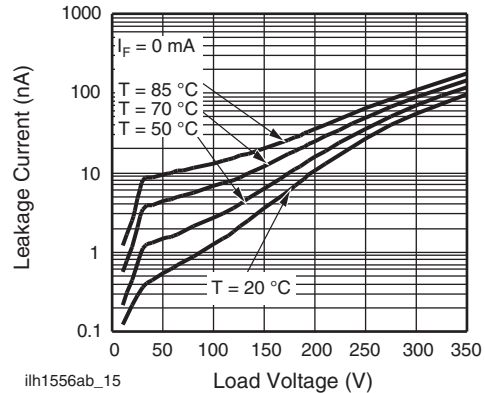


Fig. 16 - Leakage Current vs. Applied Voltage at Elevated Temperatures

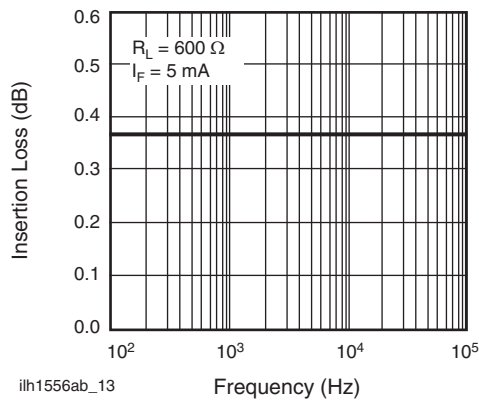


Fig. 14 - Insertion Loss vs. Frequency

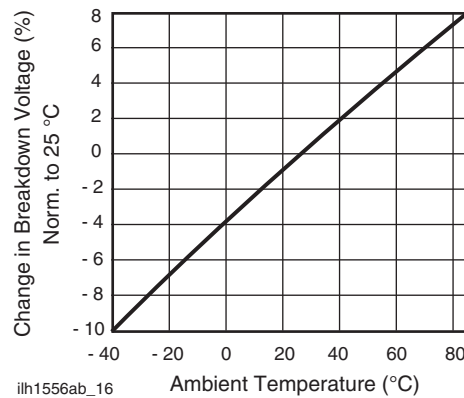


Fig. 17 - Switch Breakdown Voltage vs. Temperature

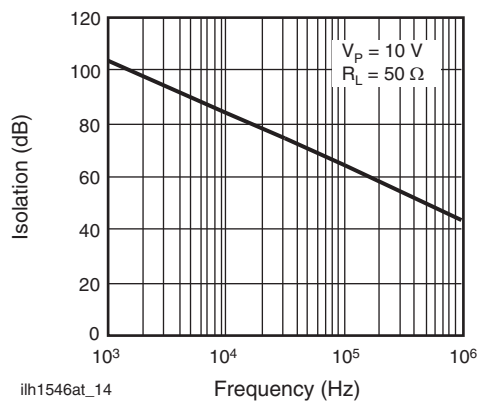


Fig. 15 - Output Isolation

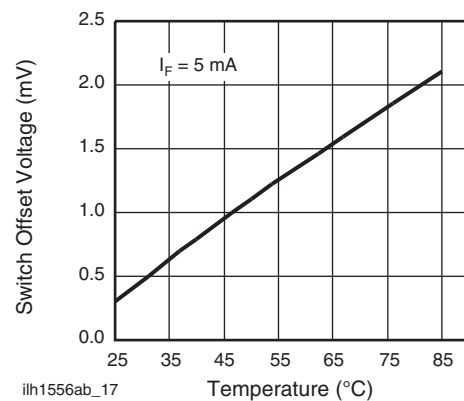


Fig. 18 - Switch Offset Voltage vs. Temperature

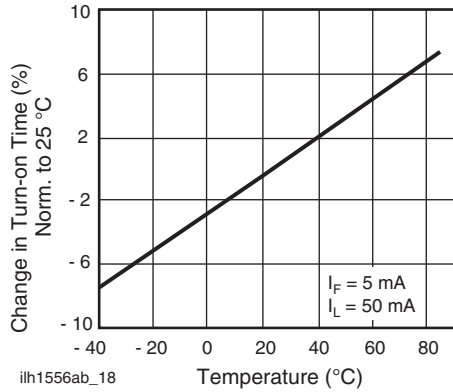


Fig. 19 - Turn-on Time vs. Temperature

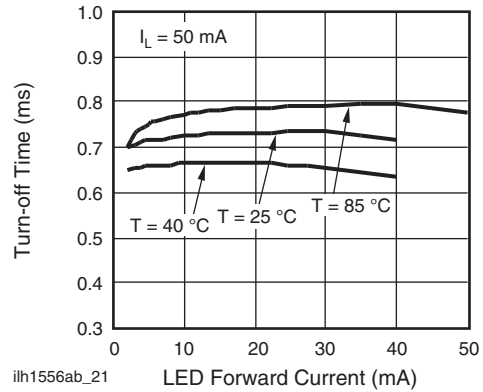


Fig. 22 - Turn-off Time vs. LED Current

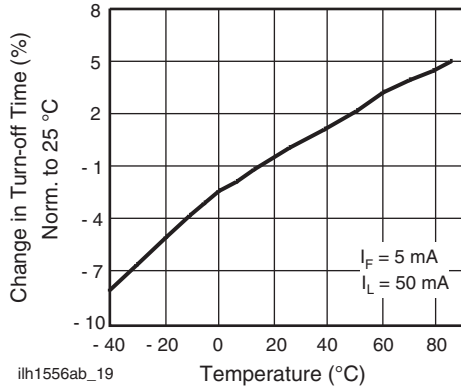


Fig. 20 - Turn-off Time vs. Temperature

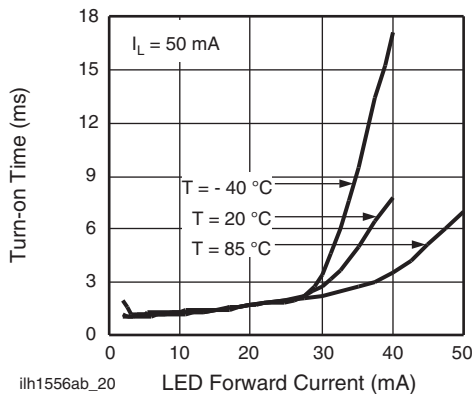
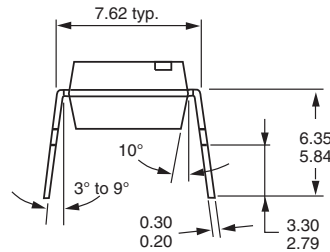
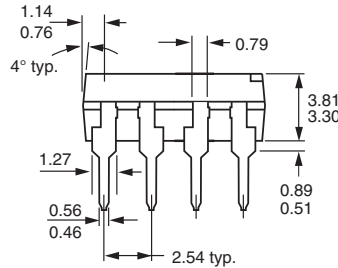
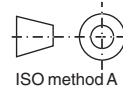
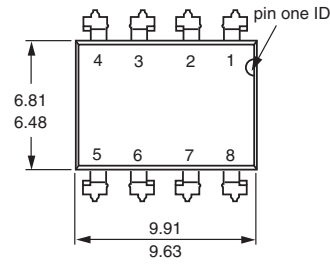


Fig. 21 - Turn-on Time vs. LED Current



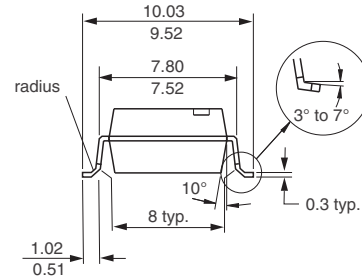
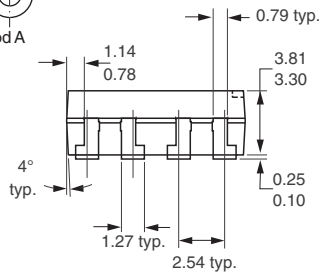
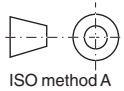
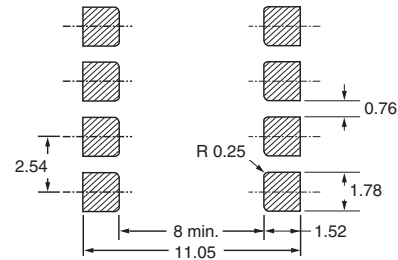
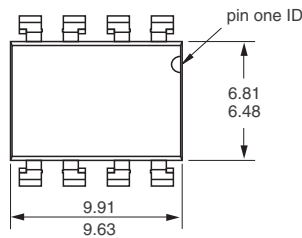
PACKAGE DIMENSIONS in millimeters

DIP



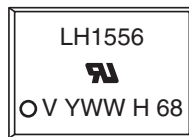
i178008

SMD



i178009

PACKAGE MARKING (example)



Note

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



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