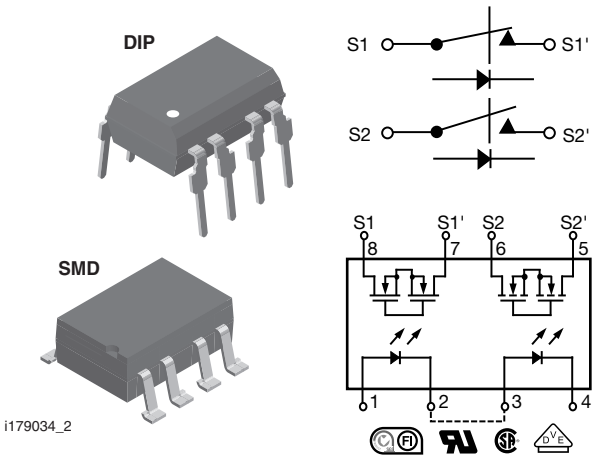
Dual 1 Form A/B, C Solid State Relay



FEATURES

- Current limit protection
- Isolation test voltage 3750 V_{RMS}
- Typical R_{ON} 10 Ω
- Load voltage 200 V
- Load current 200 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

Pb-free

e3

RoHS COMPLIANT

DESCRIPTION

The LH1512 relays contain normally open and normally closed switches that can be used independently as a 1 form A and 1 form B relay, or when used together, as a 1 form C relay. The relays are constructed as a mult.-chip hybrid device. Actuation control is via an infrared LED. The output switch is a combination of a photodiode array with MOSFET switches and control circuity.

APPLICATIONS

- General telecom switching
  - On/off hook control
  - Ring delay
  - 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

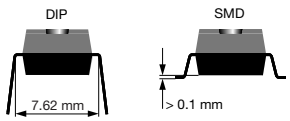
DIN EN: 60747-5-2 (VDE 0884)/60747-5-5 (pending), available with option 1

FIMKO: 25419

ORDERING INFORMATION

L	H	1	5	1	2	B	#	#	T	R

PART NUMBER — ELECTR. VARIATION — PACKAGE CONFIG. — TAPE AND REEL



PACKAGE	UL, CSA, FIMKO
SMD-8, tubes	LH1512BAC
SMD-8, tape and reel	LH1512BACTR
DIP-8, tubes	LH1512BB

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
INPUT				
LED continuous forward current		I_F	50	mA
LED reverse voltage	$I_R \leq 10$ µA	V_R	5	V
OUTPUT				
DC or peak AC load voltage	$I_L \leq 50$ µA	V_L	200	V
Continuous DC load current (form C operation)		I_L	200	mA
Peak load current, form A	t = 100 ms	I_P	(2)	
Peak load current (single shot), form B		I_P	400	mA
SSR				
Ambient operating temperature range		T_{amb}	- 40 to + 85	°C
Storage temperature range		T_{stg}	- 40 to + 125	°C
Pin soldering temperature (3)	t = 10 s max.	T_{sld}	260	°C
Input to output isolation test voltage	t = 1 s, I_{ISO} = 10 µA max.	V_{ISO}	3750	V_{RMS}
Pole-to-pole isolation voltage (S1 to S2) (1) (dry air, dust free, at sea level)			1600	V
Output power dissipation (continuous)		P_{diss}	600	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) Breakdown occurs between the output pins external to the package.
(2) Refer to current limit performance application note for a discussion on relay operation during transient currents.
(3) 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 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT						
LED forward current switch turn-on (NO)	I_L = 100 mA, t = 10 ms	I_{Fon}		0.6	2	mA
LED forward current switch turn-off (NO)	V_L = ± 150 V	I_{Foff}	0.2	0.5		mA
LED forward current switch turn-on (NC)	I_L = 100 mA, t = 10 ms	I_{Fon}	0.2	0.9		mA
LED forward current switch turn-off (NC)	V_L = ± 150 V	I_{Foff}		1	2	mA
LED forward voltage	I_F = 10 mA	V_F	1.15	1.26	1.45	V
OUTPUT						
On-resistance: (NO, NC)	I_F = 5 mA (NO), I_F = 0 (NC), I_L = 50 mA (NC)	R_{ON}		10	15	Ω
Off-resistance: (NO)	I_F = 0 mA, V_L = ± 100 V	R_{OFF}	0.35	5000		GΩ
Off-resistance: (NC)	I_F = 5 mA, V_L = ± 100 V	R_{OFF}	0.1	1.4		GΩ
Current limit: (NO)	I_F = 5 mA, t = 5 ms, V_L = ± 5 V	I_{LMT}	270	360	460	mA
Off-state leakage current: (NO)	I_F = 0 mA, V_L = ± 100 V	I_O		0.02	1000	nA
Off-state leakage current: (NC)	I_F = 5 mA, V_L = ± 100 V	I_O		0.07	1	µA
Off-state leakage current: (NO, NC)	I_F = 0 mA (NO), I_F = 5 mA, V_L = ± 200 V	I_O			1	µA
Output capacitance: (NO)	I_F = 0 mA, V_L = 50 V	C_O		60		pF
Output capacitance: (NC)	I_F = 5 mA, V_L = 50 V	C_O		60		pF
TRANSFER						
Capacitance (input to output)	V_{ISO} = 1 V	C_{IO}		3		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 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Turn-on time (NO)	I_F = 10 mA, I_L = 50 mA	t_{on}		1.4	3	ms
Turn-on time (NC)	I_F = 10 mA, I_L = 50 mA	t_{on}		1.2	3	ms
Turn-off time (NO)	I_F = 10 mA, I_L = 50 mA	t_{off}		0.7	3	ms
Turn-off time (NC)	I_F = 10 mA, I_L = 50 mA	t_{off}		2	3	ms

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

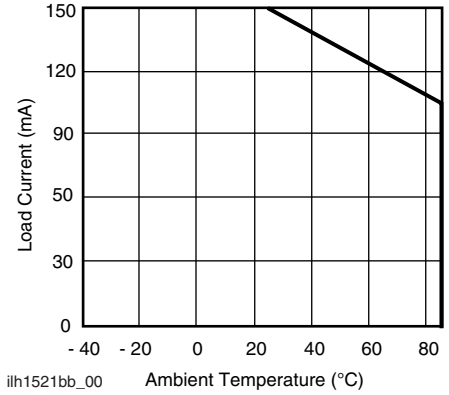


Fig. 1 - Recommended Operating Conditions

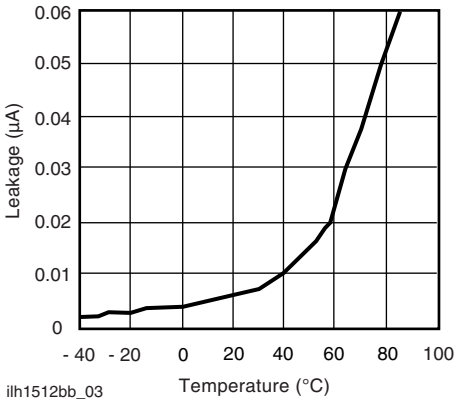


Fig. 4 - Typical Leakage vs. Temperature
(Measured across Pin 5 and 6 or 7 and 8)

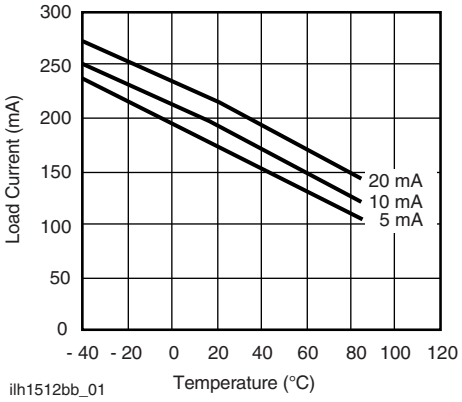


Fig. 2 - Form A Typical Load Current vs. Temperature

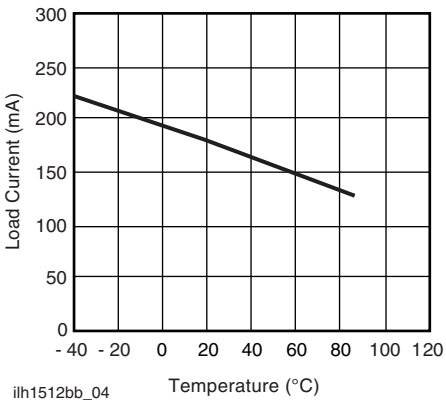


Fig. 5 - Form B Typical Load Current vs. Temperature

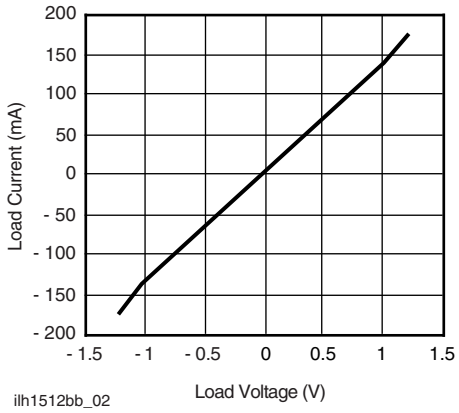


Fig. 3 - Form A Typical Load Current vs. Load Voltage

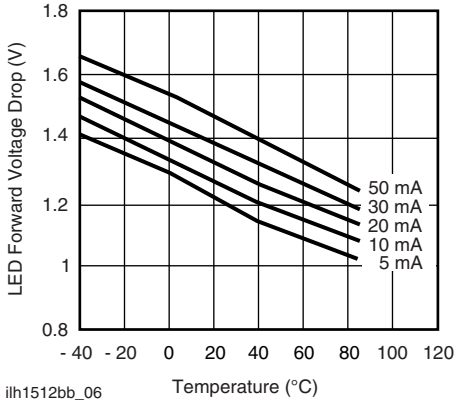


Fig. 6 - Typical LED Forward Voltage Drop vs. Temperature

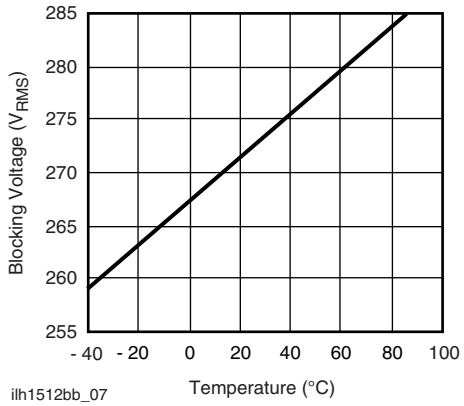


Fig. 7 - Form A Typical Blocking Voltage vs. Temperature

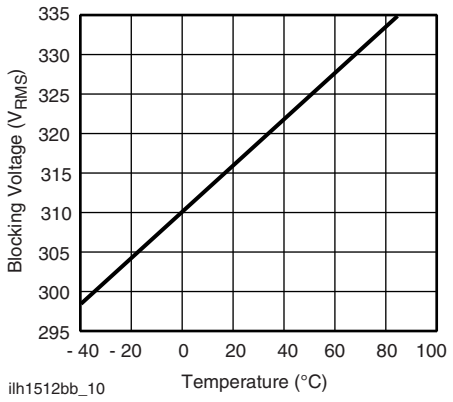


Fig. 10 - Form B Typical Blocking Voltage vs. Temperature

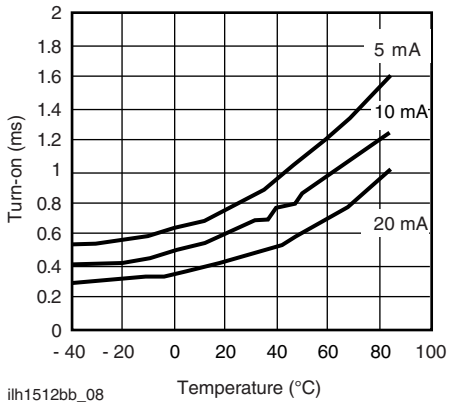


Fig. 8 - Form A Typical Turn-On vs. Temperature

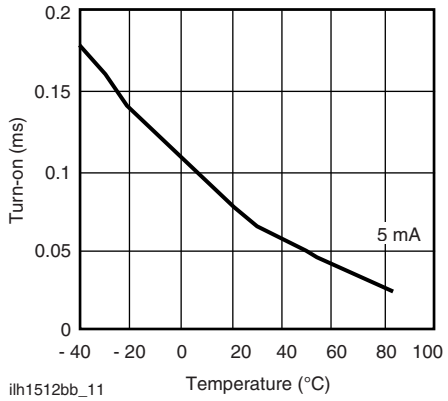


Fig. 11 - Form B Typical Turn-On vs. Temperature

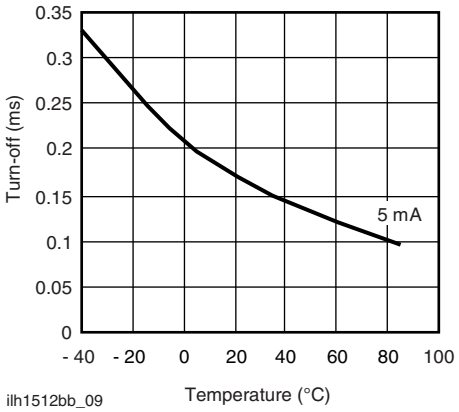


Fig. 9 - Form A Typical Turn-Off vs. Temperature

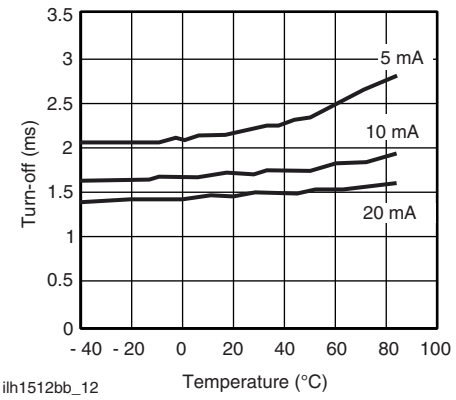


Fig. 12 - Form B Typical Turn-Off vs. Temperature

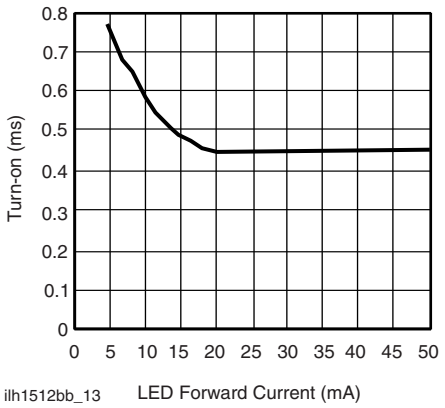


Fig. 13 - Form A Typical Turn-On vs. LED Forward Current

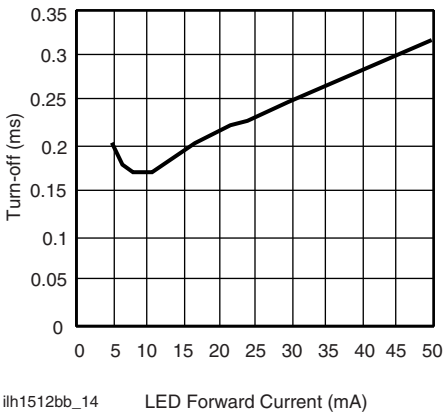


Fig. 14 - Form A Typical Turn-Off vs. LED Forward Current

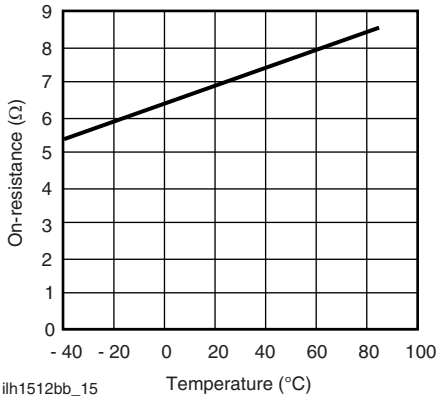


Fig. 15 - Form A Typical On-Resistance vs. Temperature

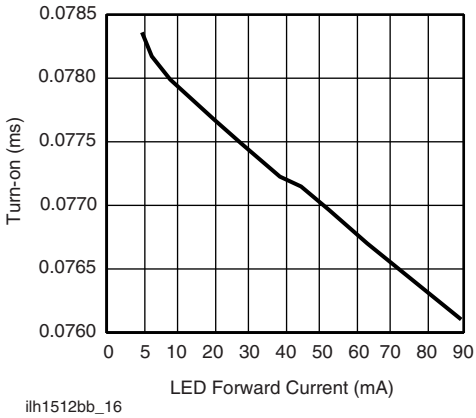


Fig. 16 - Form B Typical Turn-On vs. LED Forward Current

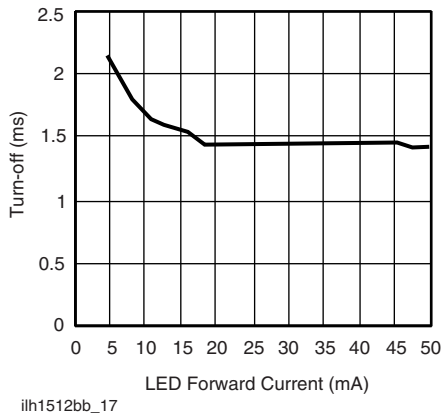


Fig. 17 - Form B Typical Turn-Off vs. LED Forward Current

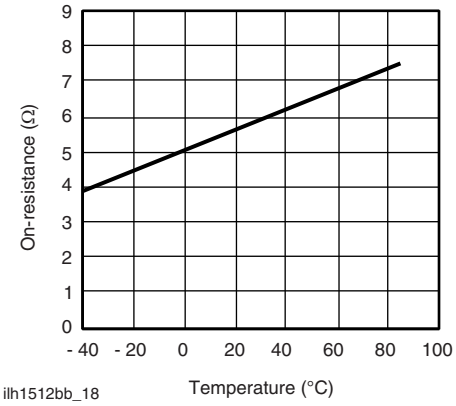


Fig. 18 - Form B Typical On-Resistance vs. Temperature

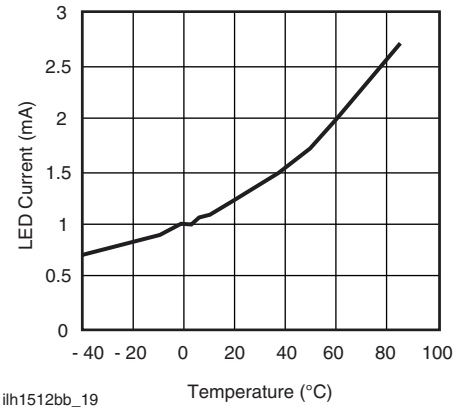


Fig. 19 - Form A Typical I_F for Switch Operation vs. Temperature

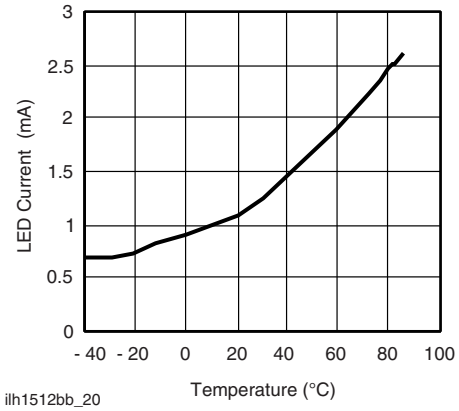


Fig. 20 - Form A Typical I_F for Switch Dropout vs. Temperature

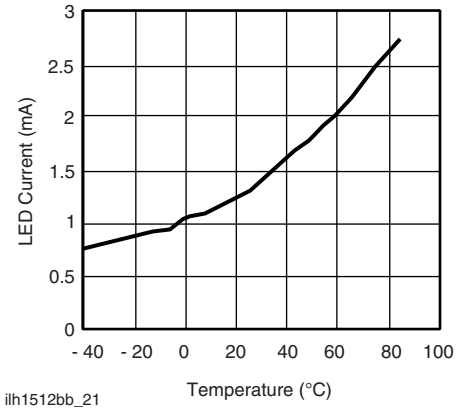


Fig. 21 - Form B Typical I_F for Switch Operation vs. Temperature

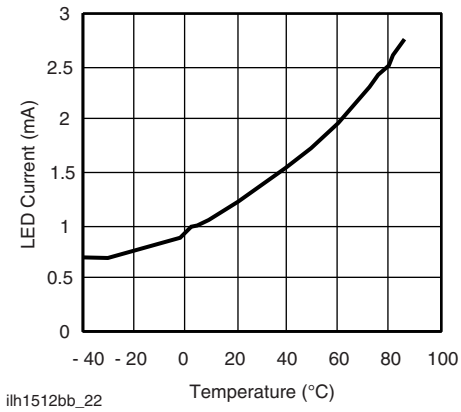
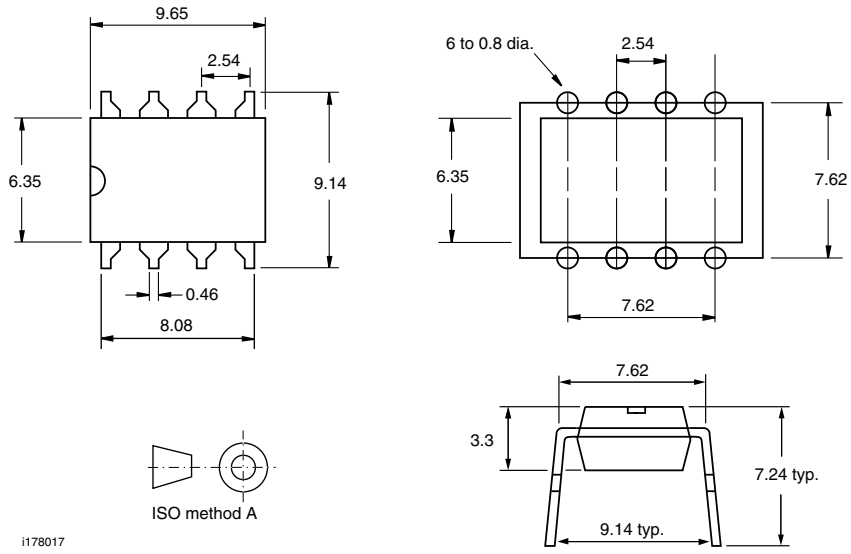


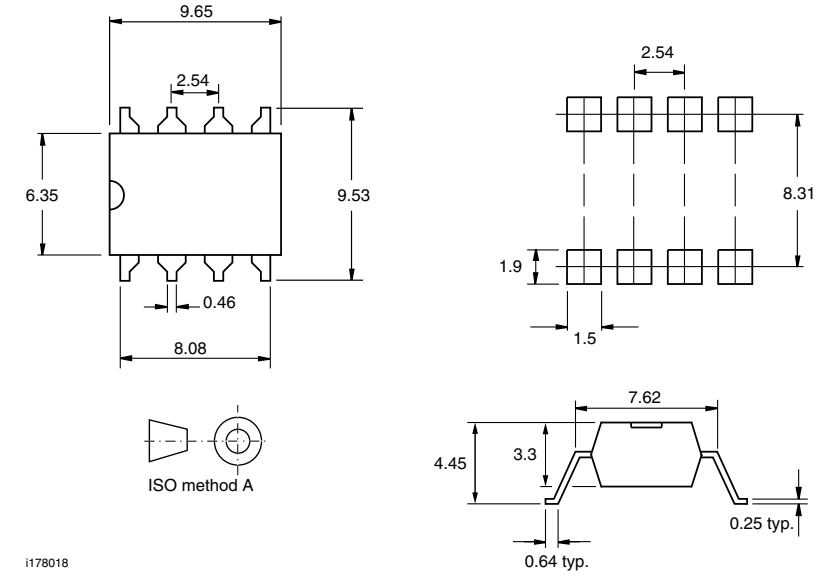
Fig. 22 - Form B Typical I_F for Switch Dropout vs. Temperature

PACKAGE DIMENSIONS in millimeters

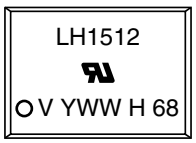
DIP



SMD



PACKAGE MARKING (example)



Note

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

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