

SIEMENS

LH1530, LH1535, LH1540 LH1541, LH1550

1 Form A

Absolute Maximum Ratings $T_A=25^\circ\text{C}$

Stresses in excess of the Absolute Maximum Ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not

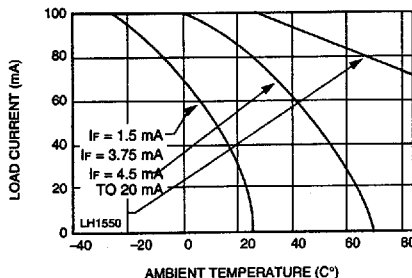
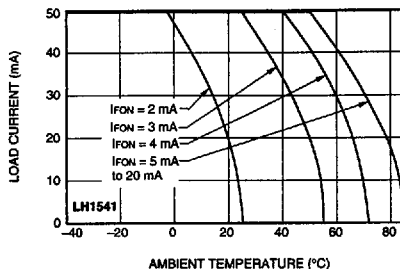
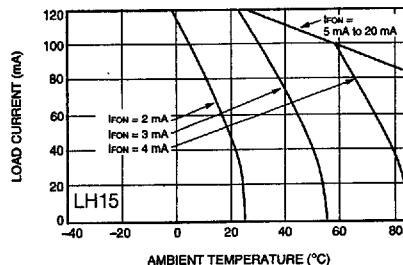
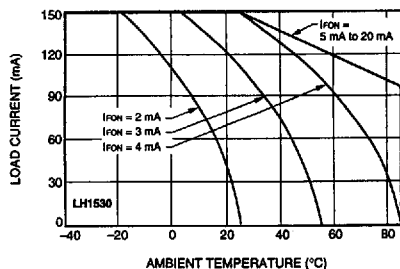
implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to Absolute Maximum Ratings for extended periods of time can adversely affect reliability.

Parameter	Symbol	Test Conditions	LH1530	LH1535/ LH1540	LH1541	LH1550	Units
Ambient Operating Temperature Range	T_A	—	-40 to +85	-40 to +85	-40 to +85	-40 to +85	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	—	-40 to +150	-40 to +150	-40 to +150	-40 to +150	$^\circ\text{C}$
Pin Soldering Temperature	T_S	$t=10\text{ s max}$	260	260	260	260	$^\circ\text{C}$
Input/Output Isolation Voltage*	V_{ISO}	—	3750	3750	3750	3750	Vrms
LED Continuous Forward Current	I_F	—	50	50	50	50	mA
LED Reverse Voltage	V_R	$I_R \leq 10\text{ }\mu\text{A}$	8	8	8	5	V
dc or Peak ac Load Voltage	V_L	$I_L \leq 50\text{ }\mu\text{A}$	350	400/350	200	350	V
Continuous dc Load Current	I_L	—	150	120	55	100	mA
Bidirectional Operation			250	250	—	—	mA
Unidirectional Operation							
Peak Load Current	I_P	$t=100\text{ ms}$ (single shot)	400	†	100	†	mA
Output Power Dissipation (continuous)	P_{DISS}	—	550	550	550	550	mW

* 5300 Vrms input/output isolation voltage available on some products. Consult factory.

† Refer to Current-Limit Performance Application Note for a discussion on relay operation during transient currents

Recommended Operating Conditions



8235605 0095704 125

Electrical Characteristics $T_A=25^{\circ}\text{C}$

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 purposes only and are not part of the testing requirements.

	Parameter	Symbol	Test Conditions	Values	LH1530	LH1535/ LH1540	LH1541	LH1550	Units	
INPUT	LED Forward Current for Switch Turn-on	I_{Fon}	$I_L=100\text{ mA}$ $t=10\text{ ms}$	Min	—	—	—	—	mA	
				Typ	1.0	1.0	0.6	1.2	mA	
				Max	2.0	2.0	2.0	2.5	mA	
	LED Forward Current for Switch Turn-off	I_{Foff}		Min	0.2	0.2	0.1	0.01	mA	
				Typ	0.9	0.9	0.5	1.100	mA	
				Max	—	—	—	—	mA	
	LED Forward Voltage	V_F	$I_F=10\text{ mA}$	V_L	$\pm$	300	350/300	150	300	V
OUTPUT				Min	1.15	1.15	1.10*	1.10*	V	
				Typ	1.26	1.26	1.19*	1.19*	V	
				Max	1.45	1.45	1.45*	1.45*	V	
	ON-resistance ac/dc Pin 4 ($\pm$) to 6 ($\pm$)	R_{ON}	$I_F=5\text{ mA}$ $I_L=50\text{ mA}$	Min	12	12	70	25†	Ω	
				Typ	18	20	110	37†	Ω	
				Max	25	25	160	50†	Ω	
	dc Pin 4, 6 (+) to 5 ($\pm$)		$I_F=5\text{ mA}$ $I_L=100\text{ mA}$	Min	3.00	3.00	—	—	Ω	
				Typ	5.00	5.00	—	—	Ω	
				Max	6.25	6.25	—	—	Ω	
	OFF-resistance	R_{OFF}	$I_F=0\text{ mA}$ $V_L=\pm 100\text{ V}$	Min	0.5	0.5	0.5	0.5	G Ω	
				Typ	5000	5000	10000	5000	G Ω	
				Max	—	—	—	—	G Ω	
	ON-state Voltage	—	$I_L=1\text{ mA}$	Min	—	—	—	—	V	
				Typ	—	—	—	—	V	
				Max	—	—	—	—	V	
			$I_L=90\text{ mA}$ $t=10\text{ ms}$	Min	—	—	—	—	V	
				Typ	—	—	—	—	V	
				Max	—	—	—	—	V	
	Current Limit ac/dc Pin 4 ($\pm$) to 6 ($\pm$)	I_{LMT}	$I_F=5\text{ mA}$ $t=5\text{ ms}$	Min	—	170	—	150	mA	
				Typ	—	210	—	200	mA	
				Max	—	250	—	270	mA	
	dc Pin 4, 6 (+) to 5 ($\pm$)		V_L	$\pm$	—	6	—	13	V	
			$I_F=5\text{ mA}$, $V_L=4\text{ V}$ $t=5\text{ ms}$	Min	—	—	—	—	mA	
				Typ	—	—	—	—	mA	
				Max	—	—	—	—	mA	
	Off-state Leakage Current	—	$I_F=0\text{ mA}$ $V_L=\pm 100\text{ V}$	Min	—	—	—	—	nA	
				Typ	0.1	0.32	0.4	0.3	nA	
				Max	200	200	200	200	nA	
			$I_F=0\text{ mA}$	Min	—	—	—	—	μA	
				Typ	—	—	—	—	μA	
				Max	1.0	1.0	1.0	1.0	μA	
			V_L	$\pm$	350	400/350	200	350	V	
	Output Capacitance Pin 4 to 6	—	$I_F=0\text{ mA}$ $V_L=1\text{ V}$	Min	—	—	—	—	pF	
				Typ	55	55	4.8	40	pF	
				Max	—	—	—	—	pF	
			$I_F=0\text{ mA}$ $V_L=50\text{ V}$	Min	—	—	—	—	pF	
				Typ	10	10	3.6	8	pF	
				Max	—	—	—	—	pF	
	Switch Offset	—	$I_F=5\text{ mA}$	Min	—	—	—	—	V	
				Typ	0.15	0.15	0.15	0.15	V	
				Max	—	—	—	—	V	
	TRANSFER	Input/Output Capacitance	C_{ISO}	$V_{ISO}=1\text{ V}$	Min	—	—	—	—	pF
				Typ	0.8	0.8	0.8	0.8	pF	
				Max	—	—	—	—	pF	
Turn-on Time		t_{on}	$I_F=5\text{ mA}$ $I_L=50\text{ mA}$	Min	—	—	—	—	ms	
				Typ	0.5†	1.2	0.12	1.4	ms	
				Max	1.0†	2.0	0.25	3.0	ms	
	Turn-off Time	t_{off}	$I_F=5\text{ mA}$ $I_L=50\text{ mA}$	Min	—	—	—	—	ms	
				Typ	0.5†	0.5	0.03	0.5	ms	
				Max	1†	2.0	0.25	3.0	ms	

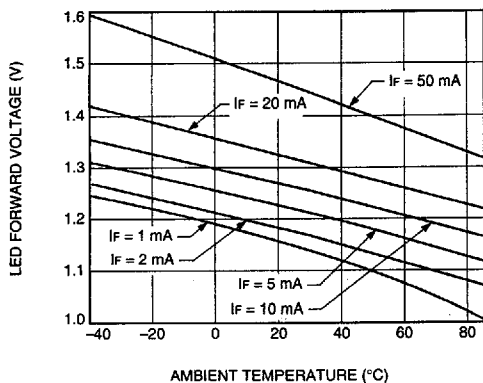
* $I_F=5\text{ mA}$.

† $I_F=10\text{ mA}$.

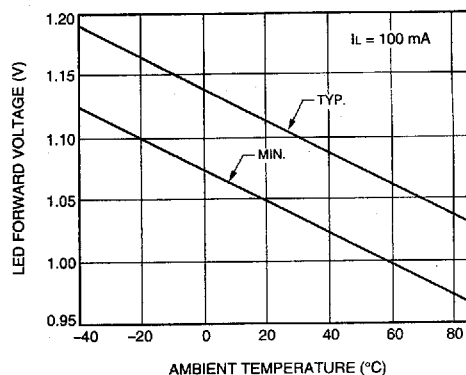
‡ $I_L=100\text{ mA}$, $t=10\text{ ms}$

8235605 0095705 061

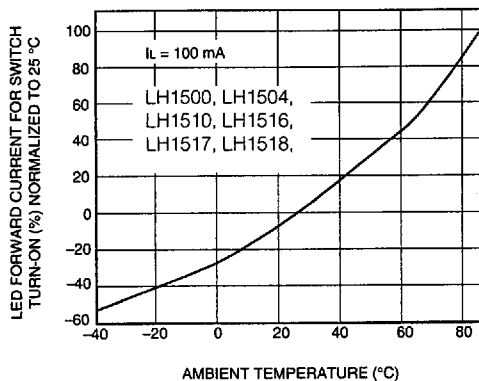
A. LED Voltage vs. Temperature



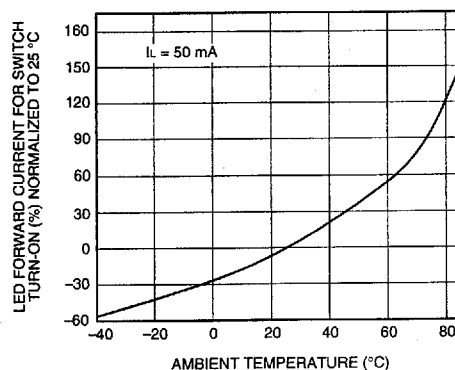
B. LED Dropout Voltage vs. Temperature



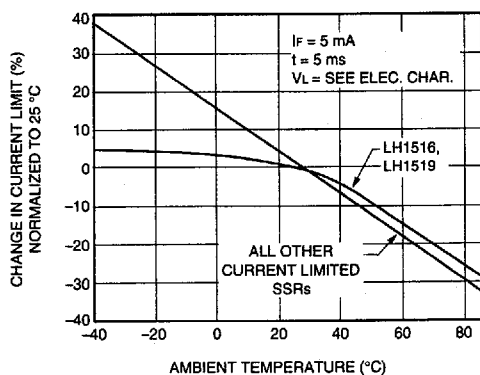
C. LED Current for Switch Turn-On vs. Temperature



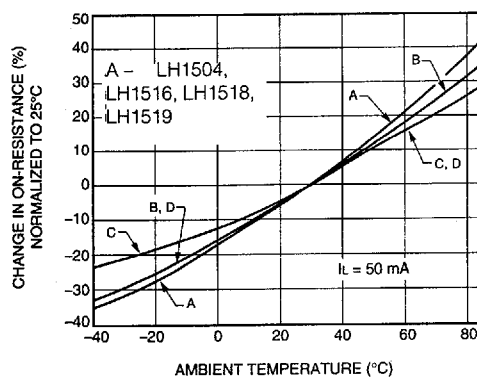
D. LED Current for Switch Turn-On vs. Temperature (LH1541)



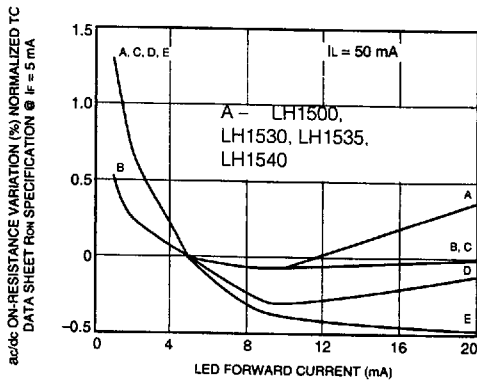
E. Current Limit vs. Temperature



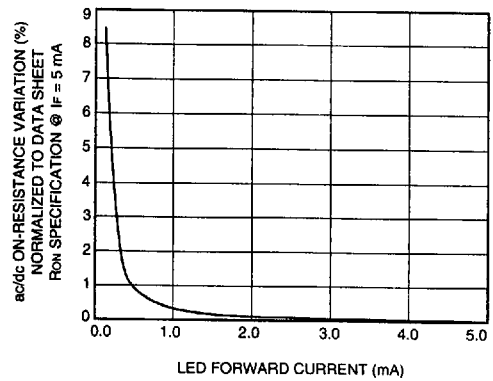
F. ON-Resistance vs. Temperature



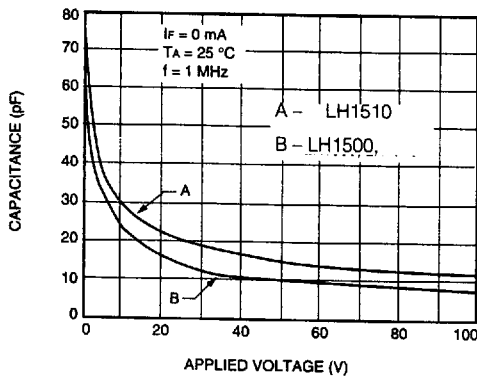
A. Variation in ON-Resistance vs. LED Current



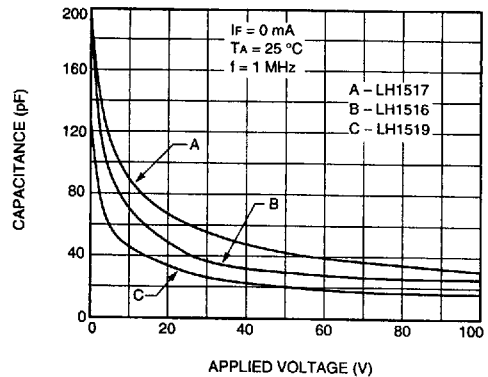
B. Variation in ON-Resistance vs. LED Current (LH1525)



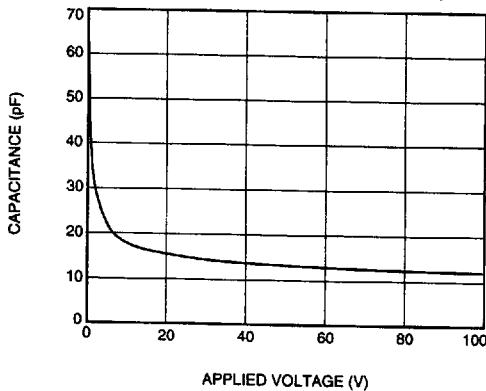
C. Switch Capacitance vs. Applied Voltage



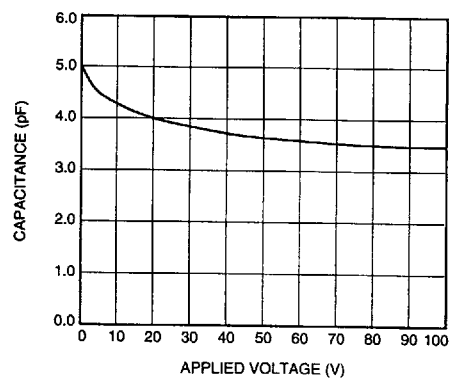
D. Switch Capacitance vs. Applied Voltage



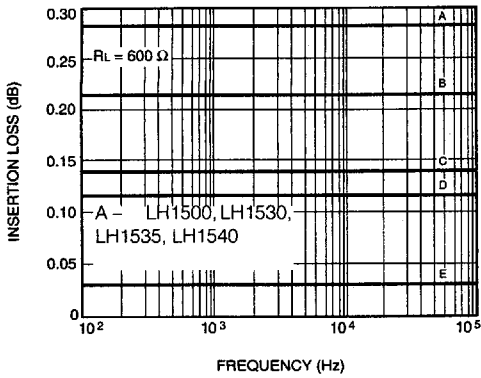
E. Switch Capacitance vs. Applied Voltage (LH1525)



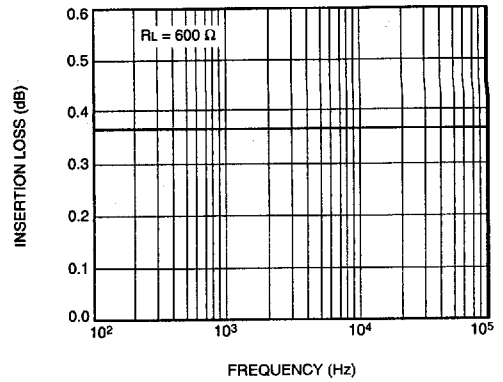
F. Switch Capacitance vs. Applied Voltage (LH1541)



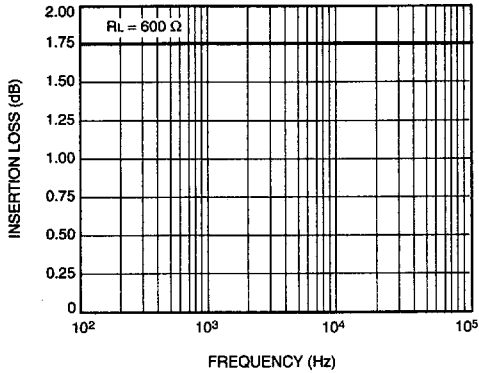
A. Insertion Loss vs. Frequency



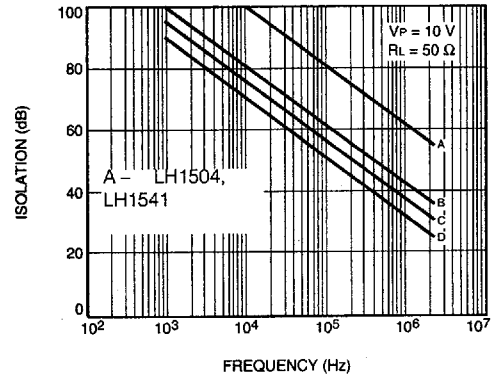
B. Insertion Loss vs. Frequency (LH1525)



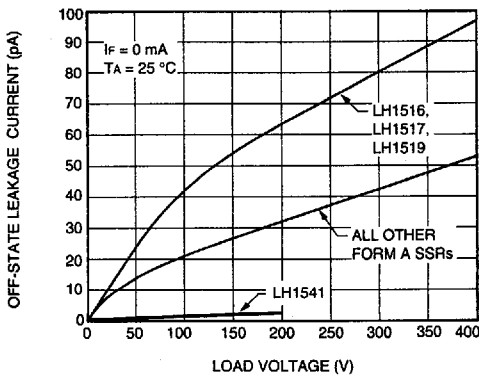
C. Insertion Loss vs. Frequency (LH1541)



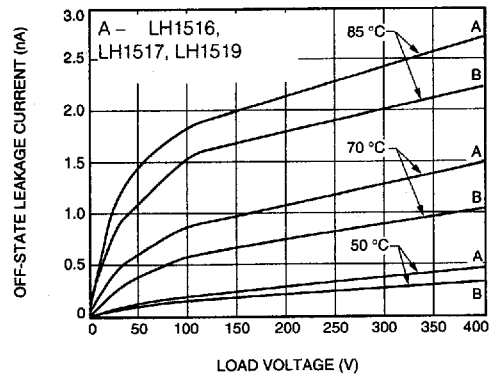
D. Output Isolation



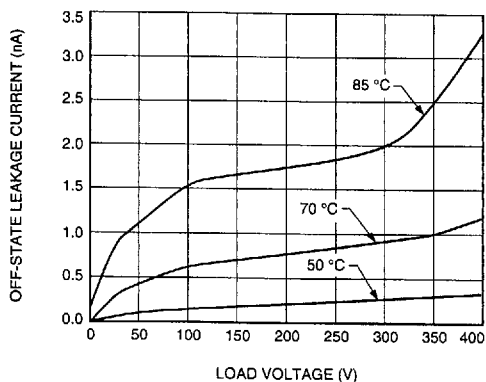
E. Leakage Current vs. Applied Voltage



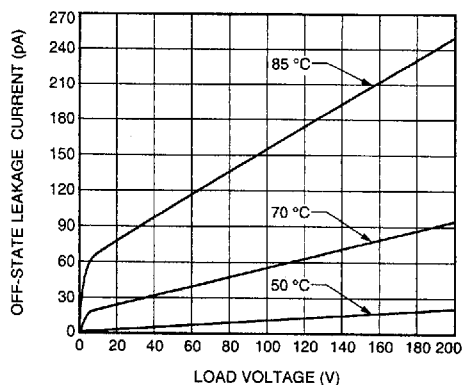
F. Leakage Current vs. Applied Voltage at Elevated Temperatures



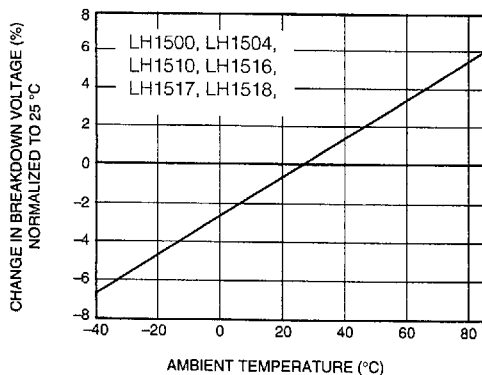
A. Leakage Current vs. Applied Voltage at Elevated Temperatures (LH1525)



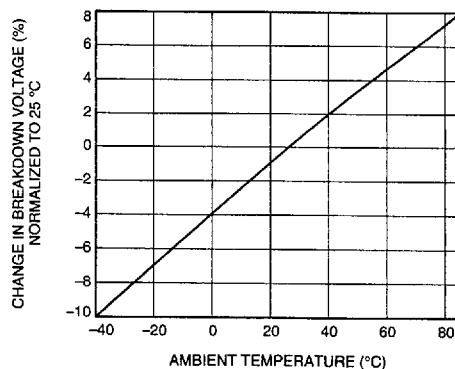
B. Leakage Current vs. Applied Voltage at Elevated Temperatures (LH1541)



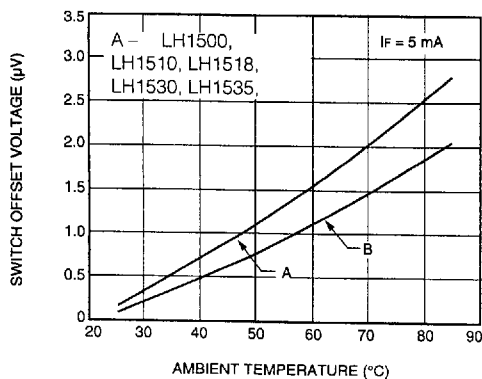
C. Switch Breakdown Voltage vs. Temperature



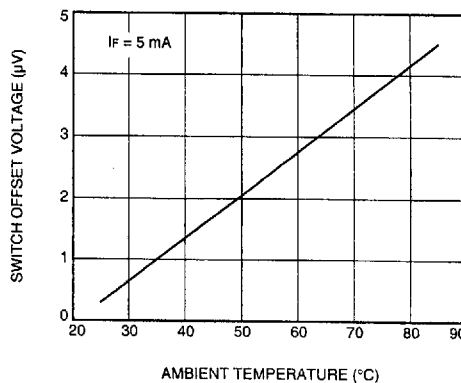
D. Switch Breakdown Voltage vs. Temperature (LH1541)



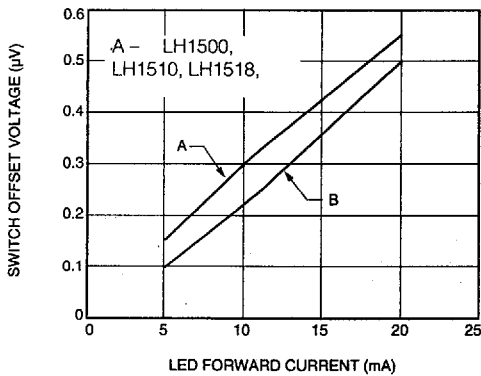
E. Switch Offset Voltage vs. Temperature



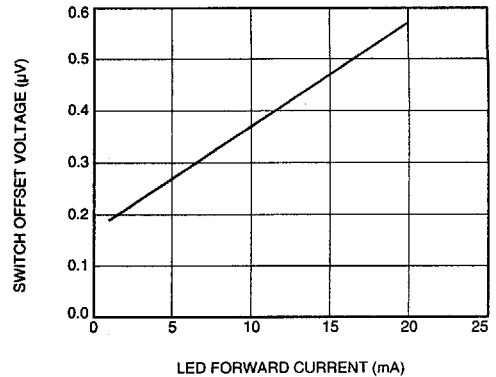
F. Switch Offset Voltage vs. Temperature (LH1525)



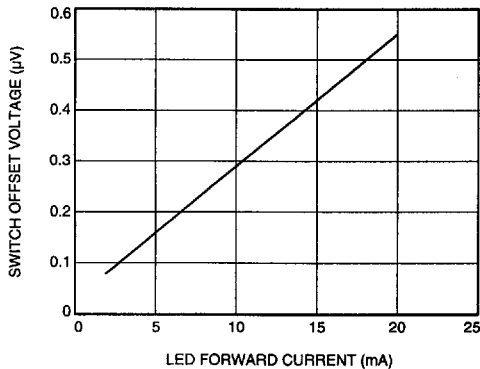
A. Switch Offset Voltage vs. LED Current



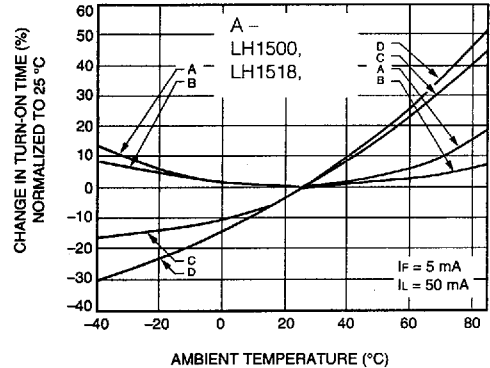
B. Switch Offset Voltage vs. LED Current (LH1525)



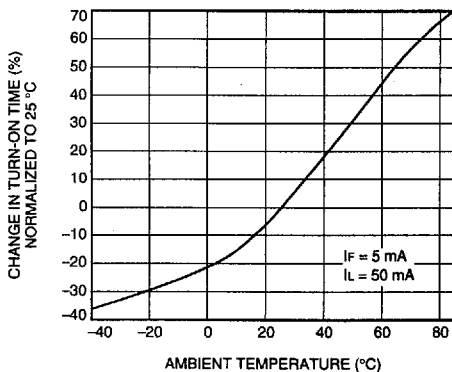
C. Switch Offset Voltage vs. LED Current (LH1541)



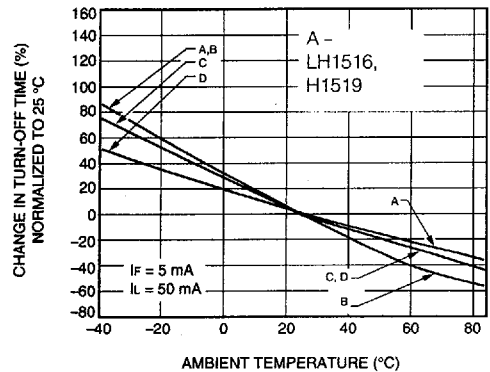
D. Turn-On Time vs. Temperature



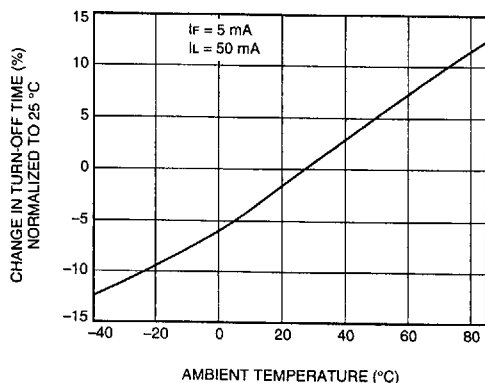
E. Turn-On Time vs. Temperature (LH1541)



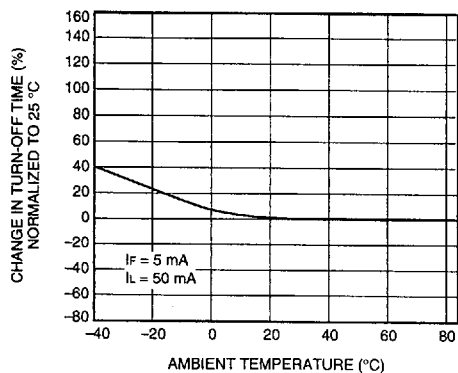
F. Turn-Off Time vs. Temperature



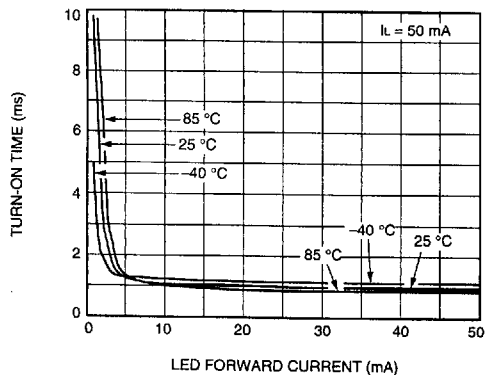
A. Turn-Off Time vs. Temperature (LH1525)



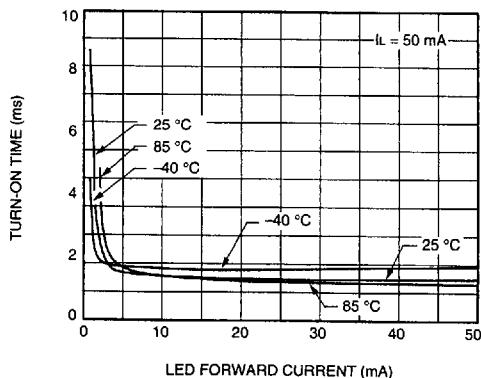
B. Turn-Off Time vs. Temperature (LH1541)



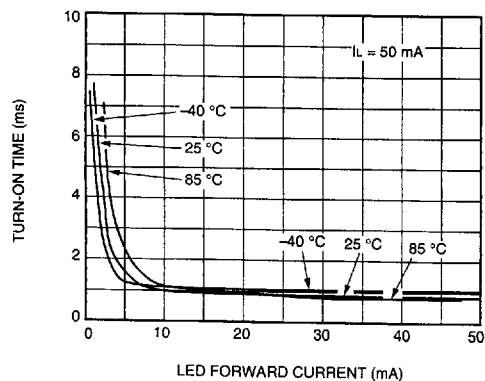
C. Turn-On Time vs. LED Current (LH1500, LH1518, LH1540)



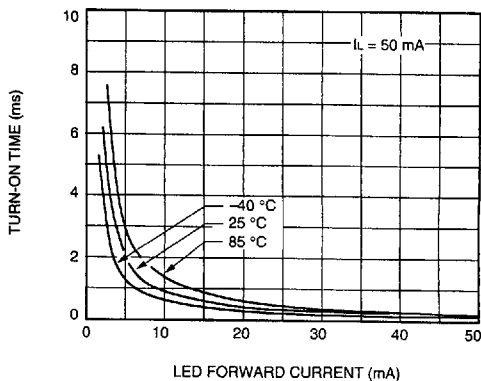
D. Turn-On Time vs. LED Current (LH1504)



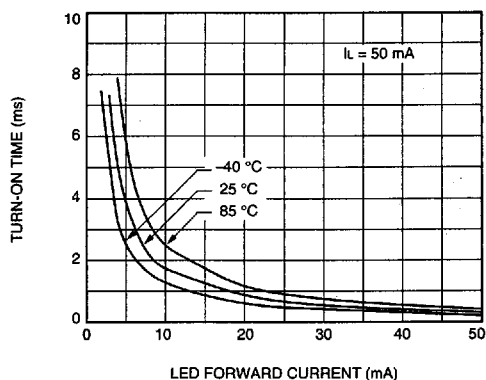
E. Turn-On Time vs. LED Current (LH1510)



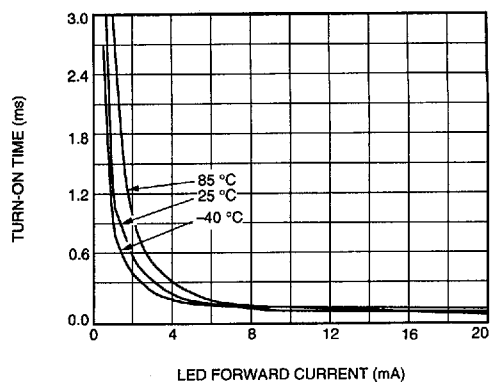
F. Turn-On Time vs. LED Current (LH1516, LH1519)



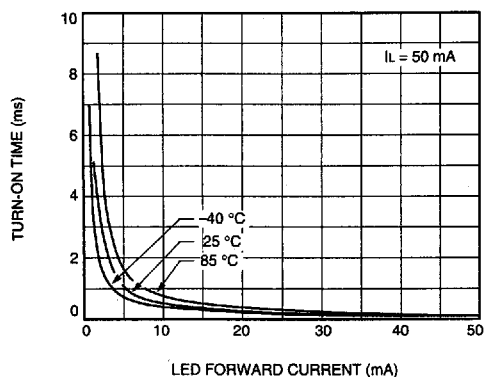
A. Turn-On Time vs. LED Current (LH1517)



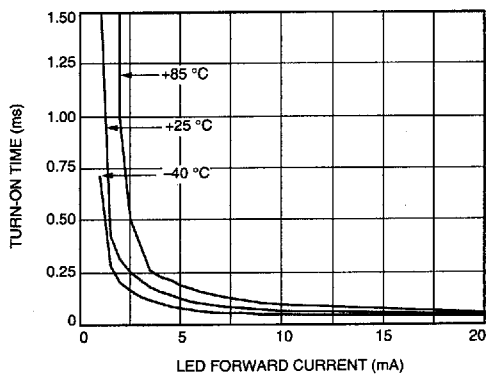
B. Turn-On Time vs. LED Current (LH1525)



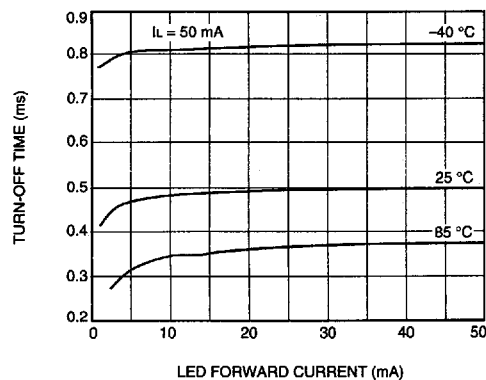
C. Turn-On Time vs. LED Current (LH1530)



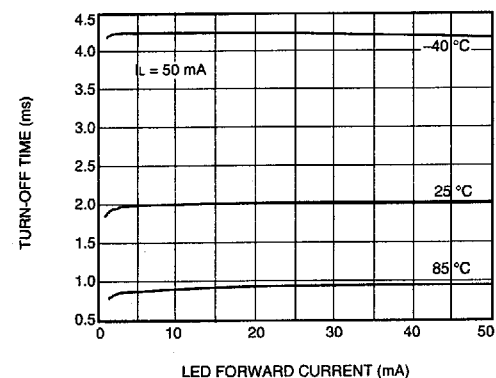
D. Turn-On Time vs. LED Current (LH1541)



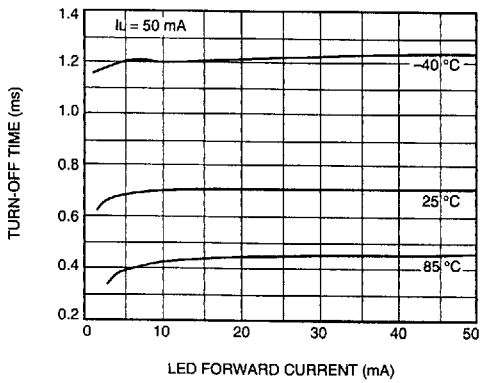
E. Turn-Off Time vs. LED Current (LH1500, LH1530, LH1540)



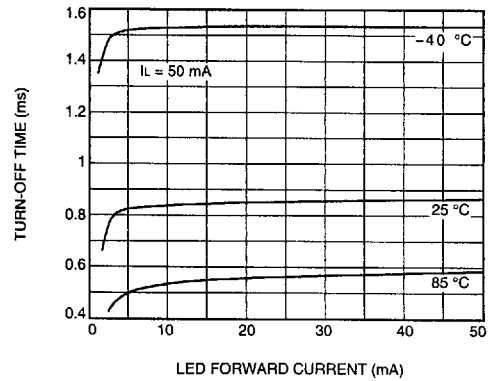
F. Turn-Off Time vs. LED Current (LH1504)



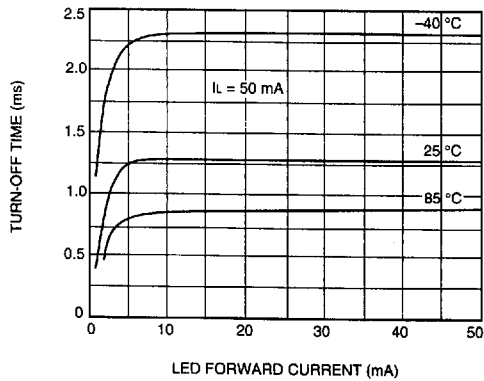
A. Turn-Off Time vs. LED Current (LH1510, LH1518)



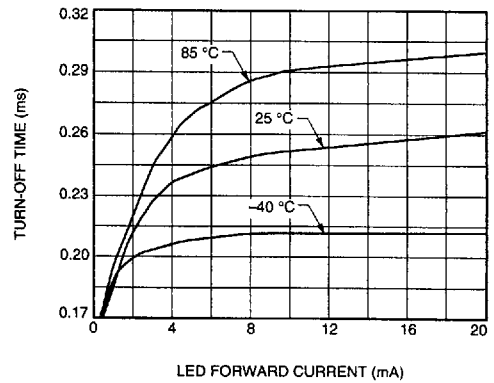
B. Turn-Off Time vs. LED Current (LH1516, LH1519)



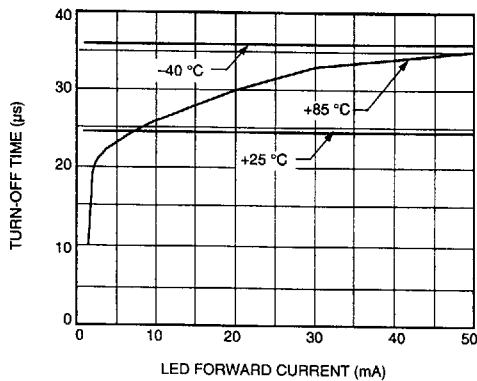
C. Turn-Off Time vs. LED Current (LH1517)



D. Turn-Off Time vs. LED Current (LH1525)

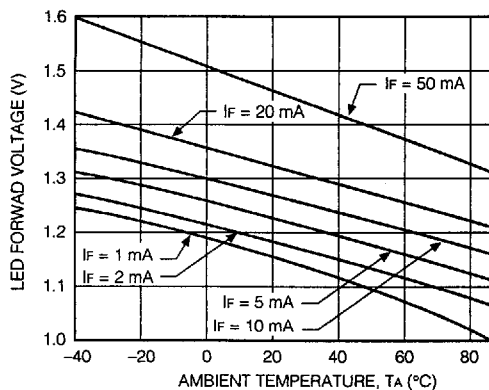


E. Turn-Off Time vs. LED Current (LH1541)

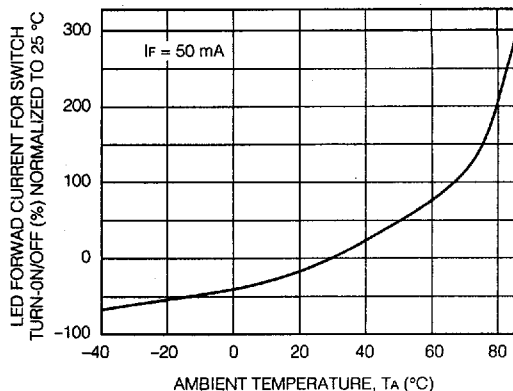


Typical Performance Characteristics, LH1550

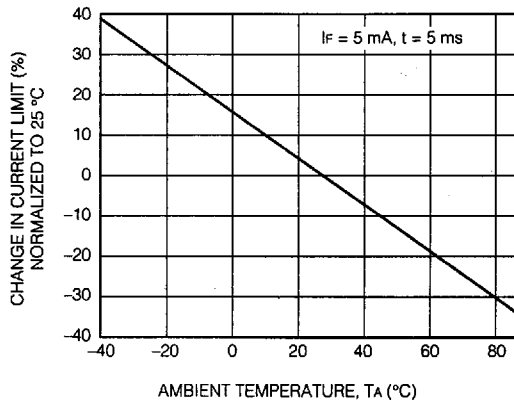
A. LED Voltage vs. Temperature



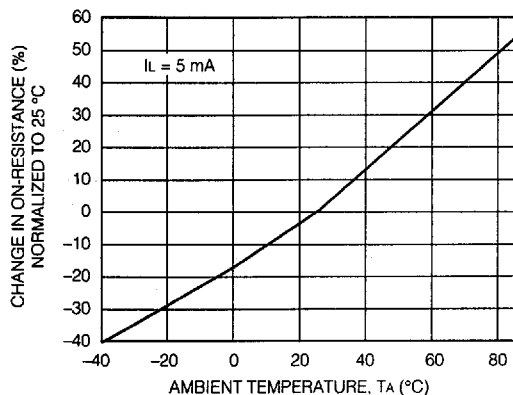
B. LED Current for Switch Turn-On/Off vs. Temperature



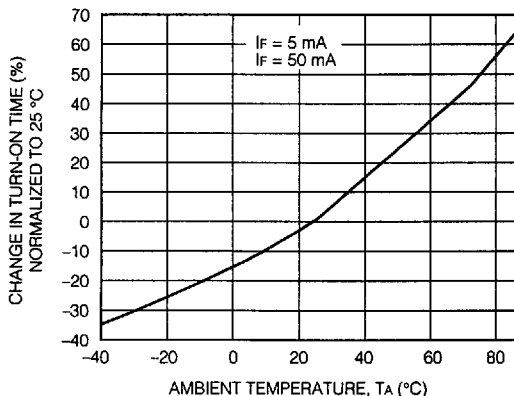
C. Current Limit vs. Temperature



D. ON-Resistance vs. Temperature



E. Turn-On Time vs. Temperature



F. Turn-Off Time vs. Temperature

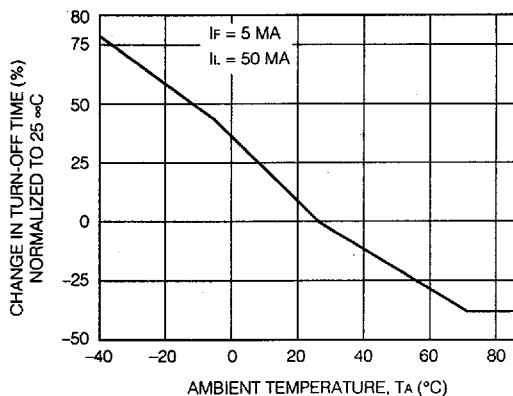


Figure 1. 6-pin DIP

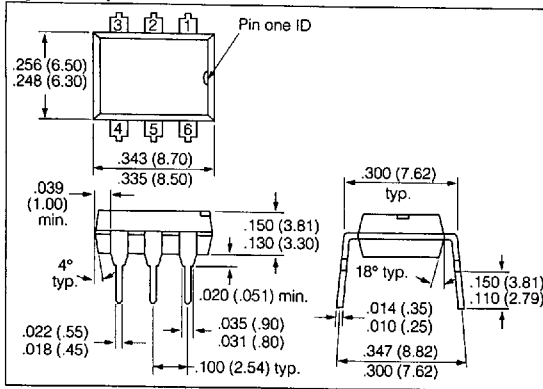


Figure 2. 6-pin, SMD

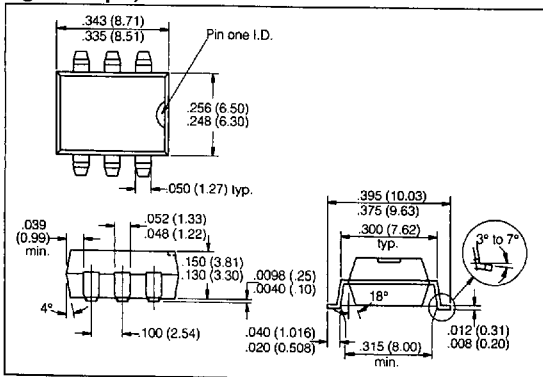


Figure 3. 8-pin DIP

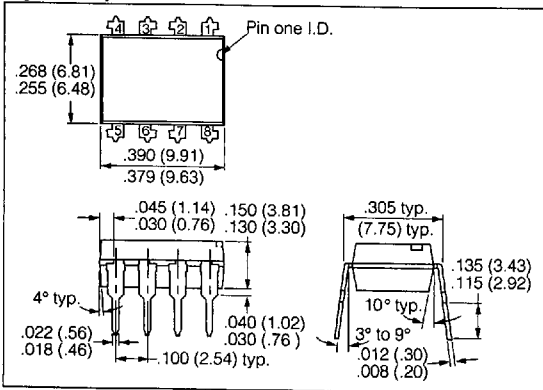


Figure 4. 8-pin, SMD

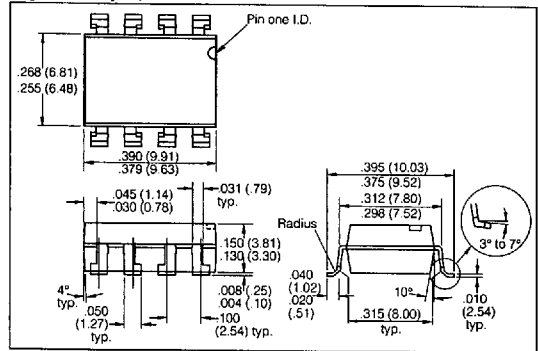


Figure 5. 8-pin SOP (PCMCIA)

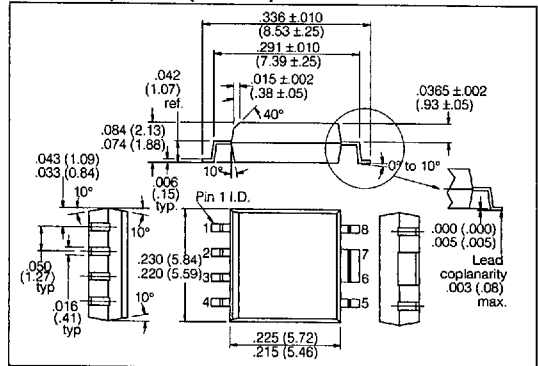


Figure 6. 18-pin SOP (PCMCIA)

