Absolute Maximum Ratings T_A=25°C

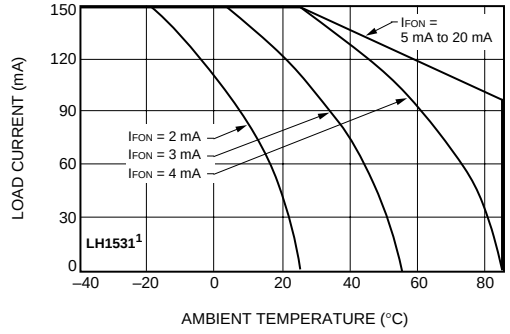
Stresses in excess of the Absolute Maximum Ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to Absolute Maximum Ratings for extended periods of time can adversely affect reliability.

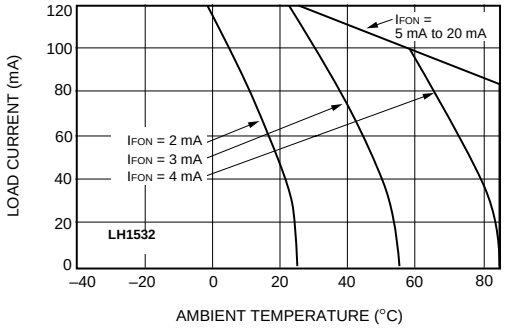
Parameter	Symbol	Test Conditions	LH1531	LH1532	LH1544	Units
Ambient Operating Temperature Range	T_A	—	–40 to +85	–40 to +85	–40 to + 85	°C
Storage Temperature Range	T_{stg}	—	–40 to +150	–40 to +150	–40 to +150	°C
Pin Soldering Temperature	T_S	t=10 s max	260	260	260	°C
Input/Output Isolation Test Voltage	V_{ISO}	t=1 Sec	5300	5300	5300	Vrms
Pole-to-Pole Isolation Voltage (S1 to S2)†	—	Dry air, dust free, at sea level	1600	1600	1600	V
LED Continuous Forward Current	I_F	—	50	50	50	mA
LED Reverse Voltage	V_R	$I_R \leq 10\ \mu A$	8	8	8	V
dc or Peak ac Load Voltage	V_L	$I_L \leq 50\ \mu A$	350	350	200	V
Continuous dc Load Current One Pole Operating Two Poles Operating	I_L	—	 150 110	 120 110	 55 40	 mA mA
Peak Load Current	I_P	t=100 ms (single shot)	400	*	100	mA
Output Power Dissipation (continuous)	P_{DISS}	—	600	600	600	mW

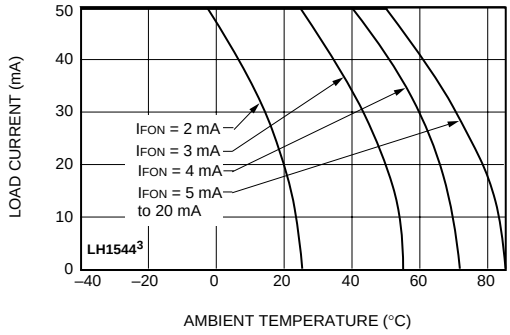
* Refer to Current-Limit Performance Application Note for a discussion on relay operation during transient currents.

† Breakdown occurs between the output pins external to the package.

SSR Recommended Operating Conditions





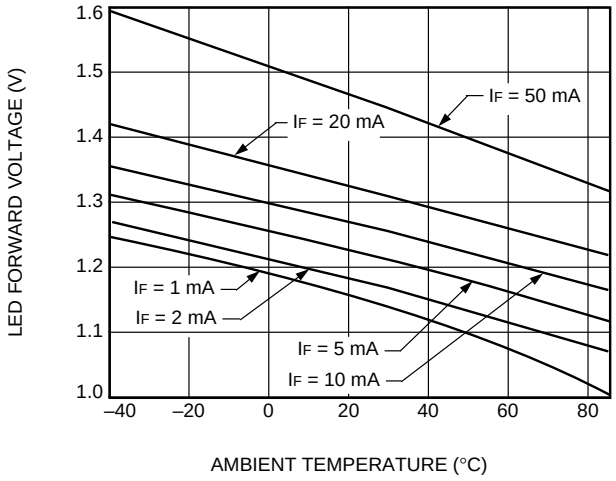


Electrical Characteristics T_A=25°C
Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluations. Typical values are for information purposes only and are not part of the testing requirements.

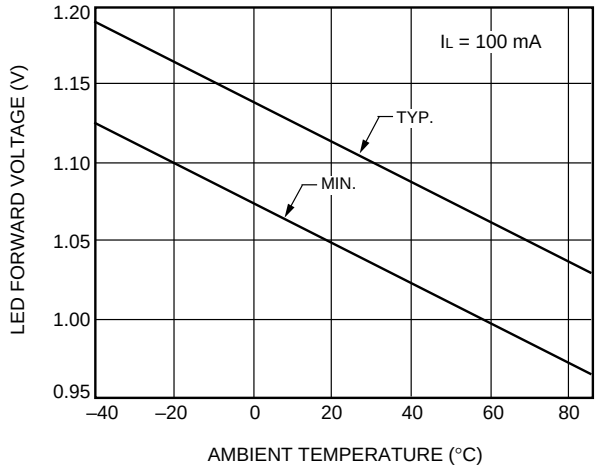
	Parameter	Symbol	Test Conditions	Values	LH1531	LH1532	LH1544	Units
INPUT	LED Forward Current for Switch Turn-on	I_{Fon}	I_L=100 mA t=10 ms	Min	—	—	—	mA
				Typ	1.0	1.0	0.9	mA
				Max	2.0	2.0	2.0	mA
	LED Forward Current for Switch Turn-off	I_{Foff}	—	Min	0.2	0.2	0.2	mA
				Typ	0.9	0.9	0.8	mA
				Max	—	—	—	mA
			V_L	±	300	300	150	V
	LED Forward Voltage	V_F	I_F=10 mA	Min	1.15	1.15	1.10*	V
				Typ	1.26	1.26	1.19*	V
				Max	1.45	1.45	1.45*	V
OUTPUT	ON-resistance	R_{ON}	I_F=5 mA I_L=50 mA	Min	12	12	70	Ω
				Typ	18	20	110	Ω
				Max	25	25	160	Ω
	OFF-resistance	R_{OFF}	I_F=0 mA V_L=±100 V	Min	0.5	0.5	0.5	GΩ
				Typ	5000	5000	10000	GΩ
				Max	—	—	—	GΩ
	ON-state Voltage	—	I_L=1 mA	Min	—	—	—	V
				Typ	—	—	—	V
				Max	—	—	—	V
			I_L=90 mA t=10 ms	Min	—	—	—	V
				Typ	—	—	—	V
				Max	—	—	—	V
	Current Limit	I_{LMT}	I_F=5 mA t=5 ms	Min	—	170	—	mA
				Typ	—	210	—	mA
				Max	—	250	—	mA
			V_L	±	—	6	—	V
	Off-state Leakage Current	—	I_F=0 mA V_L=±100 V	Min	—	—	—	nA
				Typ	0.02	0.02	0.01	nA
				Max	200	200	200	nA
			I_F=0 mA	Min	—	—	—	µA
				Typ	—	—	—	µA
				Max	1.0	1.0	1.0	µA
			V_L	±	350	350	200	V
	Output Capacitance	—	I_F=0 mA V_L=1 V	Min	—	—	—	pF
				Typ	55	55	0	pF
				Max	—	—	—	pF
			I_F=0 mA V_L=50 V	Min	—	—	—	pF
				Typ	10	10	0.5	pF
				Max	—	—	—	pF
	Pole-to-pole Capacitance (S1 to S2)	—	I_F=5 mA	Min	—	—	—	pF
				Typ	0.5	0.5	0.5	pF
				Max	—	—	—	pF
	Switch Offset	—	I_F=5 mA	Min	—	—	—	µV
				Typ	0.15	0.15	0.1	µV
				Max	—	—	—	µV
TRANSFER	Input/Output Capacitance	C_{ISO}	V_{ISO}=1 V	Min	—	—	—	pF
				Typ	1.1	1.1	1.1	pF
				Max	—	—	—	pF
	Turn-on Time	t_{on}	I_F=5 mA I_L=50 mA	Min	—	—	—	ms
				Typ	1.0†	1.4	0.13‡	ms
				Max	2.0†	2.5	0.25‡	ms
	Turn-off Time	t_{off}	I_F=5 mA I_L=50 mA	Min	—	—	—	ms
				Typ	1.0†	0.7	0.06‡	ms
				Max	2.0†	2.5	0.25‡	ms

* I_F=5 mA, † I_F=10 mA, ‡ I_L=12.5 mA
The following information refers to the SSR Recommended Operation Conditions on the previous page.
1) Both relays on with equal load currents. For single relay operation, refer to the LH1530 Recommended Operating Conditions graph.
2) Both relays on with equal load currents. For single relay operation, refer to the LH1540 Recommended Operating Conditions graph.
3) Single relay operation.

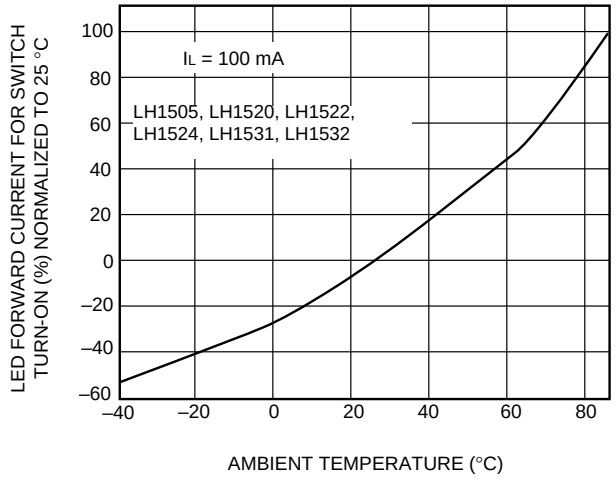
A. LED Voltage vs. Temperature



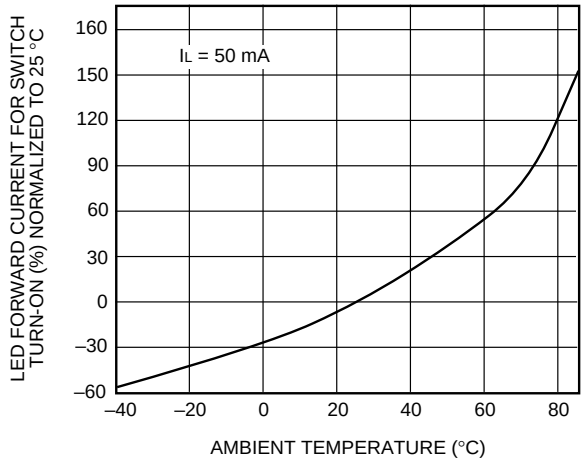
B. LED Dropout Voltage vs. Temperature



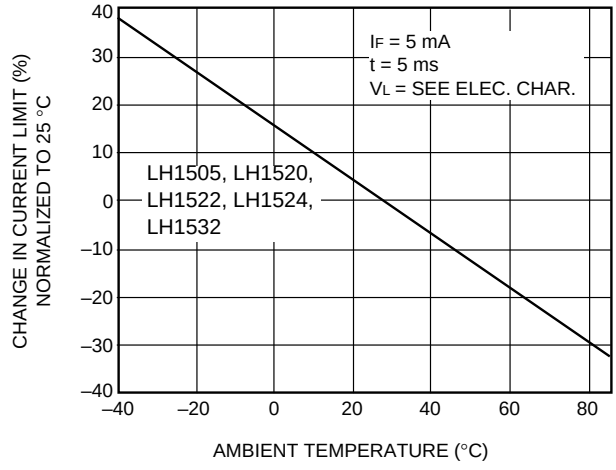
C. LED Current for Switch Turn-On vs. Temperature



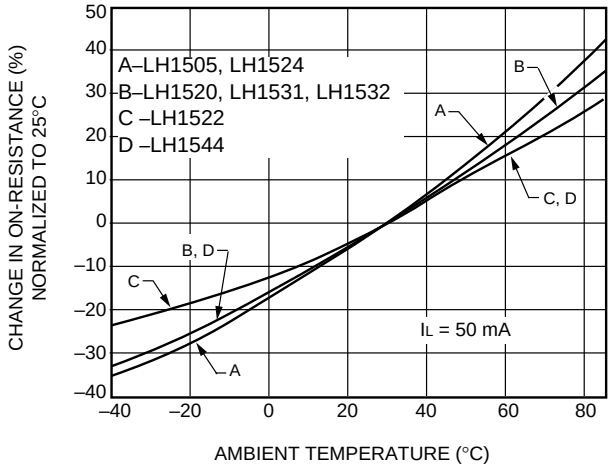
D. LED Current for Switch Turn-On vs. Temperature (LH1544)



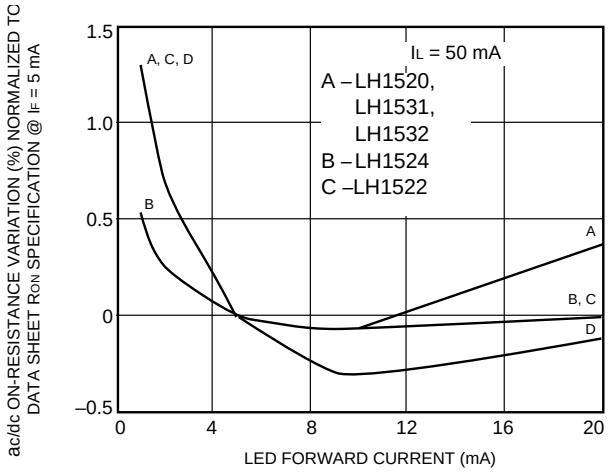
E. Current Limit vs. Temperature



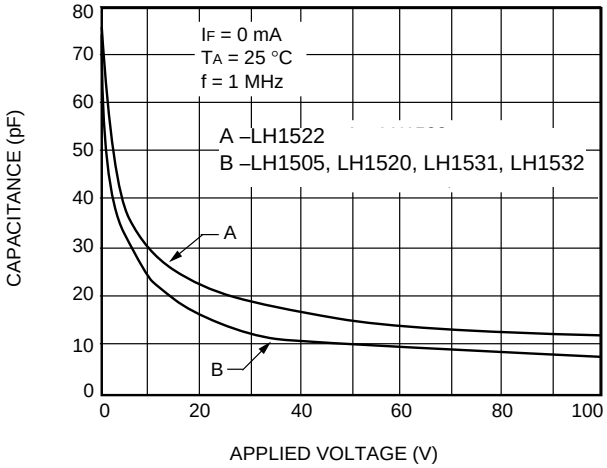
F. ON-Resistance vs. Temperature



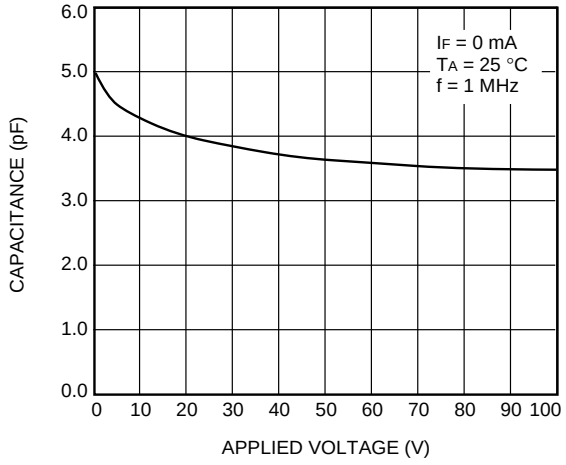
A. Variation in ON-Resistance vs. LED Current



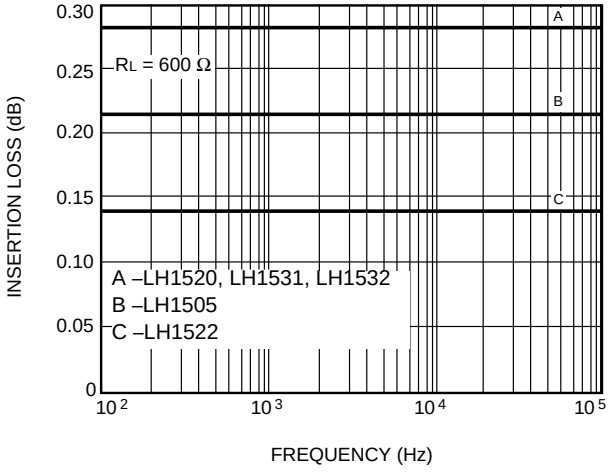
B. Switch Capacitance vs. Applied Voltage



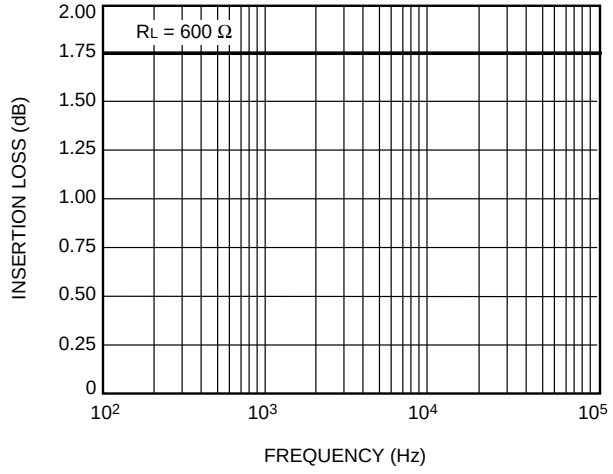
C. Switch Capacitance vs. Applied Voltage (LH1544)



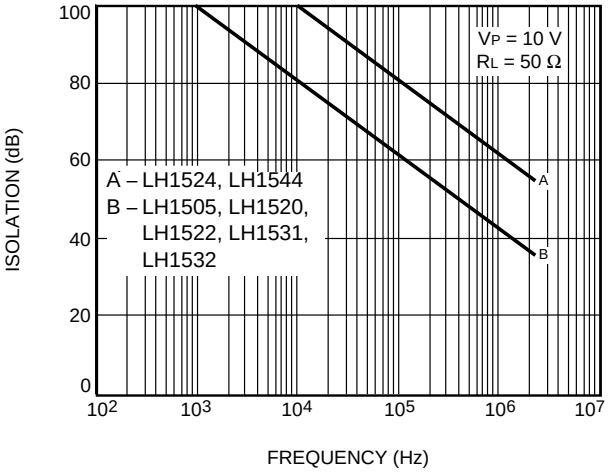
D. Insertion Loss vs. Frequency



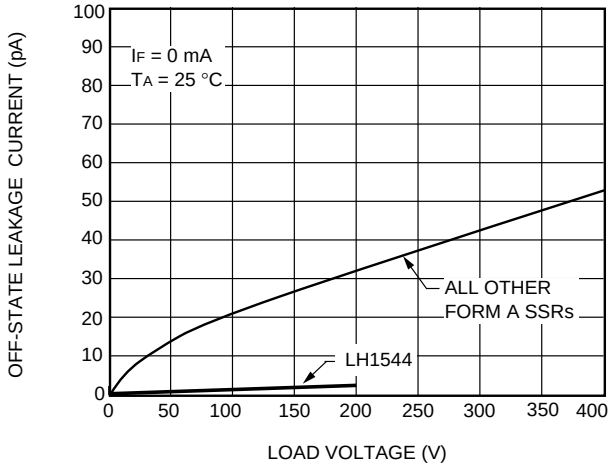
E. Insertion Loss vs. Frequency (LH1544)



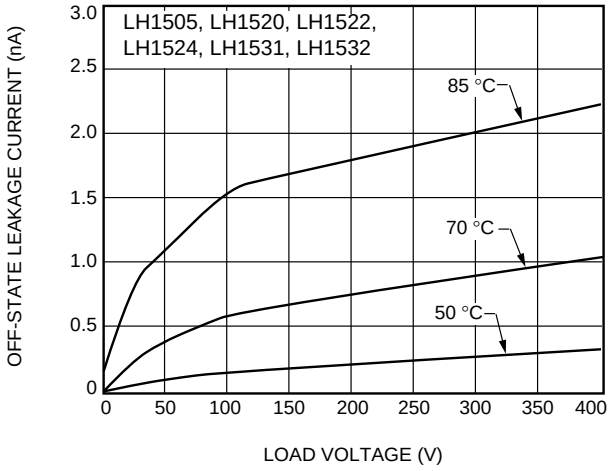
F. Output Isolation



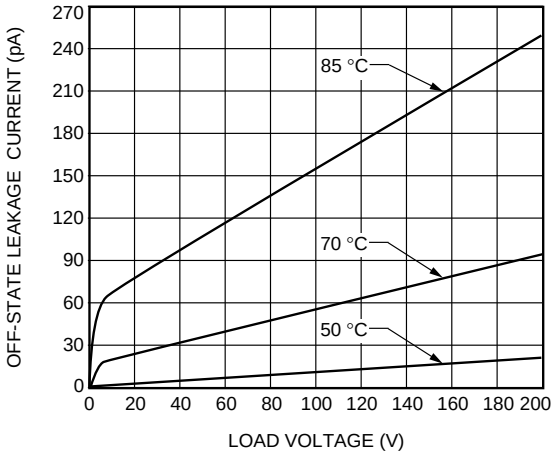
A. Leakage Current vs. Applied Voltage



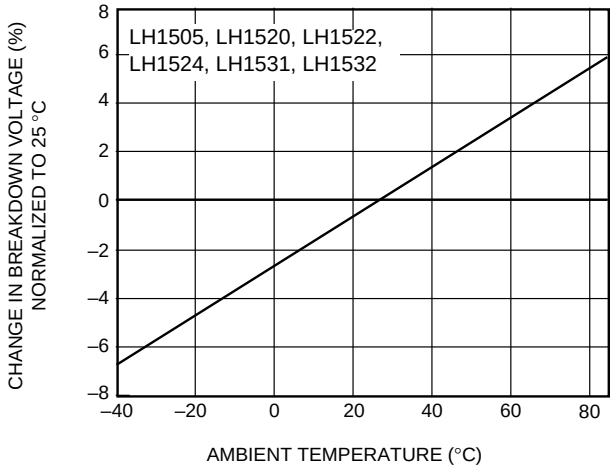
B. Leakage Current vs. Applied Voltage at Elevated Temperatures



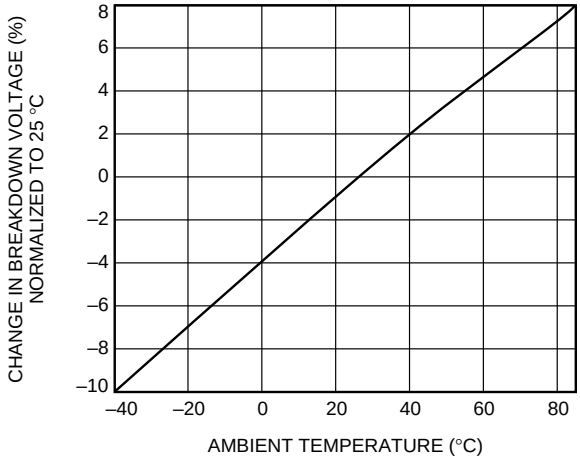
C. Leakage Current vs. Applied Voltage at Elevated Temperatures (LH1544)



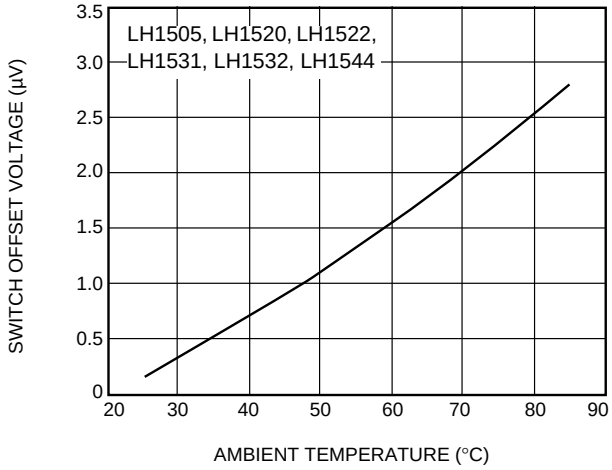
D. Switch Breakdown Voltage vs. Temperature



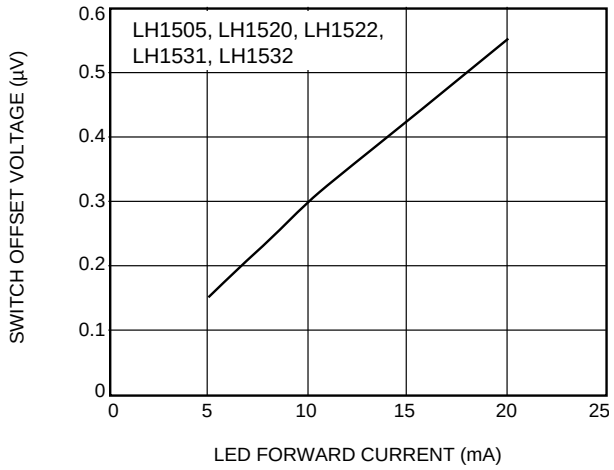
E. Switch Breakdown Voltage vs. Temperature (LH1544)



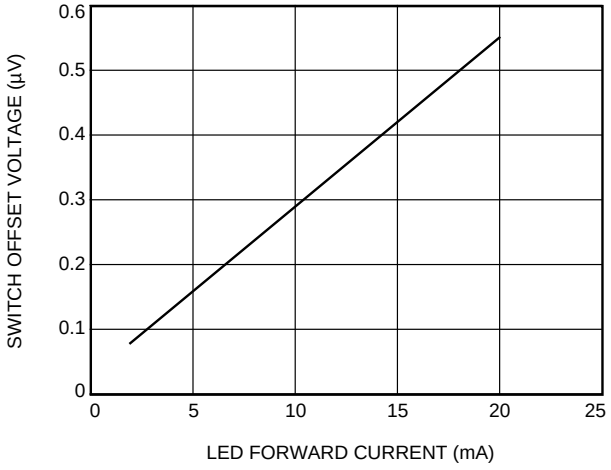
F. Switch Offset Voltage vs. Temperature



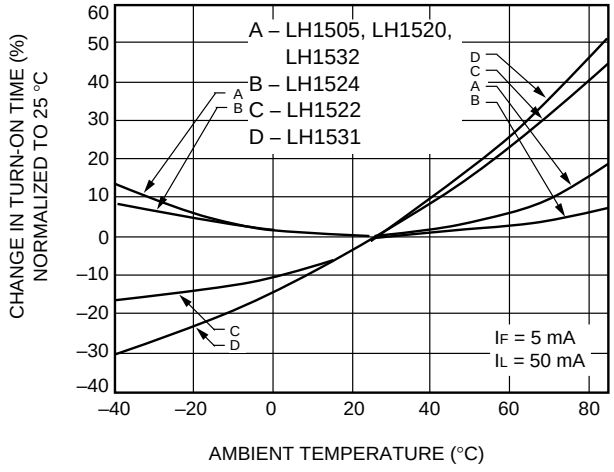
A. Switch Offset Voltage vs. LED Current



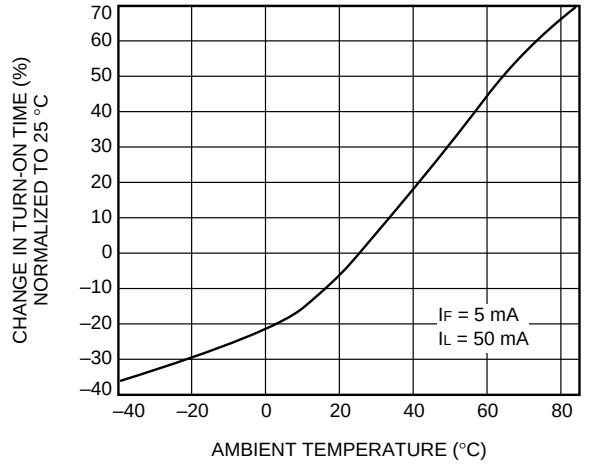
B. Switch Offset Voltage vs. LED Current (LH1544)



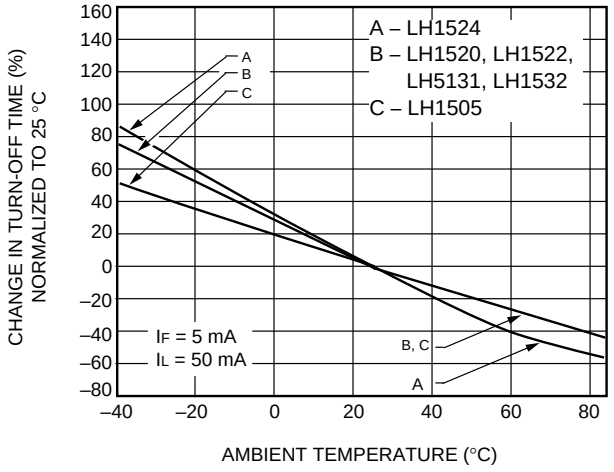
C. Turn-On Time vs. Temperature



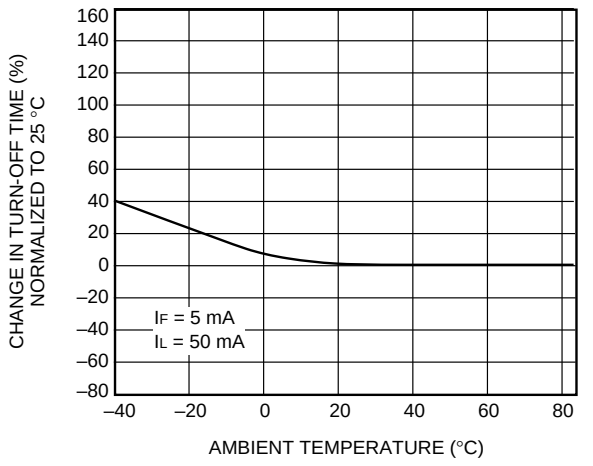
D. Turn-On Time vs. Temperature (LH1544)



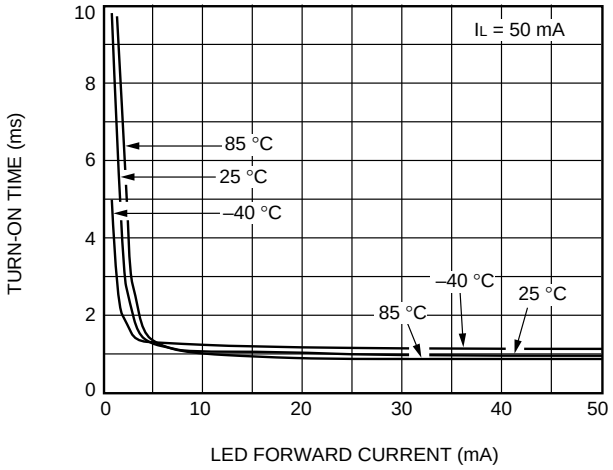
E. Turn-Off Time vs. Temperature



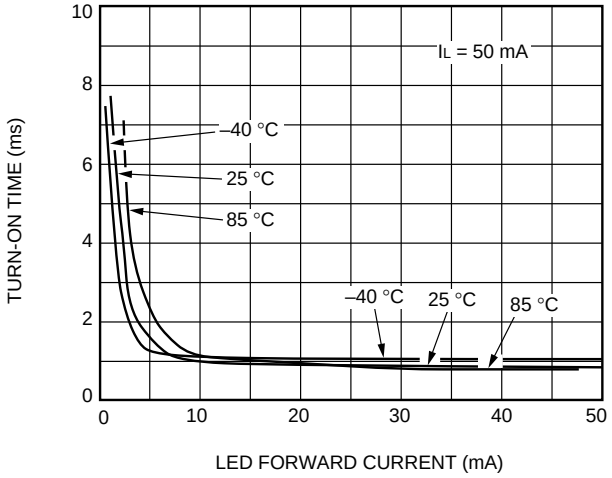
F. Turn-Off Time vs. Temperature (LH1544)



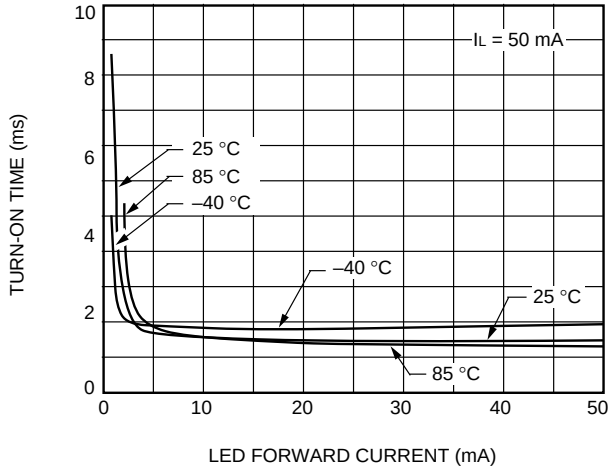
A. Turn-On Time vs. LED Current (LH1505, LH1520, LH1532)



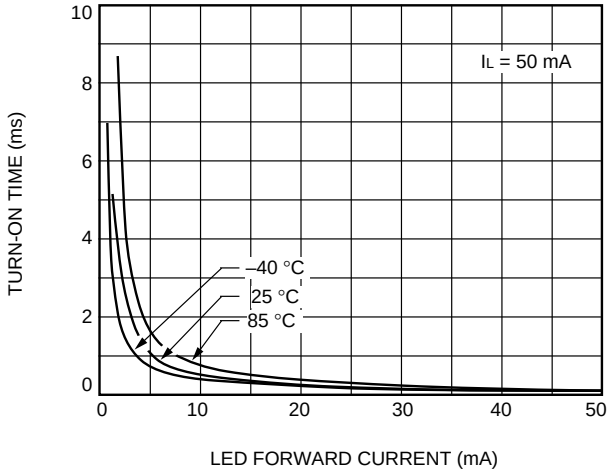
B. Turn-On Time vs. LED Current (LH1522)



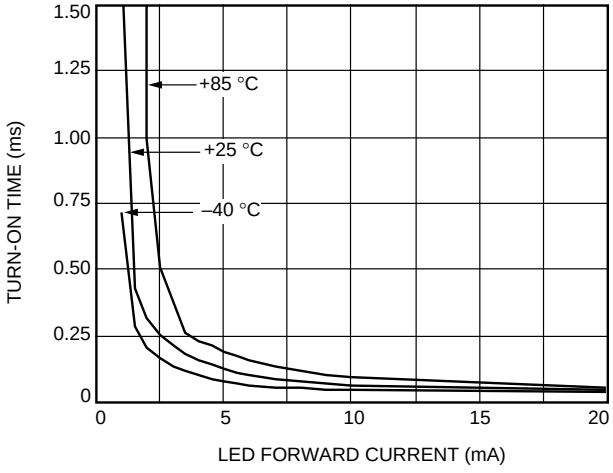
C. Turn-On Time vs. LED Current (LH1524)



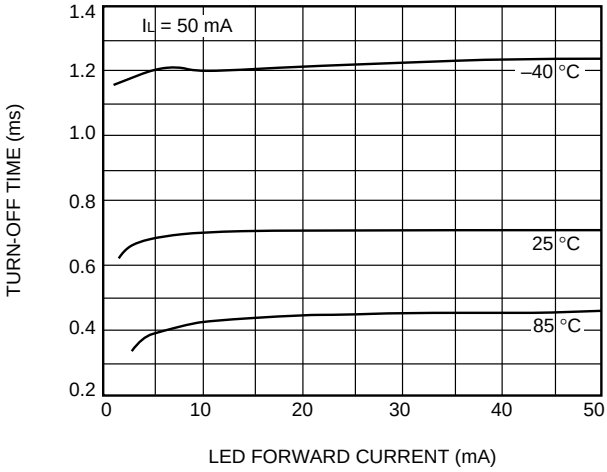
D. Turn-On Time vs. LED Current



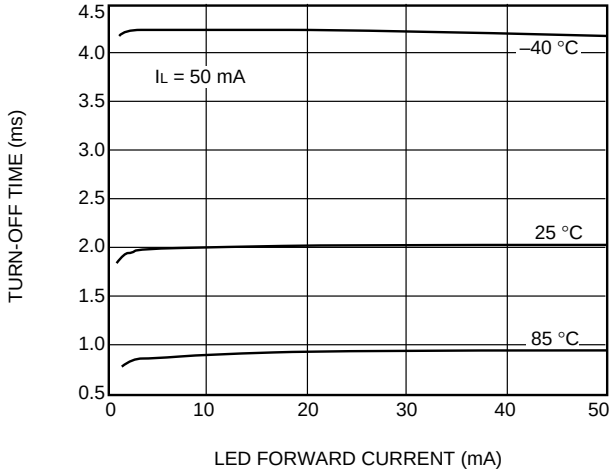
E. Turn-On Time vs. LED Current (LH1544)



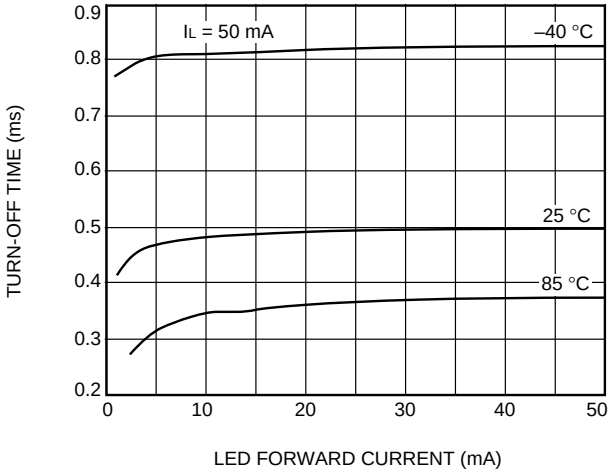
F. Turn-Off Time vs. LED Current (LH1505, LH1520, LH1522, LH1532)



A. Turn-Off Time vs. LED Current (LH1524)



B. Turn-Off Time vs. LED Current (LH1531)



C. Turn-Off Time vs. LED Current (LH1544)