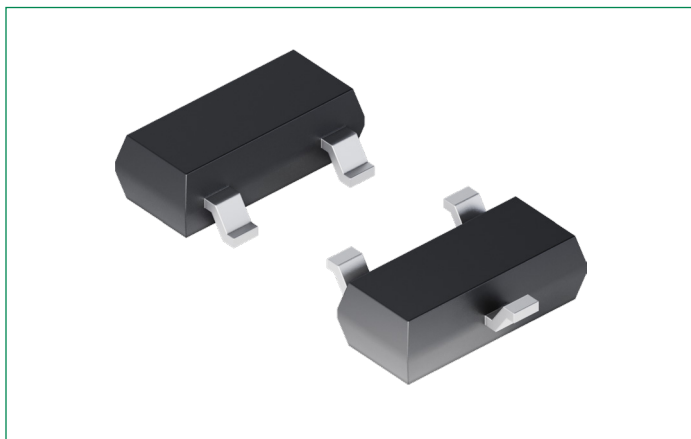


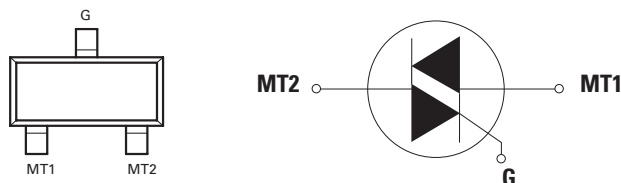
LX5 Series

EV Series 0.5 A Sensitive-Gate TRIACs

HF RoHS



Pinout Diagram (SOT-23)



MT1: Main Terminal 1; **MT2:** Main Terminal 2; **G:** Gate

Description

This 0.5 A bi-directional solid state switch series offers direct interface to microprocessor drivers in a SOT-23 package for low power AC switching applications such as e-valve and AC solenoid drive.

The die voltage blocking junctions are glass-passivated to ensure long term reliability and parametric stability.

Features

- RoHS compliant and halogen-free
- Surface mount packages
- Static dv/dt up to 100 V/μs
- Blocking voltage (V_{DRM}) capability up to 600 V
- Surge current capability up to 9.5 A

Applications

The LX5 EV Series is specially designed for low-power AC switching applications such as:

- Replacement of mechanical switch contacts to achieve extended lifetime
- Doorbell
- Door lock
- Electrovalve
- Thermostat
- AC solenoid drive

Product Summary

Characteristic	Value	Unit
$I_{T(RMS)}$	0.5	A
V_{DRM}/V_{RRM}	600	V
$I_{GT(QI)}$	5	mA

Maximum Ratings

Symbol	Characteristics	Conditions		Value	Units
V_{DSM}/V_{RSM}	Non-repetitive Peak Off-state Voltage	$t_p = 50 \mu s, T_{vj} = 25^\circ C$		700	V
V_{DRM}/V_{RRM}	Repetitive Peak Off-state Voltage	—		600	V
$I_{T(RMS)}$	RMS On-state Current	$T_c = 60^\circ C$	Full sine wave	0.5	A
I_{TSM}	Non-repetitive Surge Peak On-state Current	$f = 50 \text{ Hz}$	$T_{vj} \text{ initial} = 25^\circ C,$	8	A
		$f = 60 \text{ Hz}$	Full cycle	9.5	
I^2t	I^2t Value for Fusing	$t_p = 10 \text{ ms}$		0.32	A^2s
		$t_p = 8.3 \text{ ms}$		0.41	
di/dt	Critical Rate of Rise of On-state Current	$f = 60 \text{ Hz}, T_{vj} = 125^\circ C$		50	$A/\mu s$
I_{GTM}	Peak Gate Trigger Current	$t_p = 20 \mu s, T_{vj} = 125^\circ C$		1	A
$P_{G(AV)}$	Average Gate Power Dissipation	$T_{vj} = 125^\circ C$		0.1	W
T_{stg}	Storage Temperature Range	—		–55 to 150	$^\circ C$
T_{vj}	Virtual Junction Temperature Range	—		–40 to 125	$^\circ C$

Electrical Characteristics

Symbol	Characteristics	Conditions	Quadrant	Value			Units
				Min.	Typ.	Max.	
I_{GT}	DC Gate Trigger Current	$V_D = 12 \text{ V}, R_L = 60 \Omega$	I – II – III	–	2.5	5	mA
			IV	–	5.8	9	
V_{GT}	DC Gate Trigger Voltage	$V_D = 12 \text{ V}, R_L = 60 \Omega$	I – II – III	–	0.8	1.3	V
			IV	–	1.2	–	
V_{GD}	Gate Non-trigger Voltage	$T_{vj} = 125^\circ C, V_D = V_{DRM}, R_{GK} = 1 \text{ k}\Omega, R_L = 3.3 \text{ k}\Omega$		0.2	–	–	V
I_H	Holding Current	$I_{T(initial)} = 20 \text{ mA}$		–	1.8	5	mA
$dv/dt_{(cr)}$	Critical Rate-of-rise of Off-stage Voltage	$T_{vj} = 125^\circ C, V_D = 2/3 V_{DRM}, R_{GK} = 1 \text{ k}\Omega$		100	–	–	$V/\mu s$
$dv/dt_{(com)}$	Critical Rate-of-rise of Commutating Voltage	$di/dt = 0.43 \text{ A/ms}, T_{vj} = 110^\circ C$		5	–	–	$V/\mu s$
t_{gt}	Turn-on Time	$I_G = 2 \cdot I_{GT}, t_p = 15 \mu s, I_T = 0.7 A_{pk}$		–	2.5	–	μs

Static Characteristics

Symbol	Characteristics	Conditions	Maximum Value	Units
V_{TM}	Peak On-state Voltage	$I_T = 0.71 A_{pk}$	1.55	V
I_{DRM}/I_{RRM}	Peak Repetitive Off-state Current	$V_D = V_{DRM}, T_{vj} = 25^\circ C$	5	μA
		$V_D = V_{DRM}, T_{vj} = 125^\circ C$	500	

Thermal Characteristics

Symbol	Characteristics	Conditions	Value	Units
$R_{th(j-c)}$	Thermal Resistance, Junction to Case	$I_T = 0.5 A_{(RMS)}^1$	45	K/W
$R_{th(j-a)}$	Thermal Resistance, Junction to Ambient	$I_T = 0.5 A_{(RMS)}^1$	220	K/W

Note 1: Surface-mounted on FR4 board with a 1 square inch pad of 2 oz copper.

Characteristic Curves

Figure 1. Definition of Quadrants

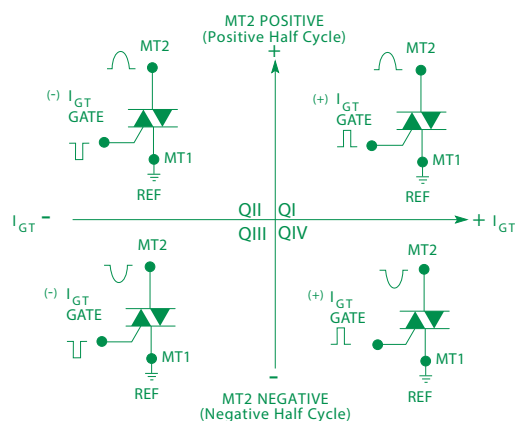


Fig. 2. Normalized DC Gate Trigger Current vs. Junction Temperature

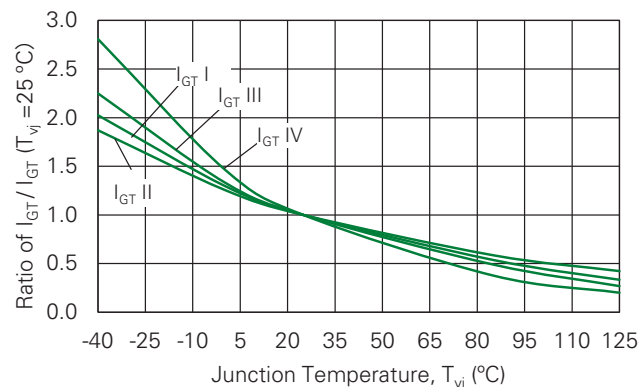


Fig. 3. Normalized DC Gate Trigger Voltage vs. Junction Temperature

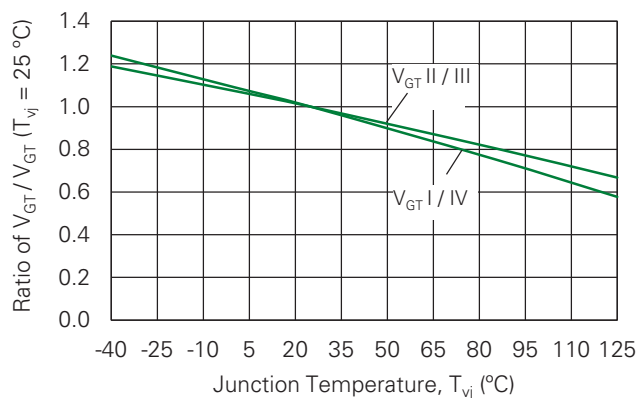


Fig. 4. Normalized DC Holding Current vs. Junction Temperature

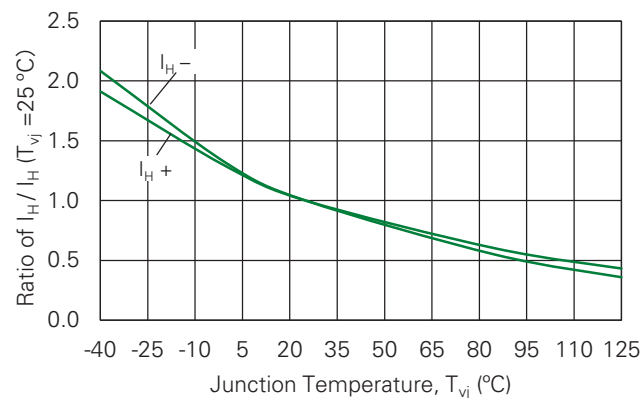


Fig. 5. Typical On-state Current vs. On-state Voltage

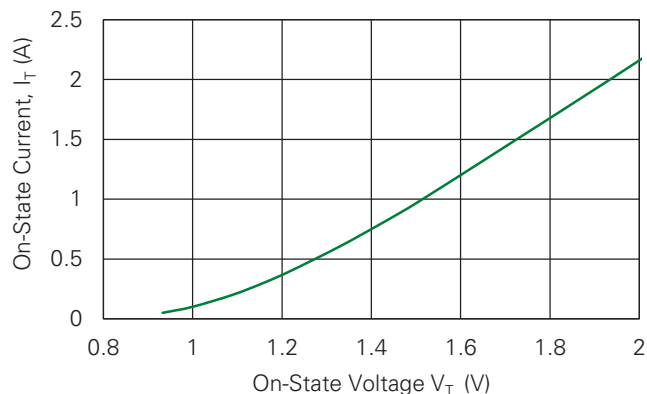


Fig. 6. Typical Power Dissipation vs. RMS On-state Current

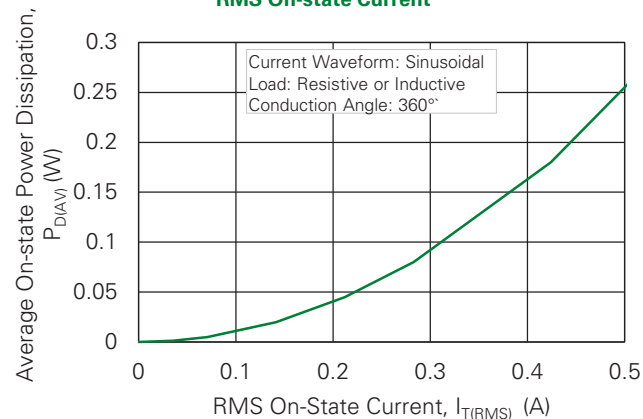


Fig. 7. Maximum Allowable Case Temperature vs. On-state Current

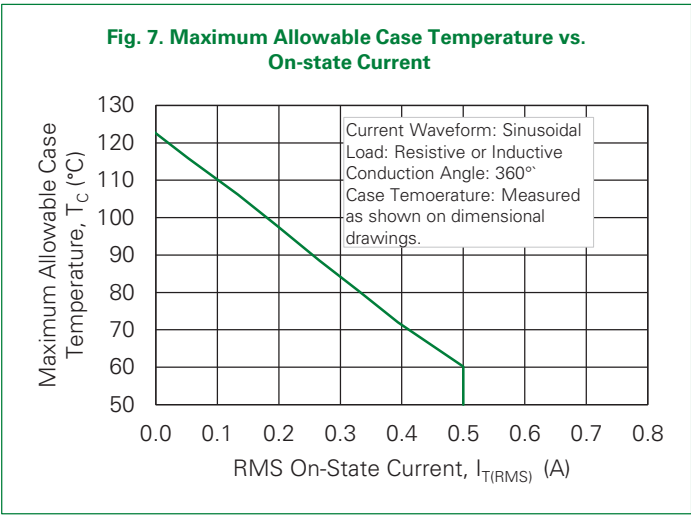
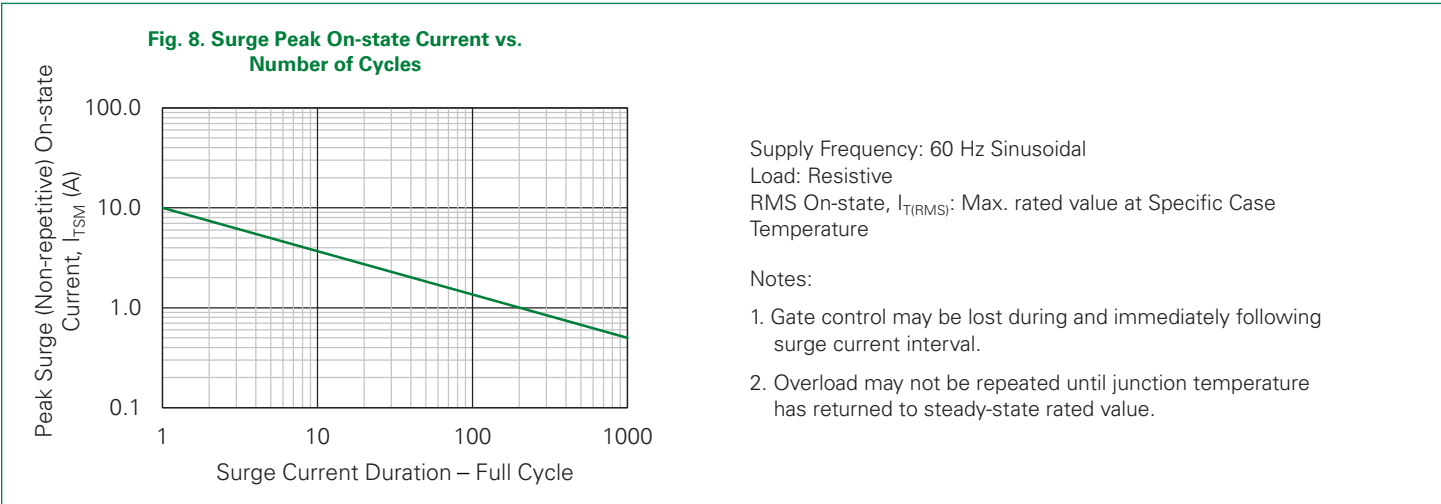


Fig. 8. Surge Peak On-state Current vs. Number of Cycles



Soldering Parameters

Characteristic		Value
Reflow Condition		Pb – Free assembly
Pre-heat	Temperature Min ($T_{s(min)}$)	150 °C
	Temperature Max ($T_{s(max)}$)	200 °C
	Time (min to max) (t_s)	60 – 120 secs
Average ramp up rate (Liquidus Temp) (T_L) to peak		3 K/s max.
$T_{s(max)}$ to T_L - Ramp-up Rate		3 K/s max.
Reflow	Temperature (T_L) (Liquidus)	217 °C
	Time (t_L)	60 – 150 seconds
Peak Temperature (T_P)		260 ^{+0/-5} °C
Time within 5°C of actual peak Temperature (t_p)		30 seconds max.
Ramp-down Rate		6 K/s max.
Time 25°C to peak Temperature (T_P)		8 minutes max

Physical Specifications

Characteristic	Value
Terminal Finish	100% Matte Tin-plated
Body Material	UL Recognized Compound Meeting Flammability Rating V-0
Lead Material	Copper Alloy

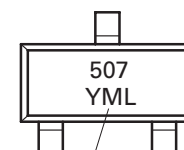
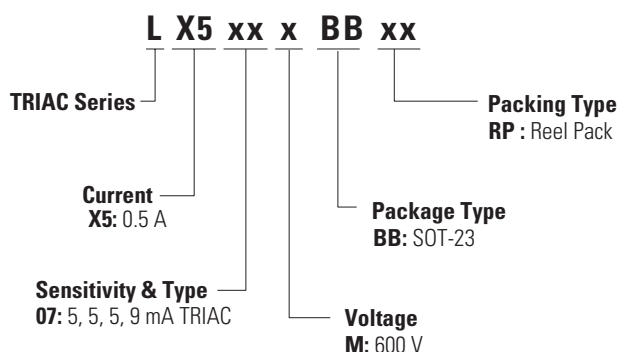
Product Selector

Part Number	Voltage	Gate Sensitivity Quadrants		Package
	600 V	I – II – III	IV	
LX507MBB	X	5 mA	9 mA	SOT-23

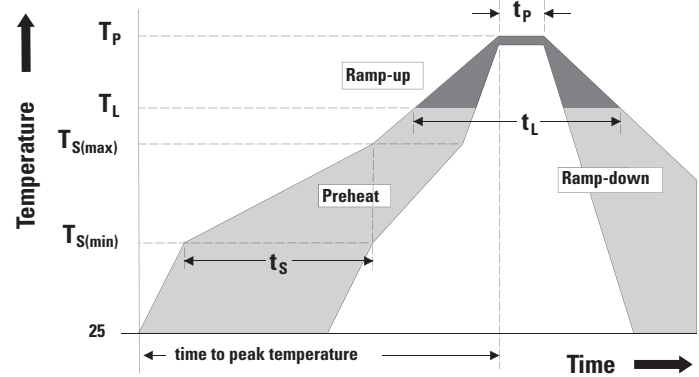
Packing Options

Part Number	Marking	Weight	Packing Mode	Base Quantity
LX507MBBRP	507	0.01 g	Reel	3000

Part Numbering and Marking



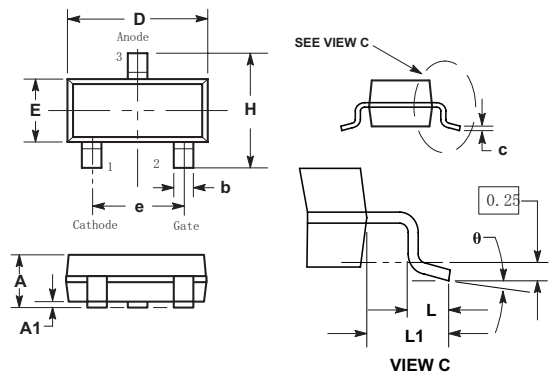
Date Code Marking
Y: Year Code
M: Month Code
L: Location Code



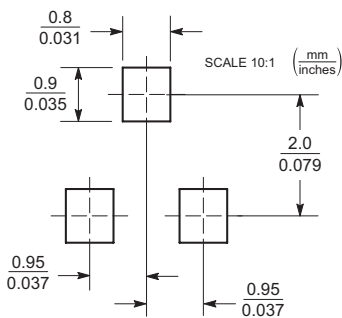
Environmental Specifications

Test	Specifications and Conditions
AC Blocking	MIL-STD-750, M-1040, Cond A Applied Peak AC voltage @ 125 °C for 1008 hours
H3TRB	EIA / JEDEC, JESD22-A101, 1008 hours; 160 V - DC: 85 °C; 85 % relative humidity
Temperature Cycling	MIL-STD-750, M-1051, 1000 cycles; -55 °C to +150 °C; 15-min dwell-time
UFAST	ESD22-A118, 96 hours, 130 °C, 85%RH
Resistance to Solder Heat	MIL-STD-750: Method 2031, 260 °C, 10 s
Solderability	ANSI/J-STD-002: category 3, Test A
Moisture Sensitivity Level	Level1, JEDEC-J-STD-020D

Package Dimensions SOT-23

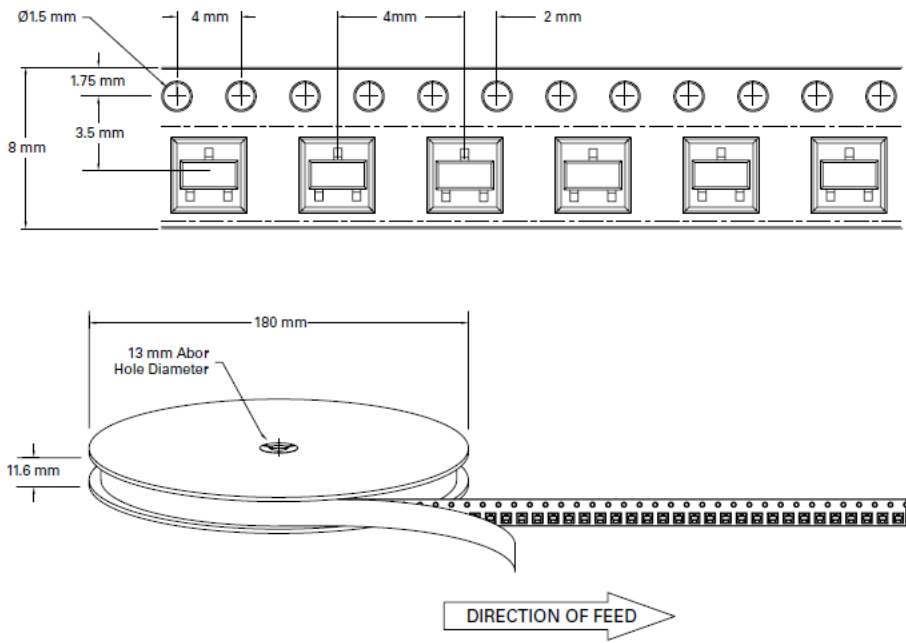


SOLDERING FOOTPRINT



Symbol	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max
A	0.89	1.02	1.12	0.035	0.040	0.044
A1	0.03	0.05	0.10	0.001	0.002	0.004
b	0.38	0.46	0.51	0.015	0.018	0.020
c	0.08	0.13	0.18	0.003	0.005	0.007
D	2.79	2.90	3.05	0.010	0.014	0.020
E	1.19	1.30	1.40	0.047	0.051	0.055
e	1.78	1.91	2.06	0.070	0.075	0.081
L	0.10	0.20	0.30	0.004	0.008	0.012
L1	0.36	0.53	0.74	0.014	0.021	0.029
H	2.11	2.39	2.64	0.083	0.094	0.104
Ø	0°	—	10°	0°	—	10°

SOT-23 Reel Pack (RP) Specifications



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