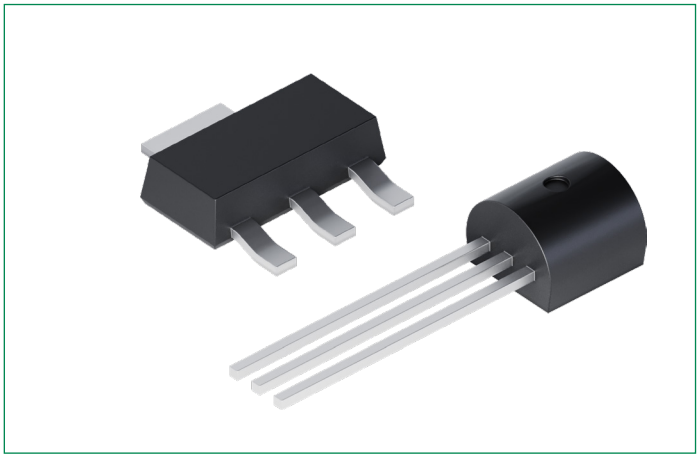
SK002xSx Series

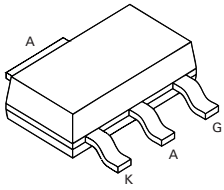
EV Series 1.5 A Sensitive SCRs

HF RoHS

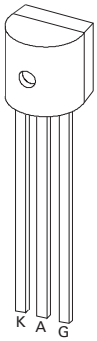


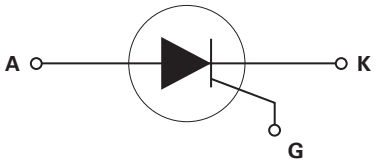
Pinout Diagram

SOT-223



TO-92





K: Cathode; **A:** Anode; **G:** Gate

Description

The SK002xSx series offers a high static dv/dt with a low turn off (t_q) time.

All SCR junctions are glass-passivated to ensure long term reliability and parametric stability.

Features

- Surge current capability up to 24 A
- Non-repetitive direct surge peak off-state voltage (V_{DSM}/V_{RSM}) up to 1250 V
- High noise immunity against dv/dt up to 250 V/µs
- Sensitive gate for direct microprocessor interface

Benefits

- Simplified input current protection
- Lower effort in input voltage protection
- Suited for environments with high EMI
- Allows direct microprocessor drive

Applications

- Ground Fault Circuit Interrupter
- Arc Fault Circuit Interrupter
- Residual Current Device
- Residual Current Circuit Breaker with Overload Protection

Product Summary

Characteristic	Value	Unit
$I_{T(RMS)}$	1.5	A
V_{DRM}/V_{RRM}	1000	V
V_{DSM}/V_{RSM} (t_p = 50 µs)	1250	V
I_{GT}	20 to 100	µA

Revised: TK.02/19/2026

Maximum Ratings

Symbol	Characteristics	Conditions			Value	Units
V_{DSM}/V_{RSM}	Non-repetitive Surge Peak Off-state Voltage	R_{GK} = 1 KΩ, P_W = 50 µs, T_{vj} = 25°C			1250	V
$I_{T(RMS)}$	On-state RMS Current	TO-92	T_C = 65 °C	Full sine wave	1.5	A
		SOT-223	T_C = 80 °C			
$I_{T(AV)}$	Average On-state Current	TO-92	T_C = 65 °C		0.9	A
		SOT-223	T_C = 80 °C			
I_{TSM}	Non-repetitive Surge Peak On-state Current	f = 50 Hz		T_{vj} initial = 25 °C, Half sine wave	20	A
		f = 60 Hz			24	
I^2t	I^2t Value for Fusing	f = 50 Hz		t_p = 10 ms	2.0	A^2s
di/dt	Critical Rate of Rise of On-state Current	I_G = 10 mA		T_{vj} = 125 °C	80	A/µs
I_{GM}	Peak Gate Current	t_p = 20 µs		T_{vj} = 125 °C	0.5	A
V_{RGM}	Peak Reverse Gate Voltage	I_{RG} = 10 µA			8	V
$P_{G(AV)}$	Average Gate Power Dissipation	T_{vj} = 125 °C			0.2	W
T_{stg}	Storage Temperature Range	–			–40 to 150	°C
T_{vj}	Virtual Junction Temperature Range	–			–40 to 125	°C

Electrical Characteristics – Dynamic (T_{vj} = 25 °C, unless otherwise specified)

Symbol	Characteristics	Conditions		Value			Units
				Min.	Typ.	Max.	
$dv/dt_{(cr)}$	Critical Rate-of-rise of Off-stage Voltage	T_{vj} = 125 °C, V_D = 67 % of V_{DRM}, Exponential Waveform	R_{GK} = 1 kΩ	40	–	–	V/µs
			R_{GK} = 220 kΩ	250	–	–	
t_q	Turn-off Time	I_T = 0.5 A		–	–	35	µs
t_{gt}	Turn-on Time	I_G = 10 mA, P_W = 15 µs, I_T = 1.6 A_{pk}		–	2.3	–	µs

Electrical Characteristics – Static (T_{vj} = 25 °C, unless otherwise specified)

Symbol	Characteristics	Conditions	Maximum Value	Units
I_{GT}	DC Gate Trigger Current	V_D = 6 V, R_L = 100 Ω	100	µA
V_{GT}	DC Gate Trigger Voltage	V_D = 6 V, R_L = 100 Ω	0.8	V
I_H	Holding Current	R_{GK} = 1 kΩ, Initial current = 20 mA	3	mA
V_{TM}	Peak On-state Voltage	1.5 A device, I_{TM} = 4 A, tp = 380 µs	1.8	V
V_{TO}	Threshold Voltage	–	1.03	V
R_D	Dynamic Resistance	–	106	mΩ
V_{GD}	Non-trigger Gate Voltage	V_D = ½ VDRM, R_{GK} = 1 kΩ, T_{vj} = 125 °C	0.2	V
I_{DRM}/I_{RRM}	Repetitive Peak Off-state Current	R_{GK} = 1 KΩ, T_{vj} = 25 °C	3	µA
		R_{GK} = 1 KΩ, T_{vj} = 125 °C	500	

Thermal Characteristics

Symbol	Characteristics	Conditions		Value	Units
$R_{th(j-c)}$	Thermal Resistance, Junction to Case (AC)	I_T = 1.5 $A_{(RMS)}$ [1]	TO-92	35	K/W
			SOT-223	25	
$R_{th(j-a)}$	Thermal Resistance, Junction to Ambient	I_T = 1.5 $A_{(RMS)}$ [1]	TO-92	150	K/W
			SOT-223	60	

Note 1: 60 Hz AC resistive load condition, 100% conduction

Characteristic Curves

Figure 1. Normalized Gate Trigger Current vs. Virtual Junction Temperature

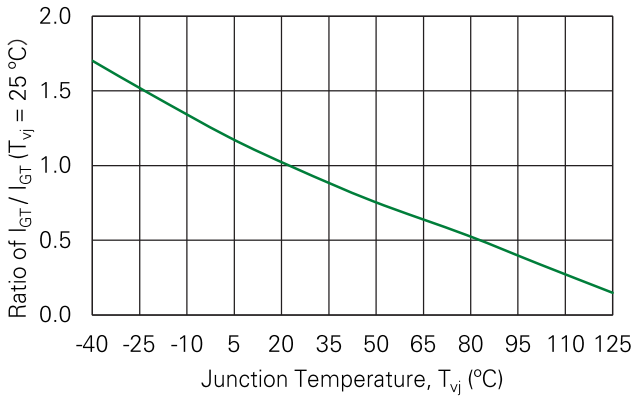


Figure 2. Normalized Holding Current vs. Virtual Junction Temperature

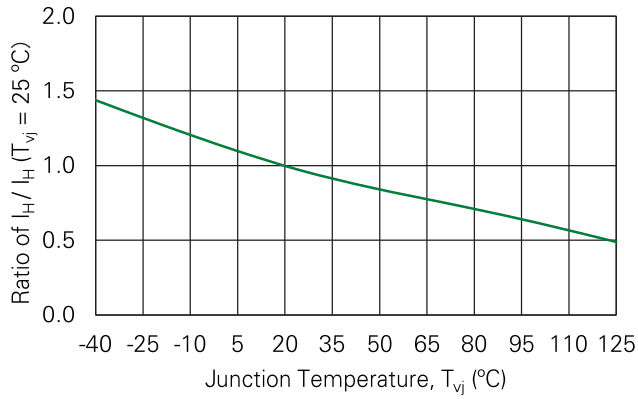


Figure 3. Normalized Gate Trigger Voltage vs. Virtual Junction Temperature

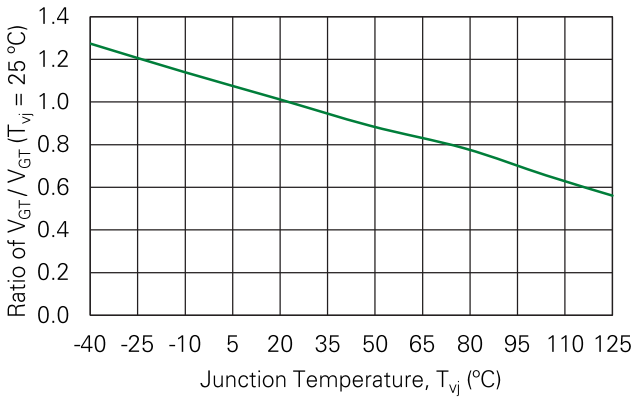


Figure 4. Typical On-state Current vs. On-state Voltage

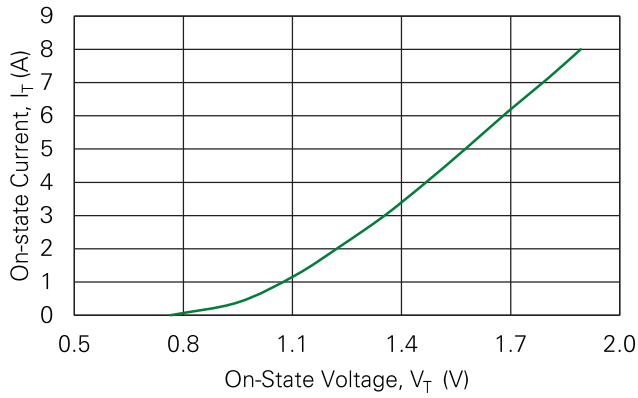


Figure 5. Typical Power Dissipation vs. RMS On-state Current

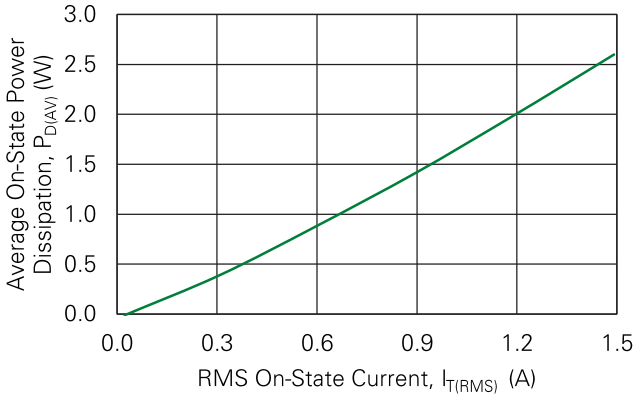


Figure 6. Maximum Allowable Case Temperature vs. On-state Current

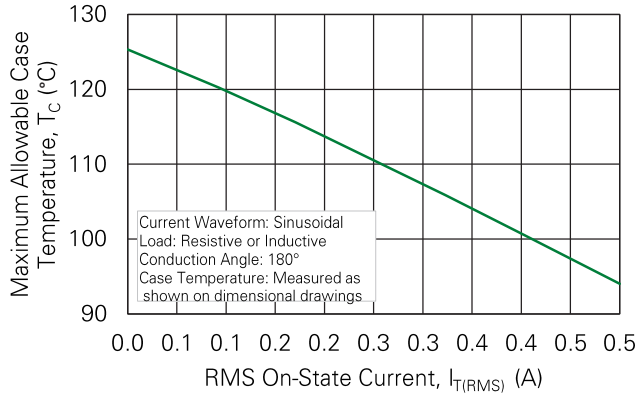
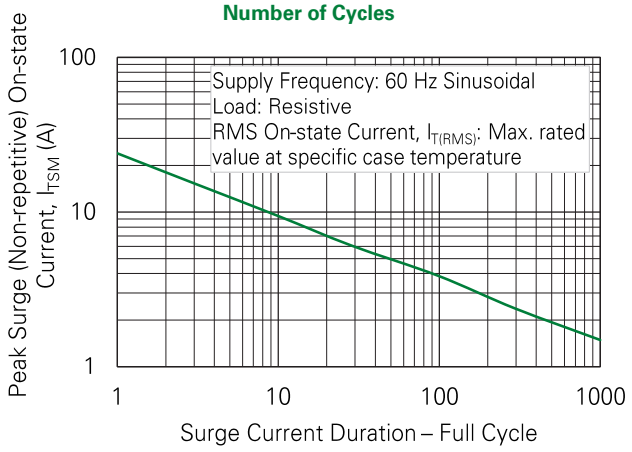


Figure 7. Surge Peak On-state Current vs. Number of Cycles

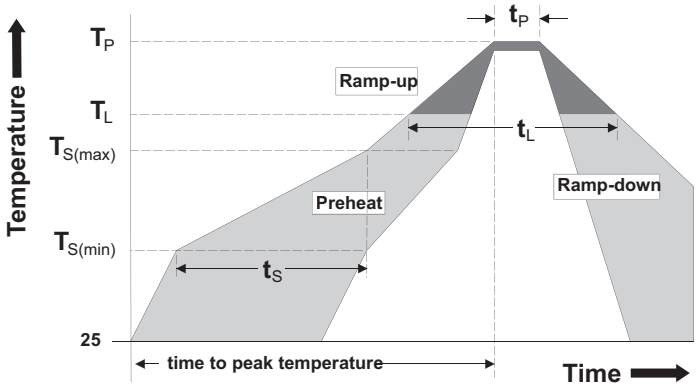


Notes:

1. Gate control may be lost during and immediately following surge current interval.
2. Overload should not be repeated until junction temperature has returned to steady-state rated value.

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 °C/second max
$T_{S(max)}$ to T_L - Ramp-up Rate		3 °C/second 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
Ramp-down Rate		6 °C/second max
Time 25°C to peak Temperature (T_P)		8 minutes max
Do Not Exceed		260°C



Physical Specifications

Characteristic	Value
Terminal Finish	100% Matte Tin-plated
Body Material	UL Recognized compound meeting flammability rating V-0
Lead Material	Copper Alloy

Environmental Specifications

Test	Specifications and Conditions
AC Blocking	MIL-STD-750, M-1040, Cond A Applied Peak AC voltage @ 125 °C for 1008 hours
Temperature/Humidity	EIA / JEDEC, JESD22-A101, 1008 hours; 320 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
UHAST	JESD22-A118, 96 hours, 130 °C, 85% RH
High-temperature Storage	MIL-STD-750, M-1031, 1008 hours; 150 °C
Low-temperature Storage	1008 hours; -40 °C
Resistance to Solder Heat	MIL-STD-750: Method 2031
Solderability	ANSI/J-STD-002: category 3, Test A

Product Selector

Part Number	Voltage	Gate Sensitivity	Package
	1000 V		
SK002ECS	X	100 µA	TO-92
SK002TS	X	100 µA	SOT-223

Ordering Information

Part Number	Marking	Weight	Packing Mode	Base Quantity
SK002ECS	SK002ECS	0.217 g	Bulk	2500
SK002ECSRP	SK002ECS	0.217 g	Tape & Reel	2000
SK002ECSAP	SK002ECS	0.217 g	Ammo Pack	2000
SK002TSRP	SK002TS	0.120 g	Tape & Reel	1000

Part Number and Marking

S K0 02 x xx xx

DEVICE TYPE
S: SCR

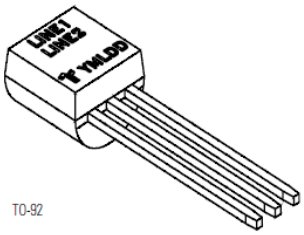
VOLTAGE RATING
K0: 1000 V

CURRENT RATING
02: 1.5 A

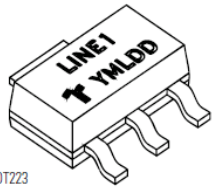
PACKAGE TYPE
EC: TO-92 Center Anode
T: SOT-223

SENSITIVITY & TYPE
S: 100 µA Sensitive SCR

PACKING TYPE
Blank: Bulk Pack
RP: Reel Pack (TO-92)
: Embossed Carrier Pack (SOT-223)
AP: Ammo Pack (TO-92)



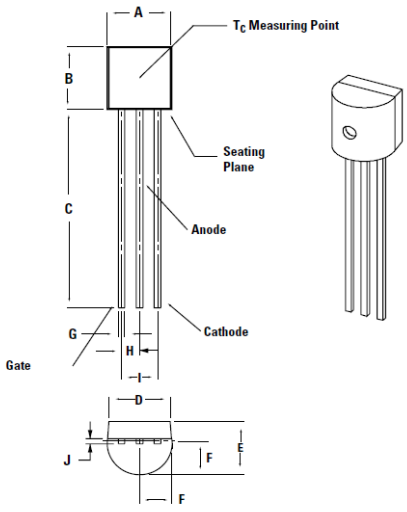
TO-92



SOT223

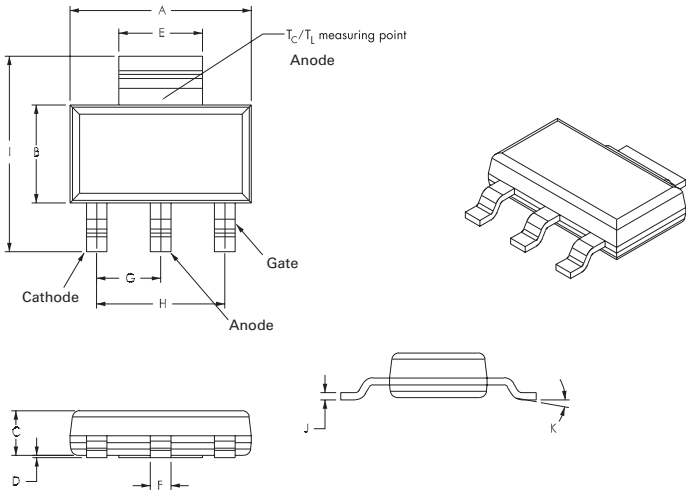
Line1 = Littelfuse Part Number
Line2 = continuation…Littelfuse Part Number
Y = Last Digit of Calendar Year
M = Letter Month Code (A-L for Jan-Dec)
L = Location Code
DD = Calendar Date

Part Outline Drawing TO-92



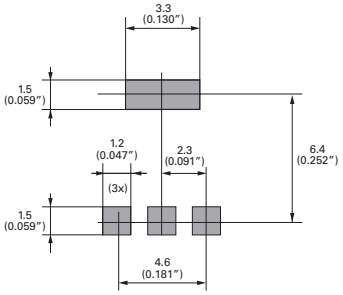
Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max
A	4.450	5.200	0.175	0.205
B	4.320	5.330	0.170	0.210
C	12.70	–	0.500	–
D	3.430	–	0.135	–
E	3.180	4.190	0.125	0.165
F	2.040	2.660	0.080	0.105
G	0.407	0.533	0.016	0.021
H	1.150	1.390	0.045	0.055
I	2.420	2.660	0.095	0.105
J	0.380	0.500	0.015	0.020

Part Outline Drawing SOT-223



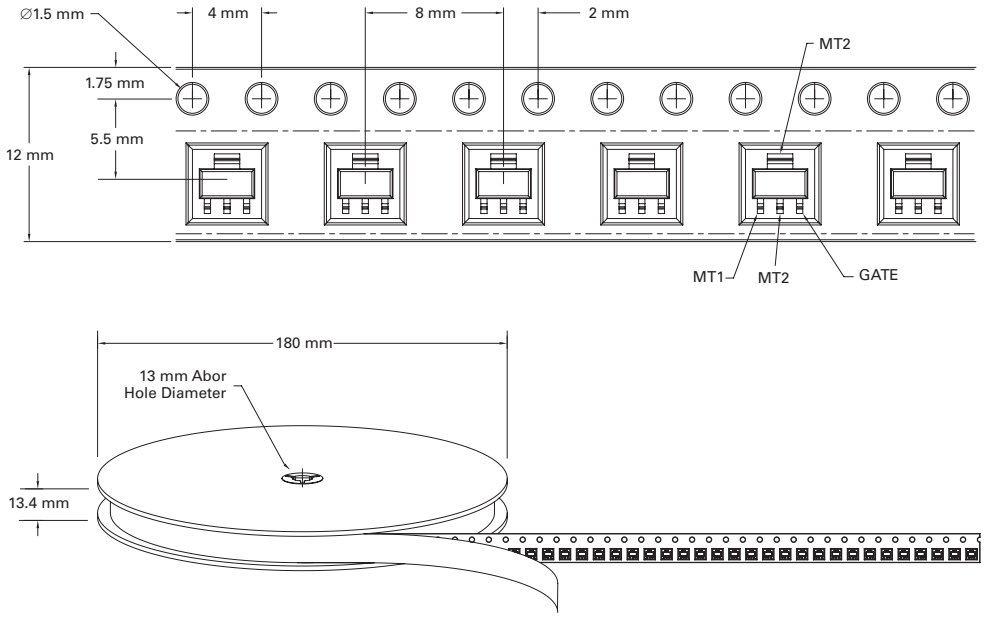
Symbol	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.30	6.50	6.70	0.248	0.256	0.264
B	3.30	3.50	3.70	0.130	0.138	0.146
C	–	–	1.80	–	–	0.071
D	0.02	–	0.10	0.001	–	0.004
E	2.90	3.00	3.15	0.114	0.118	0.124
F	0.60	0.70	0.85	0.024	0.027	0.034
G	–	2.30	–	–	0.090	–
H	–	4.60	–	–	0.181	–
I	6.70	7.00	7.30	0.264	0.276	0.287
J	0.24	0.26	0.35	0.009	0.010	0.014
K	10° MAX.					

Pad Layout for SOT-223



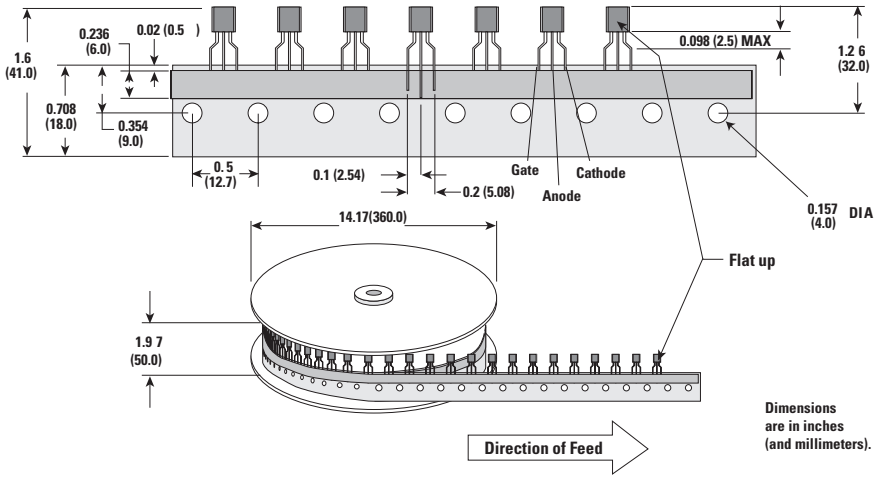
Dimensions in Millimeters (Inches)

SOT-223 Reel Pack (RP) Specifications



TO-92 (3-lead) Reel Pack (RP) Radial Leaded Specifications

Meets all EIA-468-C Standards



TO-92 (3-lead) Ammo Pack (AP) Radial Leaded Specifications

Meets all EIA-468-C Standards