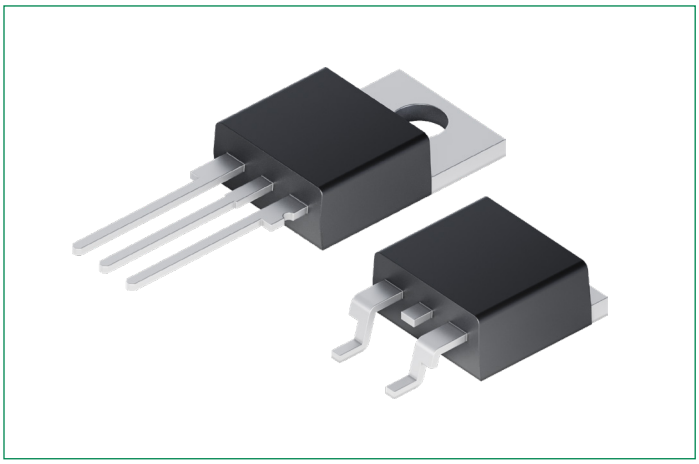
Sxx30x Series

30 A Standard SCRs

RoHS



Description

This 30A SCR series in TO-220AB and TO-263 packages, offers design flexibility and optimized thermal management. Its clip-attach assembly, 290 A surge current capability, and high noise immunity simplify input protection and filtering.

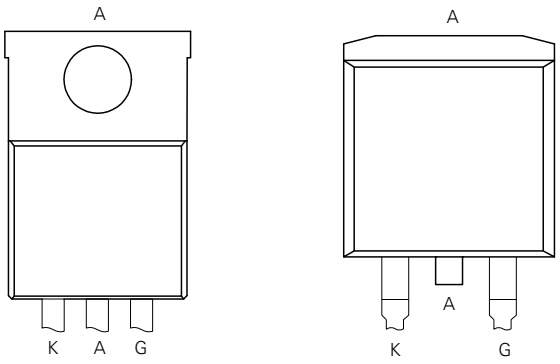
Features

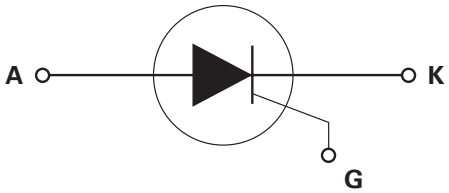
- Rated blocking voltage of 1200 V
- Halogen-free and RoHS-compliant
- Glass-passivated junctions
- Mechanically and thermally robust TO-220 clip-attach assembly
- Surge current capability up to 290 A

Applications

Typical applications include AC solid-state switches, industrial power tools, softstarter, DC motor control, and power converters.

Pinout Diagram TO-220AB and TO-263AB





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

Product Summary

Characteristic	Value	Unit
$I_{T(RMS)}$	30	A
V_{DRM}/V_{RRM}	1200	V
I_{GT}	30	mA

Revised: TK.08/28/2025

Maximum Ratings

Symbol	Characteristics	Conditions	Value	Units
$I_{T(RMS)}$	RMS On-state Current	T_c = 100 °C	30	A
$I_{T(AV)}$	Average On-state Current	T_c = 100 °C	19	A
I_{TSM}	Non-repetitive Surge Peak On-state Current (Single Half-cycle; T_{vj} (initial) = 25 °C)	f = 50 Hz	240	A
		f = 60 Hz	290	
I^2t	I^2t Value for Fusing	t_p = 8.3 ms	346	A^2s
di/dt	Critical Rate of Rise of On-state Current	f = 60 Hz; T_{vj} = 125 °C	150	A/µs
I_{GM}	Peak Gate Current	T_{vj} = 125 °C	4	A
$P_{G(AV)}$	Average Gate Power Dissipation	T_{vj} = 125 °C	0.5	W
T_{stg}	Storage Temperature Range	–	–40 to 150	°C
T_{vj}	Operating Junction Temperature Range	–	–40 to 125	°C
V_{DSM}/V_{RSM}	Non-repetitive Peak Off-state Voltage	Pulse width = 100 µs	1400	V
V_{DRM}/V_{RRM}	Repetitive Peak Off-state Voltage	–	1200	V

Thermal Characteristics

Symbol	Characteristics		Value	Units
$R_{th(j-c)}$	Thermal Resistance, Junction to Case (AC)	Sxx30R/ Sxx30N	0.6	K/W

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

Symbol	Characteristics	Conditions	Value			Units
			Min.	Typ.	Max.	
I_{GT}	DC Gate Trigger Current	V_D = 12 V, R_L = 30 Ω	5	–	30	mA
V_{GT}	DC Gate Trigger Voltage	V_D = 12 V, R_L = 30 Ω	–	0.75	1.3	V
V_{GD}	Gate Non-trigger Voltage	$V_D = V_{DRM}$, R_L = 3.3 kΩ, T_{vj} = 125 °C	0.2	–	–	V
I_H	Holding Current	I_T = 400 mA (initial)	–	–	70	mA
$dv/dt_{(cr)}$	Critical Rate-of-rise of Off-stage Voltage	V_D = 2/3 $V_{DRM,}$ Gate Open, T_{vj} = 125 °C	1000	1500	–	V/µs
		$V_D = V_{DRM,}$ Gate Open, T_{vj} = 125 °C	500	1000	–	
t_q	Turn-off Time	I_T = 2 A; t_p = 50 µs; dv/dt = 5 V/µs; di/dt = 30 A/µs	–	25	35	µs
t_{gt}	Turn-on Time	$I_G = 2 \bullet I_{GT,}$ t_p = 15 µs, I_T = 60 A	–	2.5	–	µs

Static Characteristics

Symbol	Characteristics	Conditions	Maximum Value	Units
V_{TM}	Peak On-state Voltage	I_T = 60 A; t_p = 380 µs	1.85	V
I_{DRM}/I_{RRM}	Off-state Current, Peak Repetitive	T_{vj} = 25 °C, $V_D=V_{DRM}/V_{RRM}$	5	µA
		T_{vj} = 125 °C, $V_D=V_{DRM}/V_{RRM}$	3	mA
$V_{(TO)}$	Threshold Voltage	T_{vj} = 125 °C	0.98	V
r_T	Slope Resistance	T_{vj} = 125 °C	18	mΩ

Characteristic Curves

Fig. 1. Normalized DC Gate Trigger Current vs. Junction Temperature

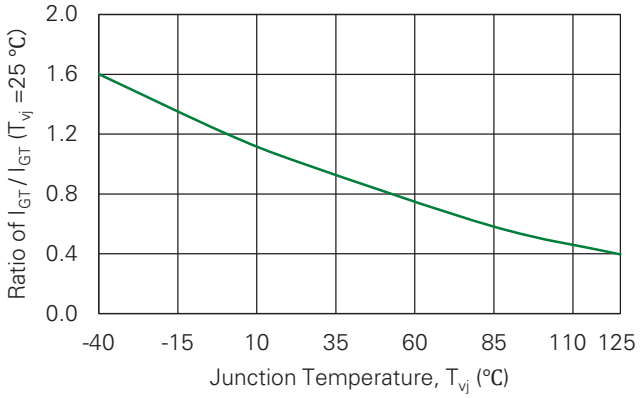


Fig. 2. Normalized DC Gate Trigger Voltage vs. Junction Temperature

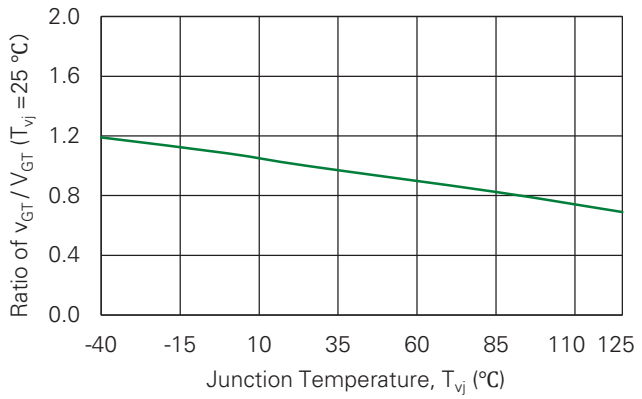


Fig. 3. Normalized DC Holding Current vs. Junction Temperature

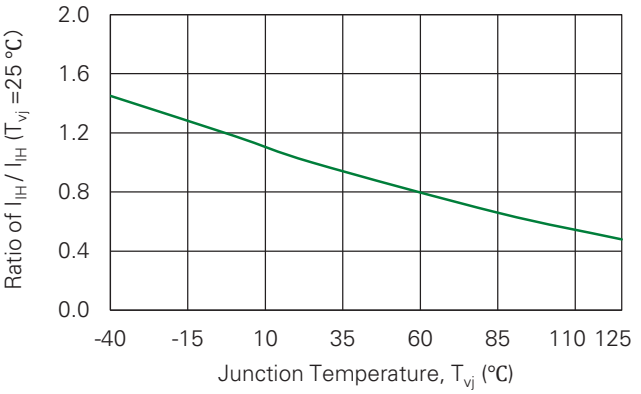


Fig. 4. Typical On-state Current vs. On-state Voltage

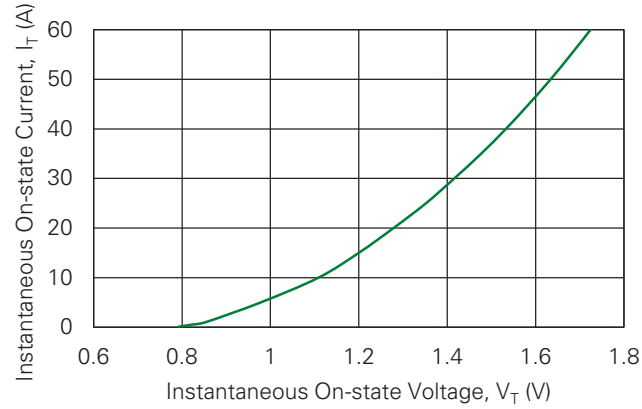


Fig. 5. Typical Power Dissipation vs. RMS On-state Current

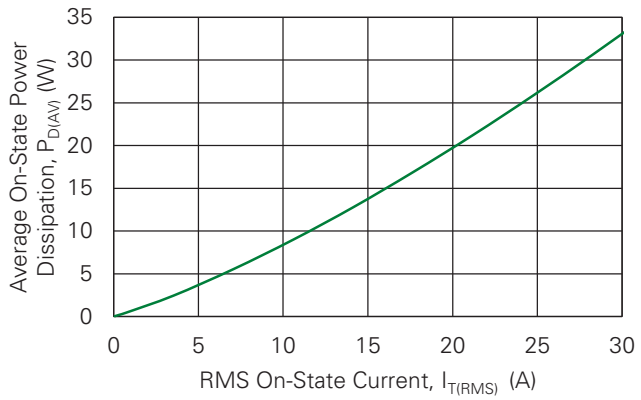


Fig. 6. Maximum Allowable Case Temperature vs. RMS On-state Current

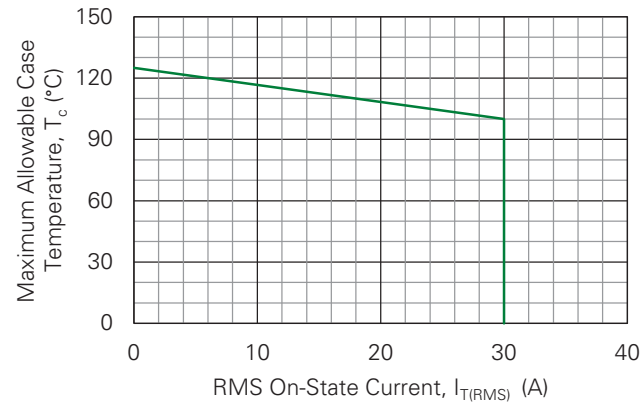


Fig. 7. Maximum Allowable Case Temperature vs. Average On-state Current

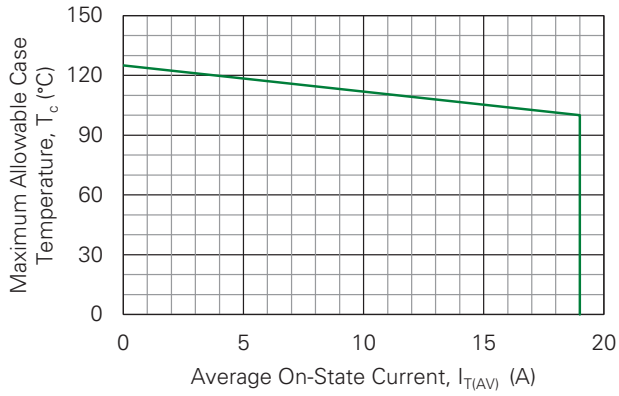
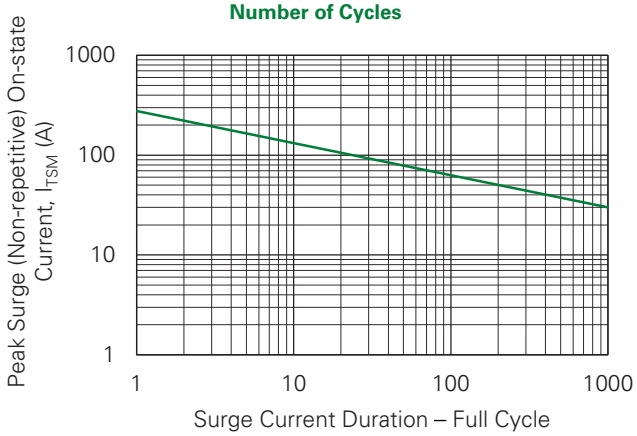


Fig. 8. Surge Peak On-state Current vs. Number of Cycles



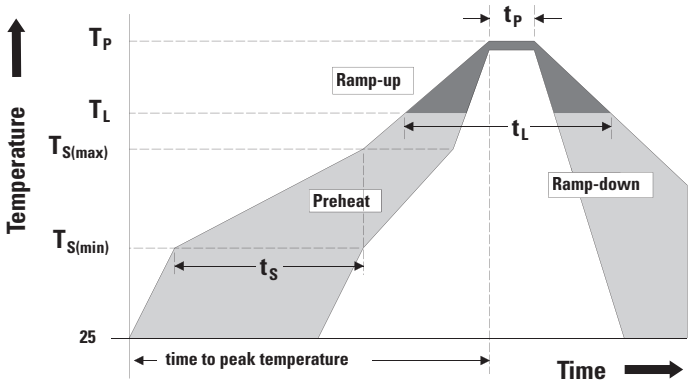
Supply Frequency: 60 Hz Sinusoidal
Load: Resistive
RMS On-state, $I_{T(RMS)}$: Max. rated value at Specific Case Temperature

Notes:

1. Gate control may be lost during and immediately following surge current interval.
2. Overload may 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)	60–180 secconds
Average ramp up rate (Liquidus Temp) (T_L) to peak		5 K/second max.
$T_{S(max)}$ to T_L - Ramp-up Rate		5 K/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)		20 – 40 seconds
Ramp-down Rate		5 K/second max.
Time 25 °C to peak Temperature (T_P)		8 minutes max.



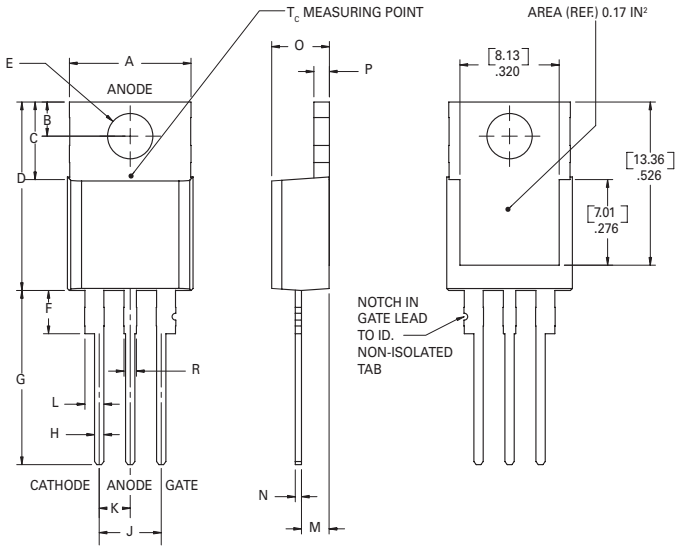
Physical Specifications

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

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
Resistance to Solder Heat	MIL-STD-750: Method 2031
Solderability	ANSI/J-STD-002: category 3, Test A
Lead Bend	MIL-STD-750, M-2036 Cond E
High Temp Storage	MIL-STD-750, M-1031,1008 hours, 150°C
Low Temp Storage	1008 hours, -40°C

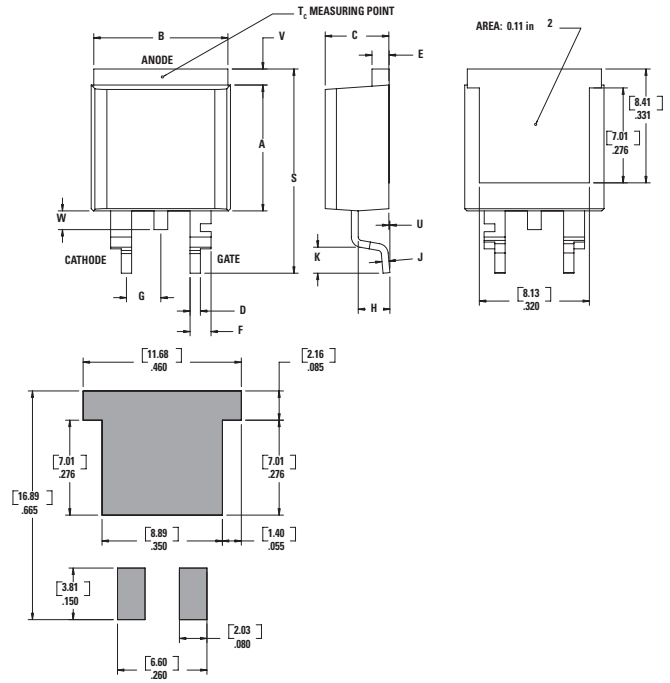
Package Dimensions TO-220AB (R-Package) – Non-isolated Mounting Tab Common with Center Lead



Note: Maximum Torque to be applied to mounting tab is 8 inch lbs. (0.904 Nm)

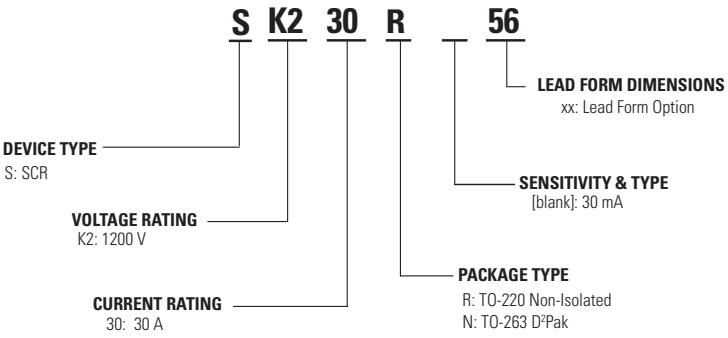
Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max
A	9.65	10.67	0.380	0.420
B	2.67	2.92	0.105	0.115
C	5.84	6.35	0.230	0.250
D	14.99	15.75	0.590	0.620
E	3.61	3.73	0.142	0.147
F	2.79	3.30	0.110	0.130
G	13.72	14.60	0.540	0.575
H	0.64	0.89	0.025	0.035
J	4.95	5.21	0.195	0.205
K	2.41	2.67	0.095	0.105
L	1.52	1.91	0.060	0.075
M	2.16	2.41	0.085	0.095
N	0.46	0.61	0.018	0.024
O	4.52	4.78	0.178	0.188
P	1.14	1.52	0.045	0.060
R	0.97	1.22	0.038	0.048

Package Dimensions TO-263AB (N-Package) – D²Pak Surface Mount

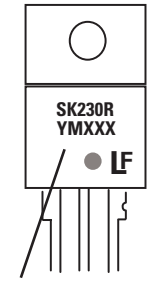


Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max
A	9.14	9.40	0.360	0.370
B	9.65	10.67	0.380	0.420
C	4.52	4.78	0.178	0.188
D	0.64	0.89	0.025	0.035
E	1.14	1.52	0.045	0.060
F	1.52	1.91	0.060	0.075
G	2.41	2.67	0.095	0.105
H	2.34	2.59	0.092	0.102
J	0.46	0.61	0.018	0.024
K	2.29	2.79	0.090	0.110
S	14.99	15.88	0.590	0.625
V	0.89	1.14	0.035	0.045
U	0.05	0.25	0.002	0.010
W	1.02	1.78	0.040	0.070

Part Numbering and Marking



TO-220 AB - (R Package)
TO-263 AB - (N Package)



Date Code Marking
Y:Year Code
M: Month Code
XXX: Lot Trace Code

Product Selector

Part Number	Voltage (1200 V)	Gate Sensitivity	Type	Package
Sxx30R	X	30 mA	Standard SCR	TO-220R
Sxx30N	X	30 mA	Standard SCR	TO-263

Note: xx = Voltage

Packing Options

Part Number	Marking	Weight	Packing Mode	M.O.Q.
Sxx30RTP	Sxx30R	2.2 g	Tube Pack	1000 (50 per tube)
Sxx30NRP	Sxx30N	1.6 g	Embossed Carrier	500

Note: xx = Voltage

Reel Pack (RP) for TO-263 Embossed Carrier Specifications

Meets all EIA-481-2 Standards