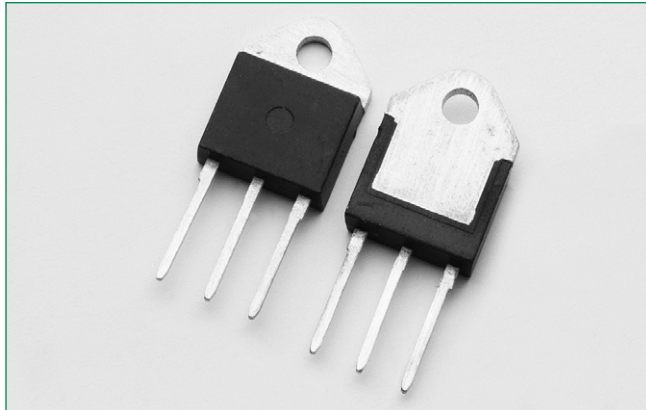


SK255KD Series




Description

Excellent unidirectional switches for phase control applications such as heating and motor speed controls. Standard phase control SCRs are triggered with few milliamperes of current at less than 1.5V potential.

Features & Benefits

- RoHS compliant
- Voltage capability up to 1200 V
- Electrically isolated package "KD-Package" and UL Recognized for 2500V_{RMS}
- Surge capability up to 550 A
- UL Recognized as an Electrically Isolated Semiconductor Device to the requirements of UL 1557.

Agency Recognitions

Agency	Agency File Number
	E71639

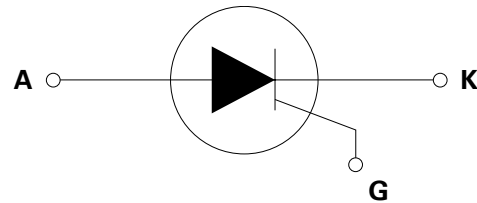
Applications

Typical applications are AC solid-state switches, industrial power tools, line rectification 50/60Hz.

Main Features

Symbol	Value	Unit
$I_{T(RMS)}$	55	A
V_{DRM}/V_{RRM}	1200	V
I_{GT}	50	mA

Schematic Symbol



Absolute Maximum Ratings

Symbol	Parameter	Test Conditions	Value	Unit
V_{DRM}/V_{RRM}	Repetitive Peak off-state/Reverse Voltage		1200	V
V_{DSM}/V_{RSM}	Non-repetitive peak off-state/Reverse voltage		1300	V
$I_{T(RMS)}$	RMS on-state current	$T_C = 60^\circ\text{C}$	55	A
$I_{T(AV)}$	Average on-state current	$T_C = 60^\circ\text{C}$	35	A
I_{TSM}	Peak non-repetitive surge current	single half cycle; $f = 50\text{Hz}$; $T_J(\text{initial}) = 25^\circ\text{C}$	520	A
		single half cycle; $f = 60\text{Hz}$; $T_J(\text{initial}) = 25^\circ\text{C}$	620	
I^2t	I^2t Value for fusing	$t_p = 8.3\text{ ms}$	1620	A^2s
di/dt	Critical rate of rise of on-state current		150	$\text{A}/\mu\text{s}$
I_{GM}	Peak gate current	$T_J = 125^\circ\text{C}$	3	A
$P_{G(AV)}$	Average gate power dissipation	$T_J = 125^\circ\text{C}$	1	W
T_{stg}	Storage temperature range		-40 to 150	$^\circ\text{C}$
T_J	Operating junction temperature range		-40 to 125	$^\circ\text{C}$

Electrical Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise specified)

Symbol	Test Conditions		Value	Unit
I_{GT}	$V_D = 12\text{V}; R_L = 30\ \Omega$	MAX.	50	mA
V_{GT}		MAX.	1.5	V
dv/dt	$V_D = 2/3 V_{DRM}$; gate open; $T_J = 125^\circ\text{C}$	MIN.	2000	V/ μs
V_{GD}	$V_D = V_{DRM}$; $R_L = 3.3\ \text{k}\Omega$; $T_J = 125^\circ\text{C}$	MIN.	0.2	V
I_H	$I_T = 500\text{mA}$ (initial)	MAX.	120	mA
t_q	$I_T = 0.5\text{A}$; $t_p = 50\mu\text{s}$; $dv/dt = 5\text{V}/\mu\text{s}$; $di/dt = -30\text{A}/\mu\text{s}$	TYP.	20	μs
t_{gt}	$I_G = 2 \times I_{GT}$; $PW = 15\mu\text{s}$; $I_T = 110\text{A}$	TYP.	3	μs

Static Characteristics

Symbol	Test Conditions		Value	Unit
V_{TM}	$I_T = 110\text{A}$; $t_p = 380\mu\text{s}$	MAX.	1.6	V
I_{DRM} / I_{RRM}	V_{DRM} / V_{RRM}	$T_J = 25^\circ\text{C}$	10	μA
		$T_J = 125^\circ\text{C}$	6	mA

Thermal Resistances

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Junction to case (AC)	1.0	$^\circ\text{C}/\text{W}$

Figure 1: Normalized DC Gate Trigger Current vs. Junction Temperature

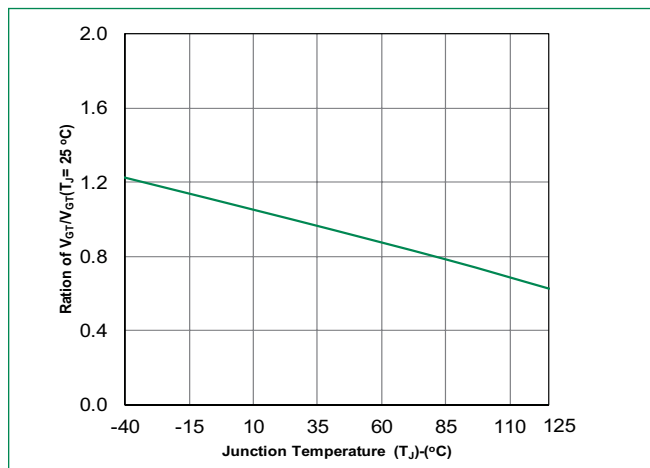


Figure 2: Normalized DC Gate Trigger Voltage vs. Junction Temperature

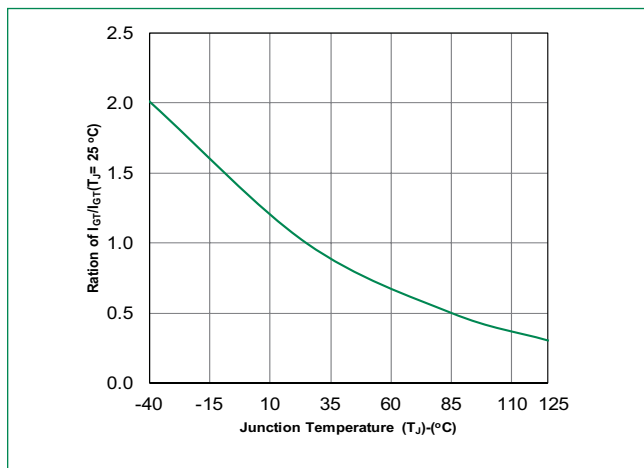


Figure 3: Normalized DC Holding Current vs. Junction Temperature

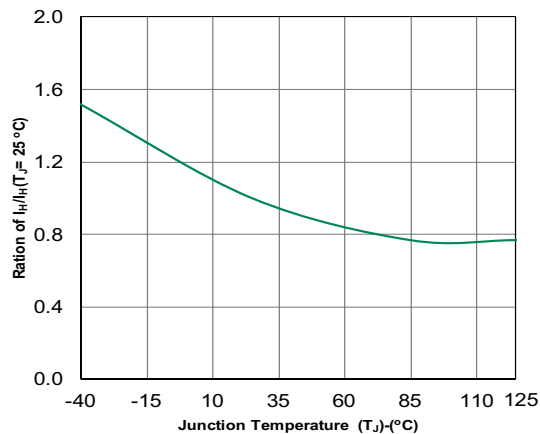


Figure 4: On-State Current vs. On-State Voltage (Typical)

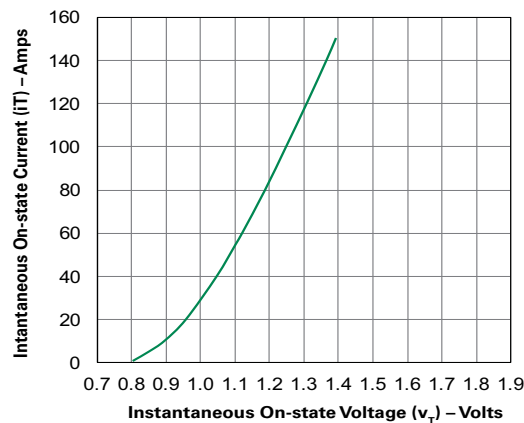


Figure 5: Power Dissipation (Typical) vs. RMS On-State Current

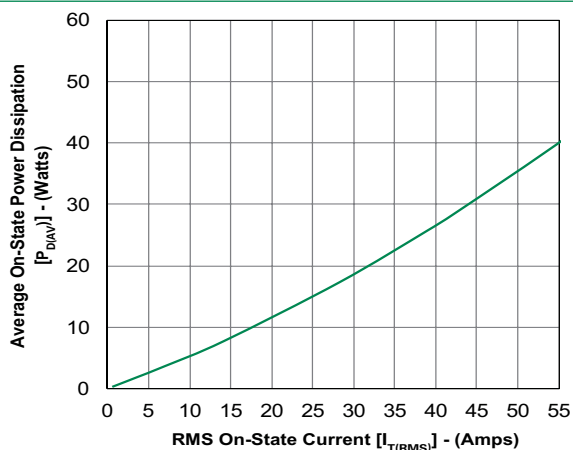


Figure 6: Maximum Allowable Case Temperature vs. RMS On-State Current

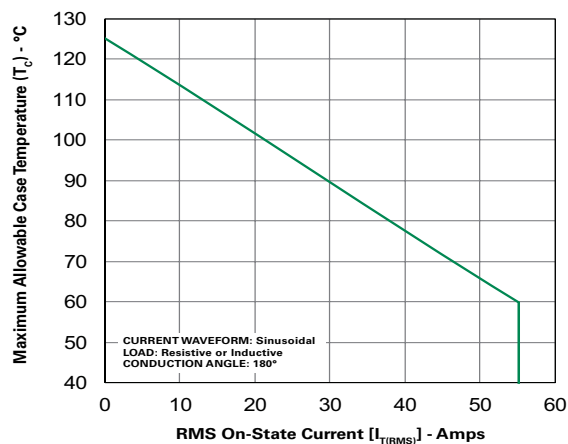


Figure 7: Maximum Allowable Case Temperature vs. Average On-State Current

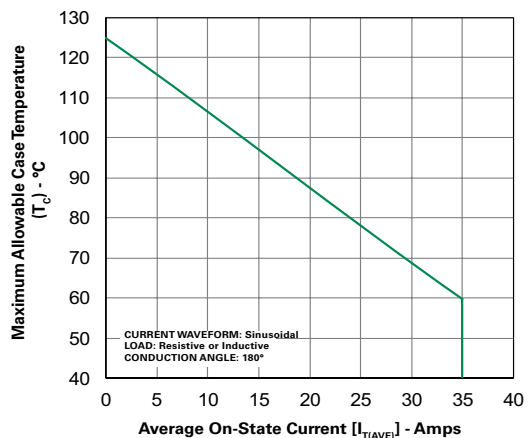
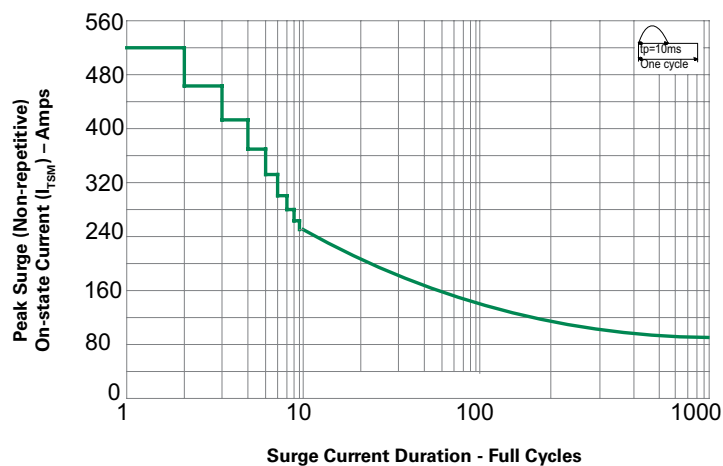


Figure 8: Surge Peak On-State Current vs. Number of Cycles



SUPPLY FREQUENCY: 50 Hz Sinusoidal
LOAD: Resistive
RMS On-State Current: [I_{T(RMS)}]: Maximum Rated Value at Specified 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.

Design Considerations

Careful selection of the correct component for the application's operating parameters and environment will go a long way toward extending the operating life of the Thyristor. Good design practice should limit the maximum continuous current through the main terminals to 75% of the component rating. Other ways to ensure long life for a power discrete semiconductor are proper heat sinking and selection of voltage ratings for worst case conditions. Overheating, overvoltage (including dv/dt), and surge currents are the main killers of semiconductors. Correct mounting, soldering, and forming of the leads also help protect against component damage.

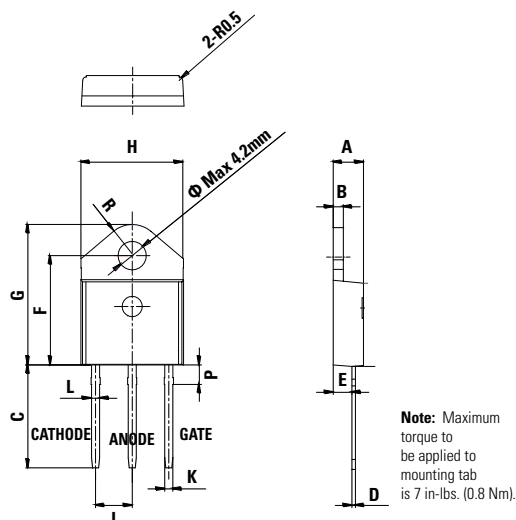
Environmental Specifications

Test	Specifications and Conditions
AC Blocking	JESD22-A108C, 80% V _{DRM} @125°C for 168 hours
Temperature Cycling	JESD22-A104D, M-1051, 50 cycles; -50°C to +150°C; 15-min dwell-time
Temperature/Humidity	EIA / JEDEC, JESD22-A101 168 hours; 100V - DC: 85°C; 85% rel humidity
Resistance to Solder Heat	JESD22-B106C
Solderability	ANSI/J-STD-002, category 3, Test A

Physical Specification

Terminal Finish	100% Matte Tin-Plated
Body Material	UL Recognized compound meeting flammability rating V-0

Dimensions – TO-218AC (KD Package) — Isolated Mounting Tab Common with Center Lead



Dimension	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
B	1.45		1.55	0.057		0.061
C	14.35		15.60	0.565		0.614
D	0.50		0.70	0.020		0.028
E	2.70		2.90	0.106		0.114
F	15.80		16.50	0.622		0.650
G	20.40		21.10	0.803		0.831
H	15.10		15.50	0.594		0.610
J	5.40		5.65	0.213		0.222
K	1.10		1.40	0.043		0.055
L	1.35		1.50	0.053		0.059
P	2.80		3.00	0.110		0.118
R		4.35			0.171	

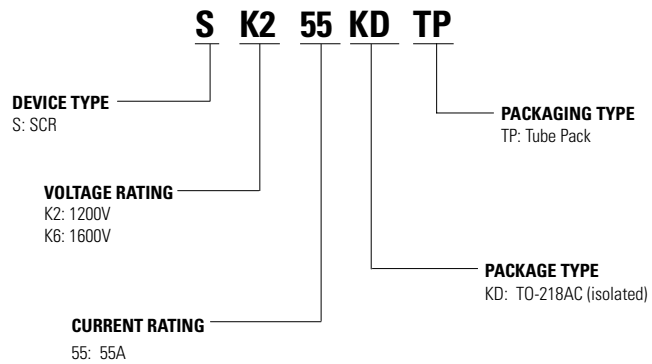
Product Selector

Part Number	Gate Sensitivity	Type	Package
SK255KD	50mA	Standard SCR	TO-218AC

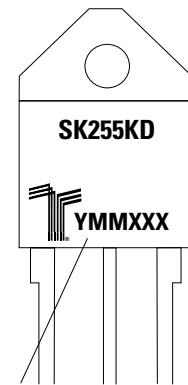
Packing Options

Part Number	Marking	Weight	Packing Mode	Base Quantity
SK255KDTP	SK255KD	4.8g	Tube	3600 (30 per tube)

Part Numbering System



Part Marking System



Date Code Marking

Y: Year Code
MM: Month Code
XXX: Lot Serial Code