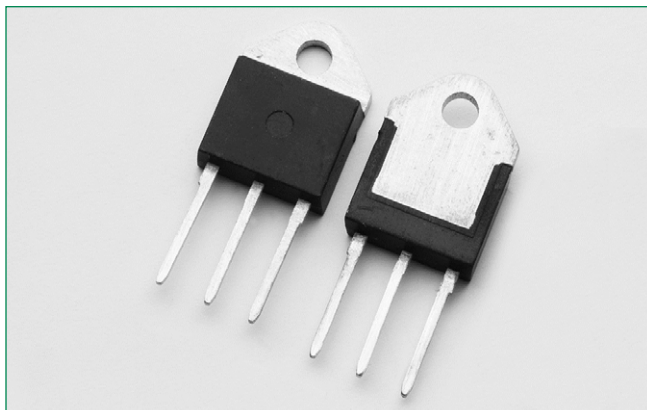


SK655KD



### 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 1600 V
- Surge capability up to 520 A
- Electrically isolated package "KD-Package" and UL Recognized for 2500V<sub>RMS</sub>
- UL Recognized as an Electrically Isolated Semiconductor Device to UL 1557.

### Agency Recognitions

Agency	Agency File Number
	E71639

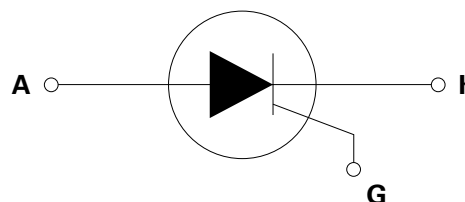
### Applications

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

### Main Features

Symbol	Value	Unit
$I_{T(RMS)}$	55	A
$V_{DRM}/V_{RRM}$	1600	V
$I_{GT}$	70	mA

### Schematic Symbol



### Absolute Maximum Ratings

Symbol	Parameter	Test Conditions	Value	Unit
$V_{DRM}/V_{RRM}$	Repetitive Peak off-state/Reverse Voltage		1600	V
$V_{DSM}/V_{RSM}$	Non-repetitive peak off-state/Reverse voltage		1700	V
$I_{T(RMS)}$	RMS on-state current	$T_c = 55^\circ\text{C}$	55	A
$I_{T(AV)}$	Average on-state current	$T_c = 55^\circ\text{C}$	35	A
$I_{TSM}$	Peak non-repetitive surge current	single half cycle; $f = 50\text{Hz}$ ; $T_j(\text{initial}) = 25^\circ\text{C}$	550	A
		single half cycle; $f = 60\text{Hz}$ ; $T_j(\text{initial}) = 25^\circ\text{C}$	660	
$I^2t$	$I^2t$ Value for fusing	$t_p = 8.3 \text{ ms}$	1800	A <sup>2</sup> s
$di/dt$	Critical rate of rise of on-state current		150	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.	70	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/ $\mu\text{s}$
$V_{GD}$	$V_D = V_{DRM}$ ; $R_L = 3.3\ \text{k}\Omega$ ; $T_J = 125^\circ\text{C}$	MIN.	0.2	V
$I_H$	$I_T = 500\text{mA}$ (initial)	MAX.	200	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	$\mu\text{s}$
$t_{gt}$	$I_G = 2 \times I_{GT}$ ; $PW = 15\mu\text{s}$ ; $I_T = 110\text{A}$	TYP.	5	$\mu\text{s}$

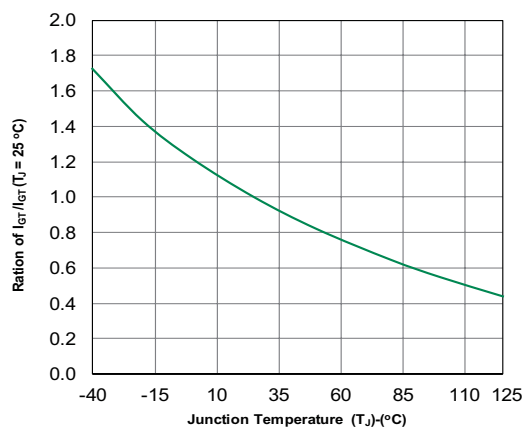
### Static Characteristics

Symbol	Test Conditions		Value	Unit
$V_{TM}$	$I_T = 110\text{A}$ ; $t_p = 380\mu\text{s}$	MAX.	1.8	V
$I_{DRM} / I_{RRM}$	$V_{DRM} / V_{RRM}$	$T_J = 25^\circ\text{C}$	10	$\mu\text{A}$
		$T_J = 125^\circ\text{C}$	8	mA

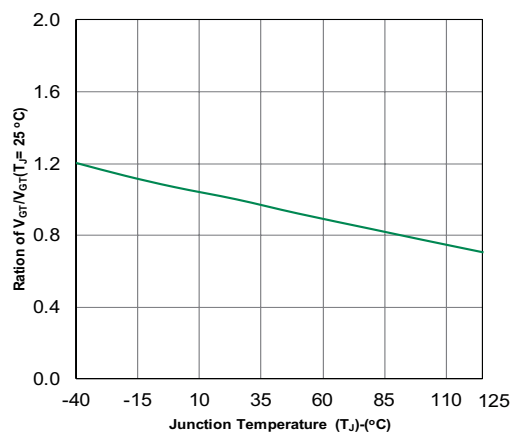
### Thermal Resistances

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

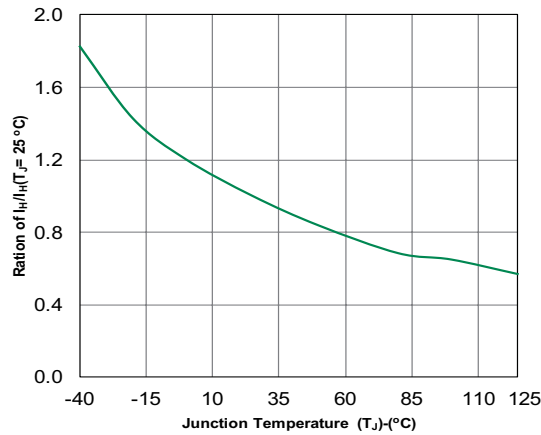
**Figure 1: Normalized DC Gate Trigger Current vs. Junction Temperature**



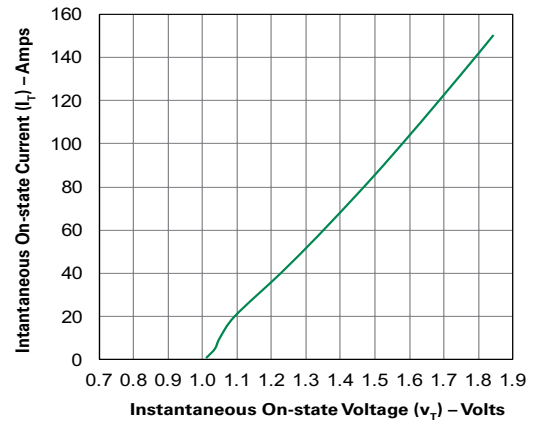
**Figure 2: Normalized DC Gate Trigger Voltage vs. Junction Temperature**



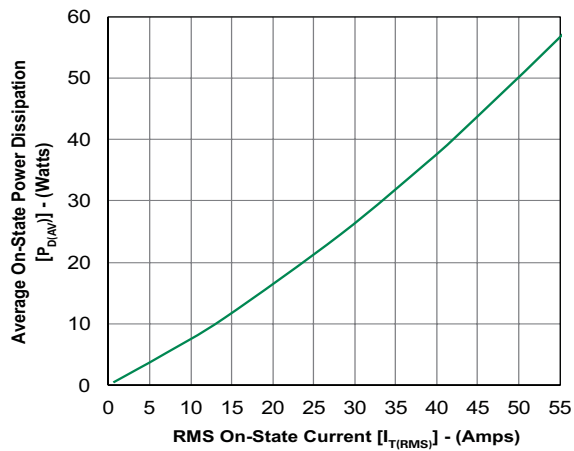
**Figure 3: Normalized DC Holding Current vs. Junction Temperature**



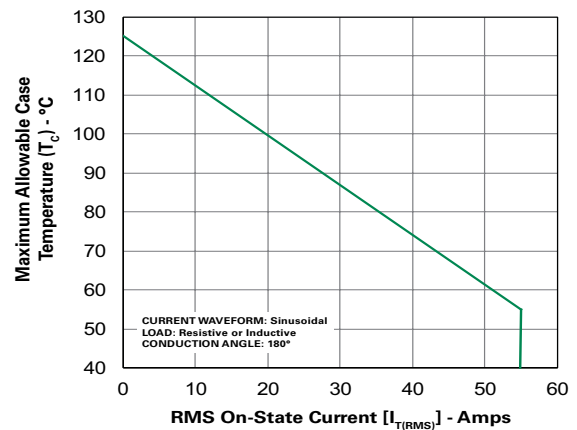
**Figure 4: On-State Current vs. On-State Voltage (Typical)**



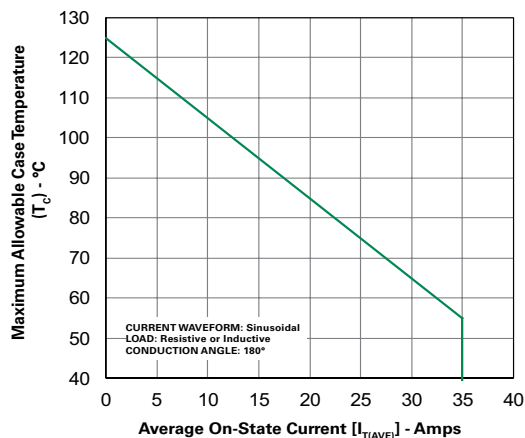
**Figure 5: Power Dissipation (Typical) vs. RMS On-State Current**



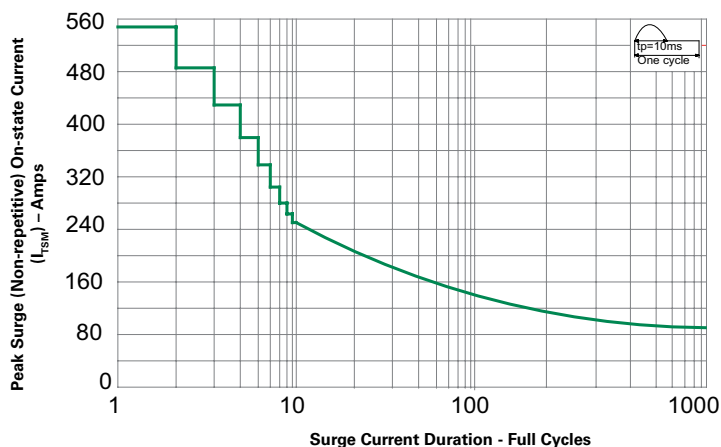
**Figure 6: Maximum Allowable Case Temperature vs. RMS On-State Current**



**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.

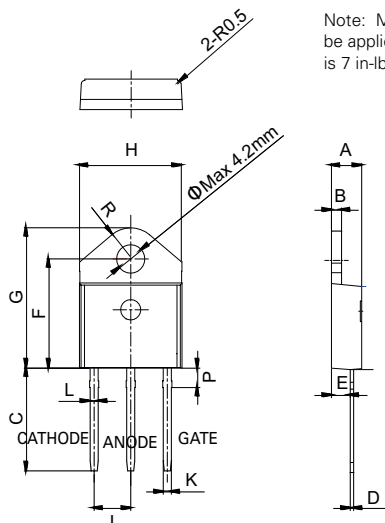
### Environmental Specifications

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

### Physical Specification

<b>Terminal Finish</b>	100% Matte Tin-Plated
<b>Body Material</b>	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	

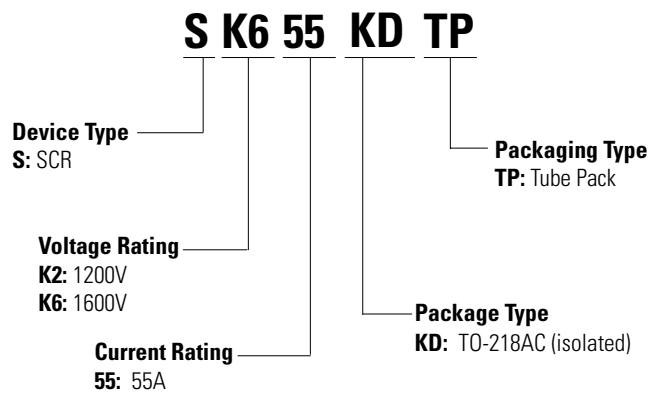
### Product Selector

Part Number	Gate Sensitivity	Type	Package
SK655KD	70mA	Standard SCR	TO-218AC

### Packing Options

Part Number	Marking	Weight	Packing Mode	Base Quantity
SK655KDTP	SK655KD	4.8g	Tube	450 (30 per tube)

### Part Numbering System



### Part Marking System

