



C149

T-25-17

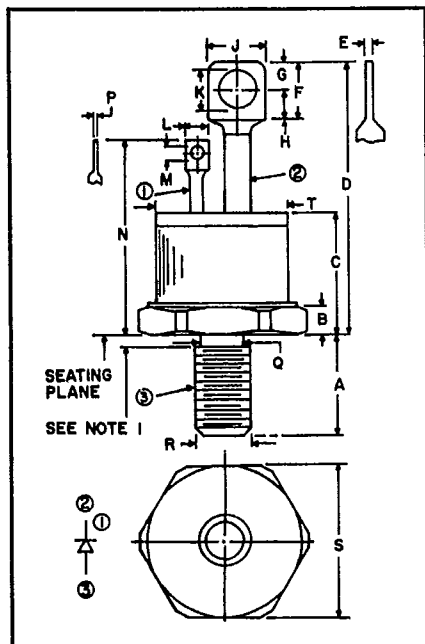
Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272

Powerex Europe, S.A., 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

Inverter Grade SCR

63 Amperes RMS

100-600 Volts/10-20 μ sec

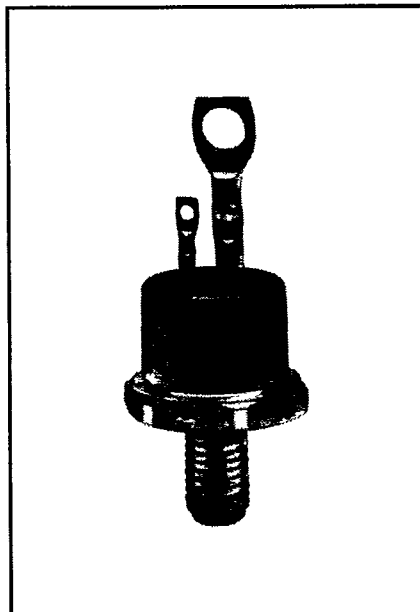


100-600 Volts, C149 Outline Drawing
Modified TO-65

Dimensions	Inches		Millimeters	
	Min.	Max.	Min.	Max.
A	.422	.452	10.72	11.47
B	.120	.135	3.05	3.42
C	.534	.565	13.57	14.34
D	1.230	1.290	31.25	32.78
E	.029	0.62	.74	1.56
F	.258	Ref.	6.55	Ref.
G	.138	Ref.	3.50	Ref.
H	.115	—	2.83	—
J	.240	.300	6.10	7.62
K	.169	.182	4.30	4.62
L	.090	.115	2.29	2.91
M	.055	.066	1.40	1.67
N	.831	.901	21.11	22.88
P	.012	—	.31	—
Q	.220	—	5.59	—
R	1/4-28		UNF-2A	
S	.676	.684	17.18	17.36
T	—	.597	—	15.15

Note:

- Complete threads to within $2\frac{1}{2}$ thd. of seating plane.
- One steel, cadmium plated nut and one steel, cadmium plated lockwasher supplied with each device.



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63 Amperes/100-600 Volts/
10-20 μ sec

Description

Powerex Inverter Grade Silicon Controlled Rectifiers (SCR) are designed for applications. These are all-diffused, compression bonded encapsulated (CBE) devices employing the field-proven amplifying (di/namic) gate.

Features:

- ☐ Center Fired Di/Namic Gate
- ☐ High dv/dt With Soft Gate Control
- ☐ High Frequency Operation
- ☐ Sinusoidal Waveform Operation To 20kHz
- ☐ Rectangular Waveform Operation To 20kHz
- ☐ Low Dynamic Forward Voltage Drop
- ☐ Low Switching Losses At High Frequency

Applications:

- ☐ UPS Inverters
- ☐ Induction Heating Inverters
- ☐ High Frequency Lighting
- ☐ Cycloconverters
- ☐ Choppers
- ☐ DC To DC Conversion

Ordering Information

Example: Select the complete 7 digit part number you desire from the table — i.e. C149M10 is a 600 Volt, 63 Ampere Inverter Grade SCR, 10 μ s T_q .

Type	Voltage V_{DRM}/V_{RRM}	Code	Turn-Off	
			t_q (μ sec)	Code
C149	100	A	10	10
	200	B	20	20
	400	D		
	600	M		

Note: All voltages not available in all current ratings.



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C149**Inverter Grade SCR**63 Amperes RMS/100-600 Volts/10-20 μ sec**Absolute Maximum Ratings**

Ratings	Symbol	C149A	C149B	Units
Repetitive Peak Off-State Voltage	V_{DRM}	100	200	Volts
Repetitive Peak Reverse Voltage	V_{RRM}	100	200	Volts
Non-repetitive Peak Reverse Voltage	V_{RSM}	150	300	Volts

Ratings	Symbol	C149D	C149M	Units
Repetitive Peak Off-State Voltage	V_{DRM}	400	600	Volts
Repetitive Peak Reverse Voltage	V_{RRM}	400	600	Volts
Non-repetitive Peak Reverse Voltage	V_{RSM}	500	720	Volts

C149

RMS On-State Current	$I_{T(RMS)}$	63	Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (60 Hz) ③	I_{TSM}	1000	Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (50 Hz) ③	I_{TSM}	920	Amperes
Critical Rate-of-Rise of On-State Current (Non-Repetitive) ①④⑥	di/dt	200	Amperes/ μ s
Critical Rate-of-Rise of On-State Current (Repetitive)	di/dt	100	Amperes/ μ s
I^2t (for Fusing), 8.3 ms	I^2t	4150	A ² sec
Average Gate Power Dissipation	$P_{G(AV)}$	2	Watts
Storage Temperature	T_{stg}	-40 to 150	°C
Operating Temperature	T_j	-40 to 125	°C
Mounting Torque ①		30	in.-lb.
Mounting Torque ①		3.4	N-m

① Consult recommended mounting procedures.

② Applies for zero or negative gate bias.

③ Per JEDEC RS-397, 5.2.2.1.

④ With recommended gate drive.

⑤ Higher dv/dt ratings available, consult factory.

⑥ Per JEDEC standard RS-397, 5.2.2.6.



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C149**Inverter Grade SCR**63 Amperes RMS/100-600 Volts/10-20 μ sec**Electrical Characteristics**

Characteristics	Symbol	Test Conditions	Min.	C149 Typ.	Max.	Units
Current—Conducting State						
Peak On-State Voltage	V_{TM}	$T_c = 25^{\circ}\text{C}$, $I_{TM} = 500\text{A}$	—	—	3.0	Volts
Typical Critical dv/dt exponential to V_{DRM} ②⑤	dv/dt	$T_j = 125^{\circ}\text{C}$, $V_D = V_{DRM}$	200	—	—	V/ μsec
Voltage—Blocking State						
Forward Leakage, Peak	I_{DRM}	$T_j = 125^{\circ}\text{C}$, $V_D = V_{DRM}$	—	7	12	mA
Reverse Leakage, Peak	I_{RRM}	$T_j = 125^{\circ}\text{C}$, $V_R = V_{RRM}$	—	7	12	mA
Gate						
Gate Current to Trigger	I_{GT}	$T_c = 25^{\circ}\text{C}$, $V_D = 6\text{V}$, $R_L = 3\Omega$	—	—	150	mA
Gate Voltage to Trigger	V_{GT}	$T_c = 25^{\circ}\text{C}$, $V_D = 6\text{V}$, $R_L = 3\Omega$	—	—	3.0	Volts
Non-Triggering Gate Voltage	V_{GD}	$T_c = 125^{\circ}\text{C}$, $V_D = V_{DRM}$, $R_L = 1\text{k}\Omega$	0.25	—	—	Volts
Thermal						
Maximum Thermal Resistance ① Junction to Case	$R_{th(j-c)}$		—	—	0.35	$^{\circ}\text{C/Watt}$

① Consult recommended mounting procedures.

② Applies for zero or negative gate bias.

③ Per JEDEC RS-397, 5.2.2.1.

④ With recommended gate drive.

⑤ Higher dv/dt ratings available, consult factory.

⑥ Per JEDEC standard RS-397, 5.2.2.6.



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C149**Inverter Grade SCR**63 Amperes RMS/100-600 Volts/10-20 μ sec**Electrical Characteristics**

Characteristics	Symbol	Test Conditions	C149-10			C149-20			Units
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Switching Circuit									
Turn-off Time (with Reverse Voltage)	t_q	$T_c = +125^\circ\text{C}$, $I_{TM} = 150\text{A}$, $V_R = 50\text{V/min.}$, $di/dt = 5\text{A}/\mu\text{s}$, reapplied $dv/dt = 20\text{V}/\mu\text{s}$ linear Repetition Rate = 1 pps Gate Bias During Turn-Off Interval $V_D = 0\text{V}$, $R_L = 100\Omega$	—	8	10	—	15	20	μsec
Turn-Off Time (with Reverse Voltage)	t_q	$T_c = +125^\circ\text{C}$, $I_{TM} = 150\text{A}$, $V_R = 50\text{V/min.}$, $di/dt = 5\text{A}/\mu\text{s}$, reapplied $dv/dt = 200\text{V}/\mu\text{s}$ linear Repetition Rate = 1 pps Gate Bias During Turn-Off Interval $V_D = 0\text{V}$, $R_L = 100\Omega$	—	13	†	—	20	†	μsec
Turn-Off Time (with Feedback Diode)	t_q	$T_c = +125^\circ\text{C}$, $I_{TM} = 150\text{A}$, $V_R = 1\text{V}$, $di/dt = 5\text{A}/\mu\text{s}$, reapplied $dv/dt = 200\text{V}/\mu\text{s}$ linear Repetition Rate = 1 ppm Gate Bias During Turn-Off Interval $V_D = 0\text{V}$, $R_L = 100\Omega$	—	20	†	—	35	†	μsec

†Consult factory for a specified maximum turn-off time.



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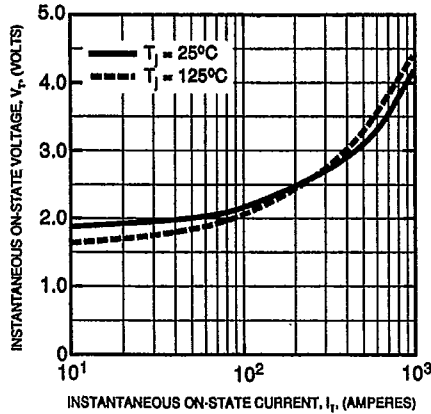
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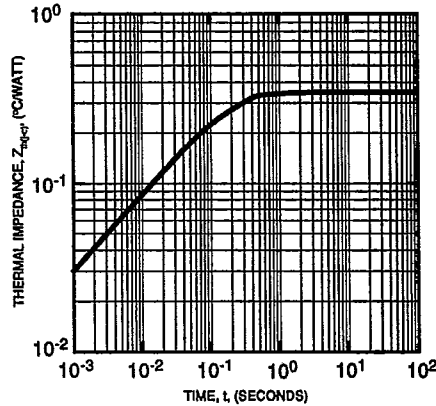
Inverter Grade SCR

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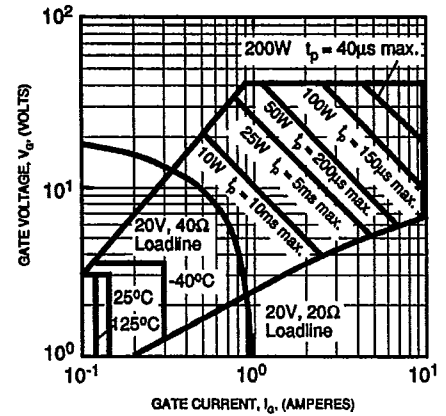
MAXIMUM ON-STATE CHARACTERISTICS



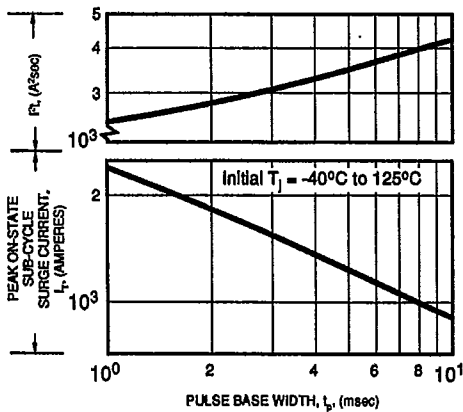
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



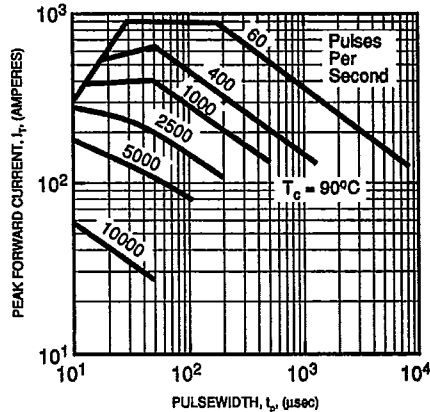
GATE CHARACTERISTICS AND POWER RATINGS



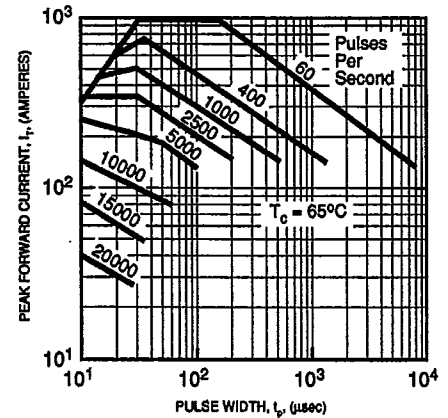
MAXIMUM ALLOWABLE NON-REPETITIVE SUB-CYCLE SURGE ON-STATE CURRENT AND P1 RATINGS



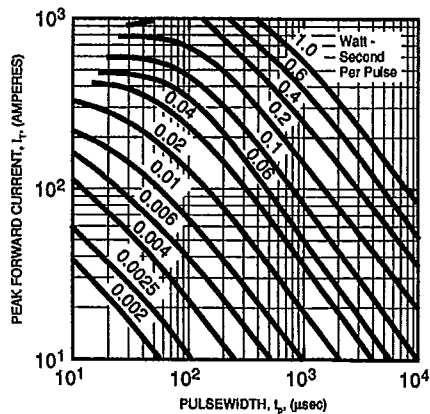
MAXIMUM ALLOWABLE PEAK FORWARD CURRENT



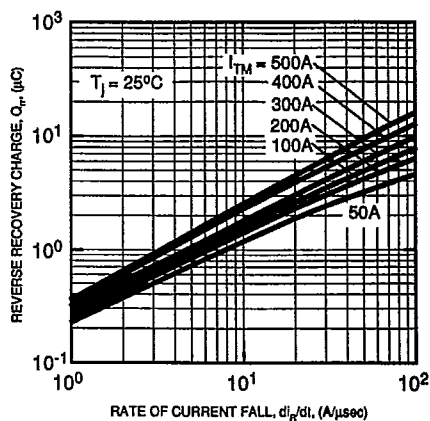
MAXIMUM ALLOWABLE PEAK FORWARD CURRENT



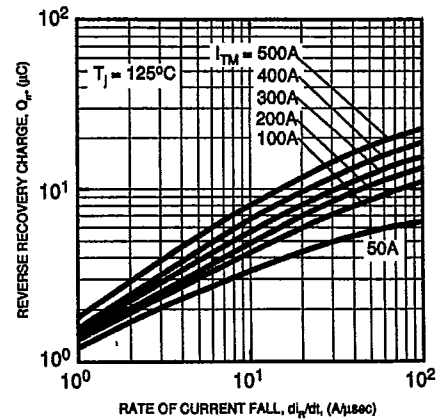
SINUSOIDAL PULSE ENERGY



REVERSE RECOVERY CHARGE CHARACTERISTICS (SINUSOIDAL WAVEFORM)



REVERSE RECOVERY CHARGE CHARACTERISTICS (SINUSOIDAL WAVEFORM)





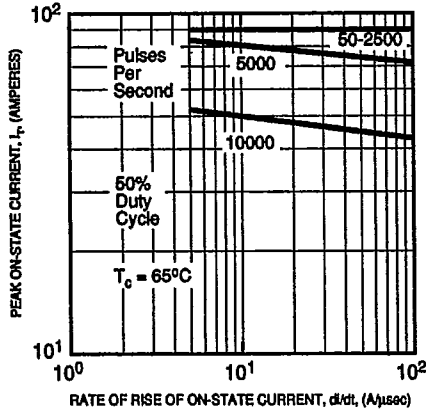
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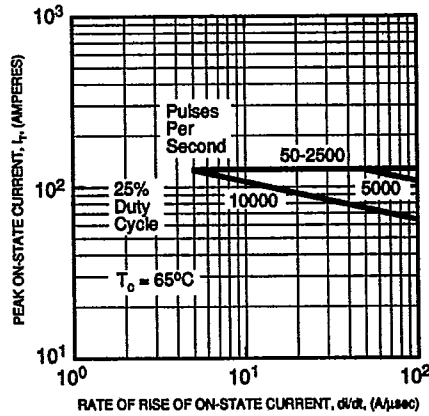
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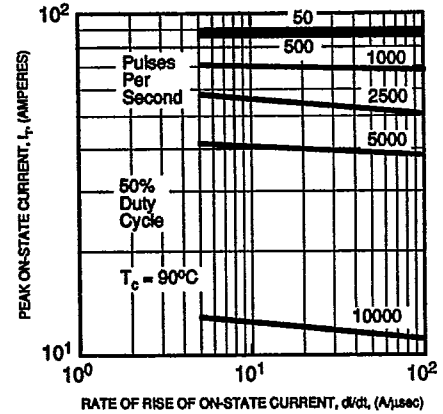
MAXIMUM ALLOWABLE PEAK
ON-STATE CURRENT VS. di/dt
(RECTANGULAR WAVEFORM)



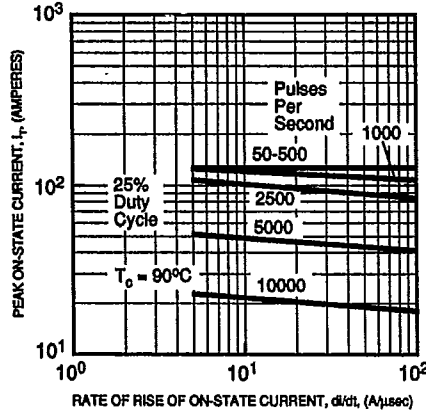
MAXIMUM ALLOWABLE PEAK
ON-STATE CURRENT VS. di/dt
(RECTANGULAR WAVEFORM)



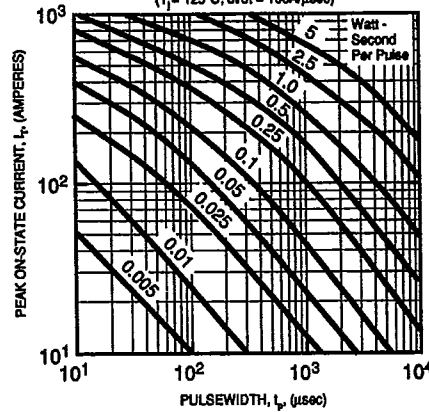
MAXIMUM ALLOWABLE PEAK
ON-STATE CURRENT VS. di/dt
(RECTANGULAR WAVEFORM)



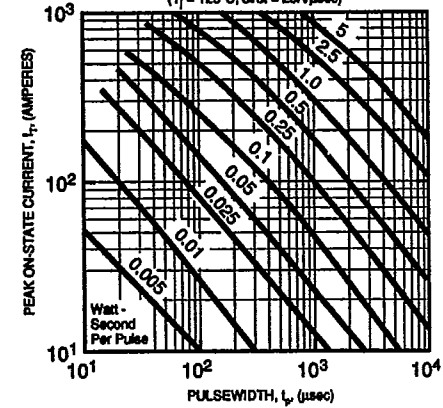
MAXIMUM ALLOWABLE PEAK
ON-STATE CURRENT VS. di/dt
(RECTANGULAR WAVEFORM)



ENERGY PER PULSE VS. PEAK CURRENT
AND PULSEWIDTH



ENERGY PER PULSE VS. PEAK CURRENT
AND PULSEWIDTH



ENERGY PER PULSE VS. PEAK CURRENT
AND PULSEWIDTH

