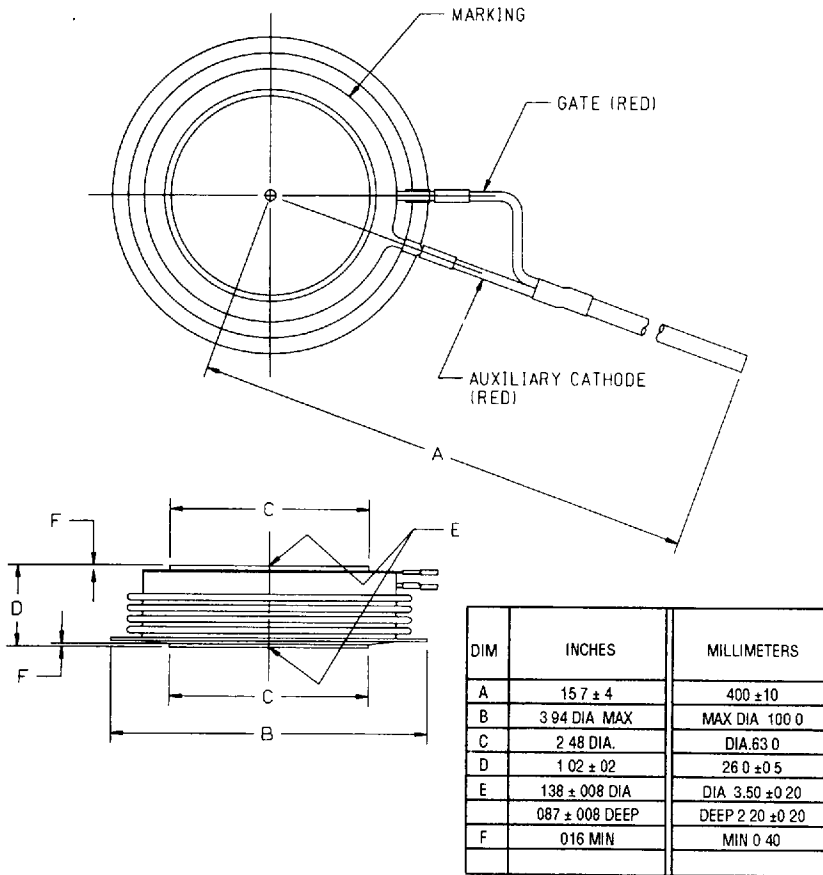


Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412)925-7272  
 Powerex Europe, S.A., 428 Avenue G. Durand, BP107, 72003 Le Mans, France(43) 72.75.15

### Asymmetric Gate-Turn-Off Thyristors

1800 Amperes/ 2000 & 2500 Volts



#### Description:

Powerex GTOs are designed for use in voltage-source inverter applications requiring fast switching GTOs with low snubber capacitances.

#### Features:

- Low Snubber Capacitance (4.0 μF for 1800A/2000A switch)
- Low On-State Voltage
- Low Switching Losses
- Fast Switching Time ( $t_{gr}$  = 30μS maximum)

#### Applications:

- Motor Control Inverters (VVVF)
- Traction (Main Motor)
- UPS Inverters
- Choppers
- Thyristor Switch
- Power Supply

#### Ordering Information

Example: Select the complete ten digit device part number from the table below.

DEVICE	CURRENT RATING	MANU. NUMBER	TYPE	VOLTAGE RATING
<b>FG</b>	<b>1800</b>	<b>C</b>	<b>H</b>	- <b>40</b> - <b>50</b>
PRESS PACK GTO	$I_{TQPM}$ 1800 A		ASYMMETRIC High-Voltage	$V_{DRM}$ 40=2000V 50=2500V



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FG1800CH-40,50

POWEREX INC

Asymmetric

Gate-Turn-Off Thyristors

1800 Amperes/2000 & 2500 Volts

Absolute Maximum Ratings,  $T_J=25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	FG1800CH-40	FG1800CH-50	Units
Repetitive Peak Reverse Voltage	$V_{RRM}$	17	17	Volts
Non-Repetitive Peak Reverse Voltage	$V_{RSM}$	17	17	Volts
DC Reverse Voltage	$V_{R(DC)}$	17	17	Volts
Repetitive Peak Off-State Voltage	$V_{ORM}$	2000	2500	Volts
Non-Repetitive Peak Off-State Voltage	$V_{OSM}$	2100	2500	Volts
DC Off-State Voltage	$V_{O(DC)}$	1600	2000	Volts
Controllable On-State Current	$V_D=1/2V_{ORM}, T_J=125^\circ\text{C}, C_S=4.0\mu\text{F}$ $L_S=0.2\mu\text{H}, I_{OQ}=-360\text{A}$		$I_{TORM}$ 1800	A
RMS On-State Current			$I_{T(RMS)}$ 860	A
Average On-State Current	Sine-wave $\Theta=180^\circ, T_C=91^\circ\text{C}, f=60\text{ Hz}$		$I_{T(AV)}$ 550	A
Surge On-State Current	NON-REP, One half cycle at 60Hz		$I_{TSM}$ 16,000	A
$I^2t$ for Fusing	One half cycle at 60 Hz		$I^2t$ 1,100,000	$\text{A}^2\text{-sec}$
Critical Rate of Rise of On-State Current	$V_D=1/2 V_{ORM}, I_{GM}=30\text{A}, T_J=125^\circ\text{C}$		$di/dt$ 300	$\text{A}/\mu\text{s}$
Peak Gate Forward Current			$I_{FGM}$ 50	A
Peak Gate Reverse Current			$I_{RGM}$ 500	A
Peak Gate Forward Voltage			$V_{FGM}$ 10	V
Peak Gate Reverse Voltage			$V_{RGM}$ 17	V
Peak Gate Forward Power Dissipation			$P_{FGM}$ 250	W
Peak Gate Reverse Power Dissipation			$P_{RGM}$ 17000	W
Average Gate Forward Power Dissipation			$P_{FG(AV)}$ 50	W
Average Gate Reverse Power Dissipation			$P_{RG(AV)}$ 150	W
Junction Temperature			$T_J$ -40 TO +125	$^\circ\text{C}$
Storage Temperature			$T_{stg}$ -40 TO +150	$^\circ\text{C}$
Mounting Force	RECOMMENDED VALUE 19.6 kN or 4400 lbs.		17.6 TO 23.5 3960 TO 5280	kN lbs.
Weight (typical)			820	grams

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FG1800CH-40,50  
 Asymmetric  
**Gate-Turn-Off Thyristors**  
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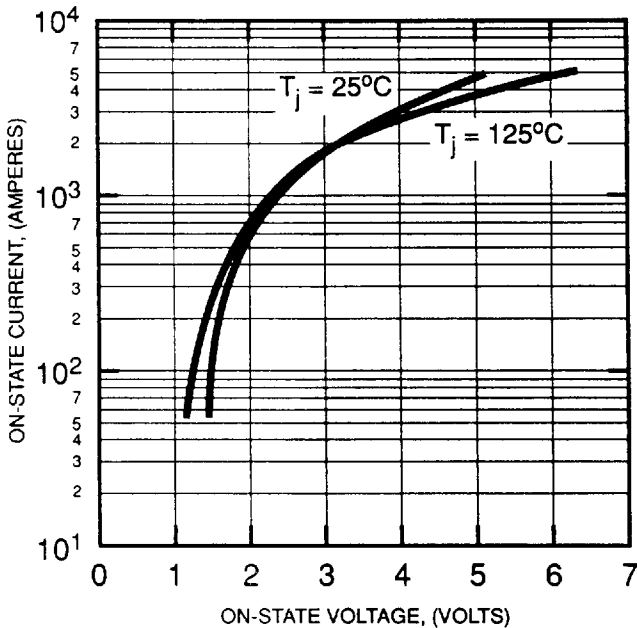
**Electrical Characteristics,  $T_j=25^\circ\text{C}$  unless otherwise specified**

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Repetitive Peak Reverse Leakage Current	$I_{RRM}$	$T_j=125^\circ\text{C}, V_a=V_{RRM}$	-----	-----	300	mA
Repetitive Peak Forward Leakage Current	$I_{DRM}$	$T_j=125^\circ\text{C}, V_d=V_{DRM}, V_{GK}=-2\text{V}$	-----	-----	100	mA
Gate Reverse Blocking Current	$I_{RG}$	$T_j=125^\circ\text{C}, V_{RG}=-15\text{V}$	-----	-----	300	mA
Peak On-State Voltage	$V_{TM}$	$T_j=125^\circ\text{C}, I_{TM}=1800\text{A}$	-----	-----	3.0	V
Critical Rate of Rise of Off-State Voltage	$dv/dt$	$T_j=125^\circ\text{C}, V_d=50\% V_{DRM}, V_{GK}=-2\text{V}$	1000	-----	-----	V/ $\mu\text{s}$
Turn-Off Time	$t_{gr}$	$I_{TM}=1800\text{A}, T_j=125^\circ\text{C}, V_{RG}=15\text{V}, C_s=4.0\mu\text{F}, L_s=0.2\mu\text{H}, di_d/dt=30\text{A}/\mu\text{s}, V_d=50\% V_{DRM}$	-----	-----	30	$\mu\text{s}$
Turn-On Time	$t_{gr}$	$I_{TM}=1800\text{A}, T_j=125^\circ\text{C}, I_{GK}=30\text{A}, V_d=1/2 V_{DRM}$	-----	-----	10	$\mu\text{s}$
Gate Trigger Current	$I_{GT}$	$V_d=5\text{V TO } 20\text{V}, I_T=25\text{A TO } 200\text{A}$	-----	-----	3.0	A
Gate Trigger Voltage	$V_{GT}$	$V_d=5\text{V TO } 20\text{V}, I_T=25\text{A TO } 200\text{A}$	-----	-----	1.5	V

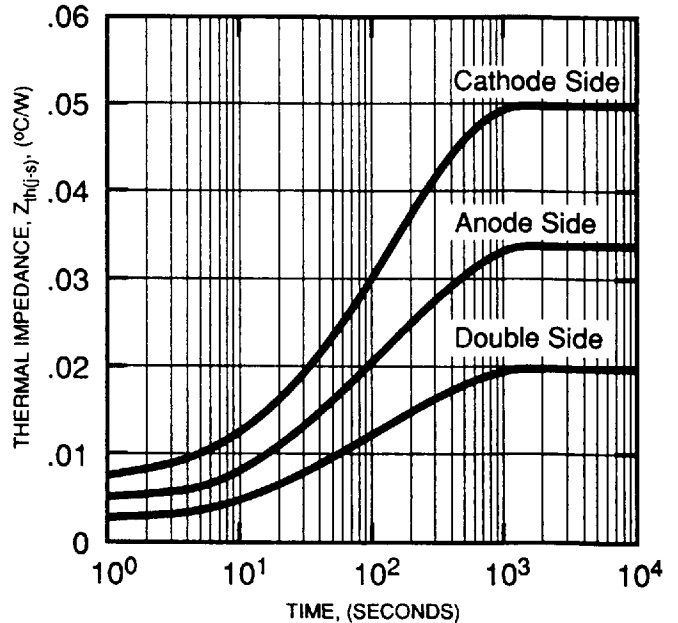
**Thermal Characteristics**

Characteristics	Symbol	Min.	Typ.	Max.	Units
Thermal Resistance Junction to Sink	$R_{\theta JS}$	-----	-----	0.020	$^\circ\text{C/W}$

**MAXIMUM ON-STATE CHARACTERISTIC**



**TRANSIENT THERMAL IMPEDANCE CHARACTERISTIC, (JUNCTION TO SINK)**



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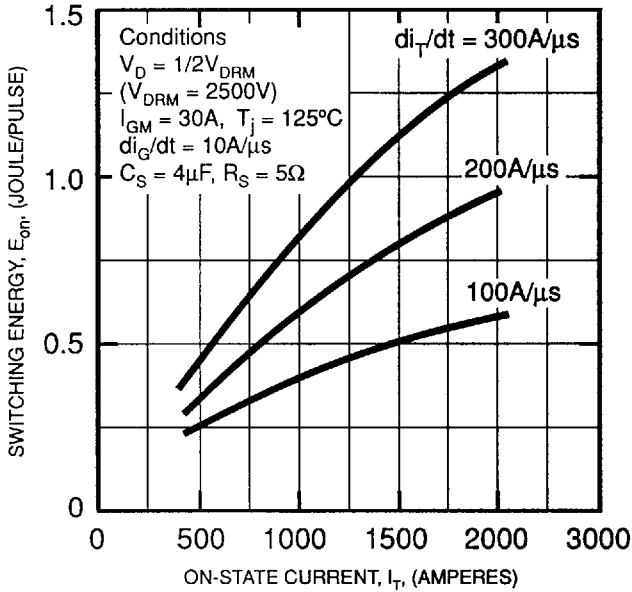
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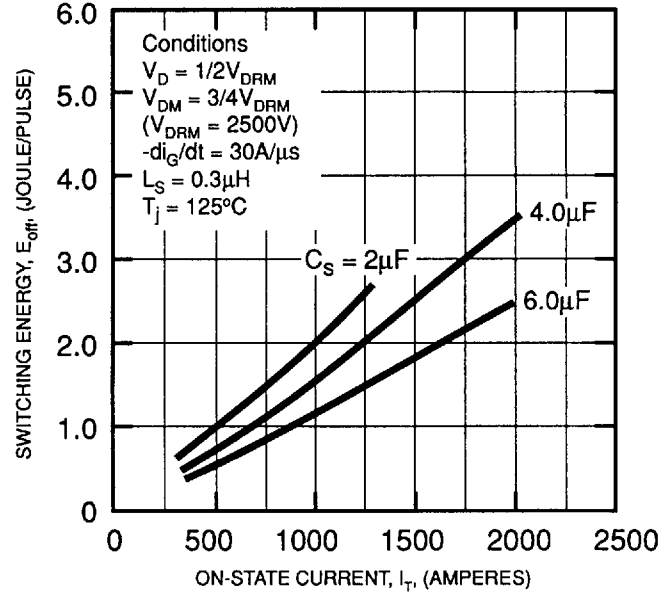
Gate-Turn-Off Thyristors

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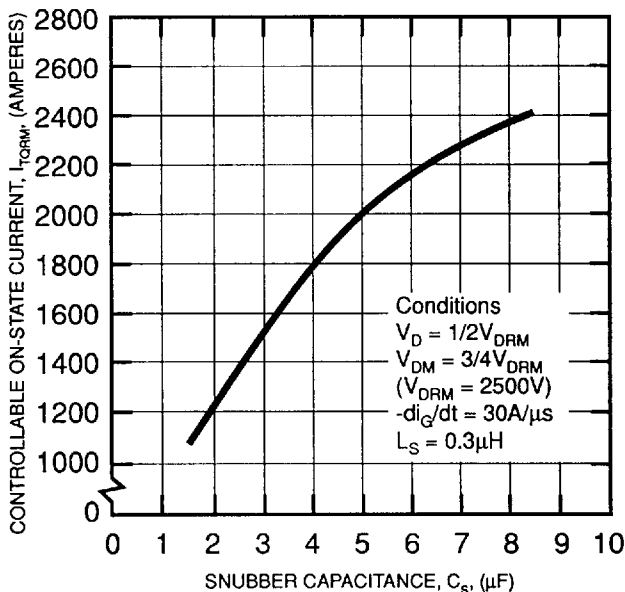
**MAXIMUM TURN-ON SWITCHING ENERGY DISSIPATION PER PULSE**



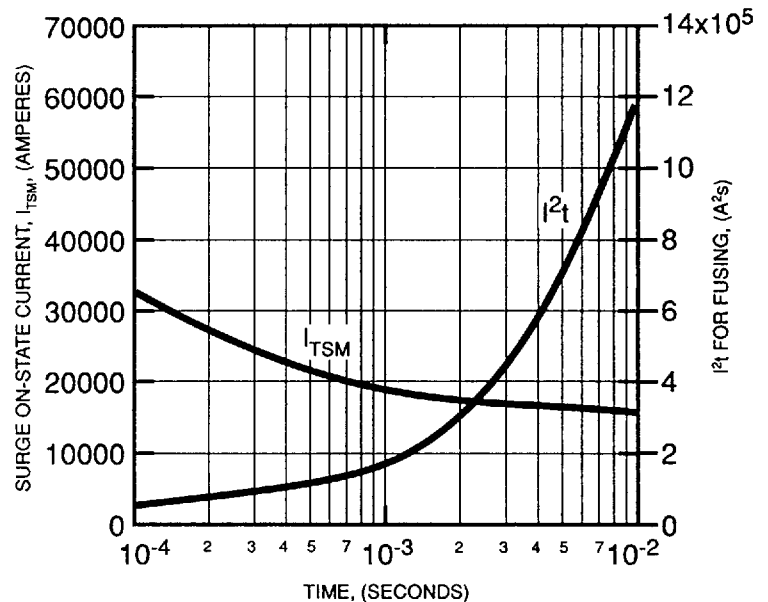
**MAXIMUM TURN-OFF SWITCHING ENERGY DISSIPATION PER PULSE**



**MAXIMUM CONTROLLABLE ON-STATE CURRENT VS. SNUBBER CAPACITANCE**



**PEAK ONE-CYCLE ON-STATE SURGE CURRENT AND  $I^2t$**

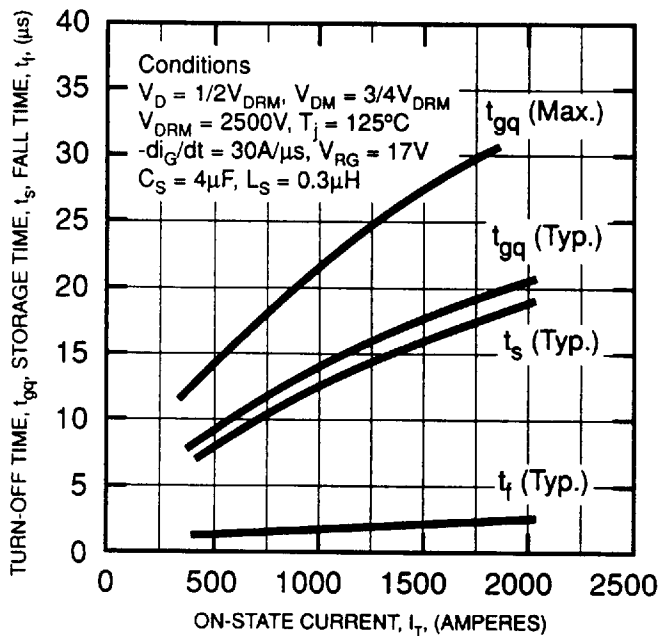


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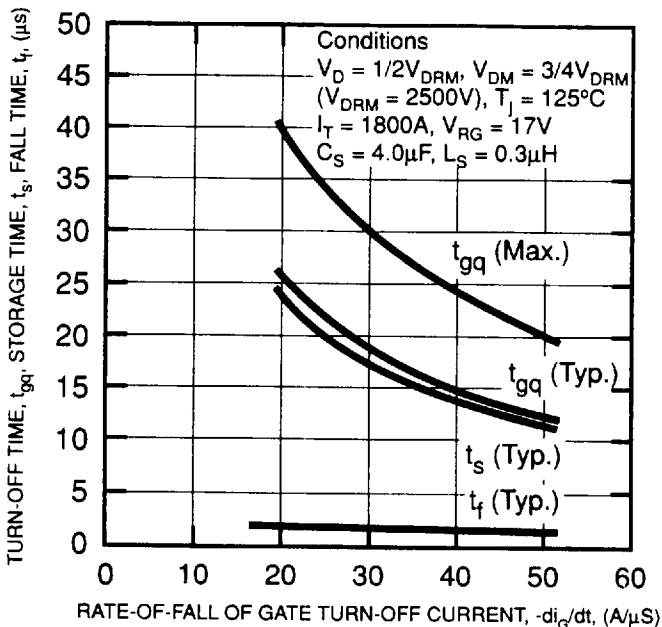
**FG1800CH-40,50**  
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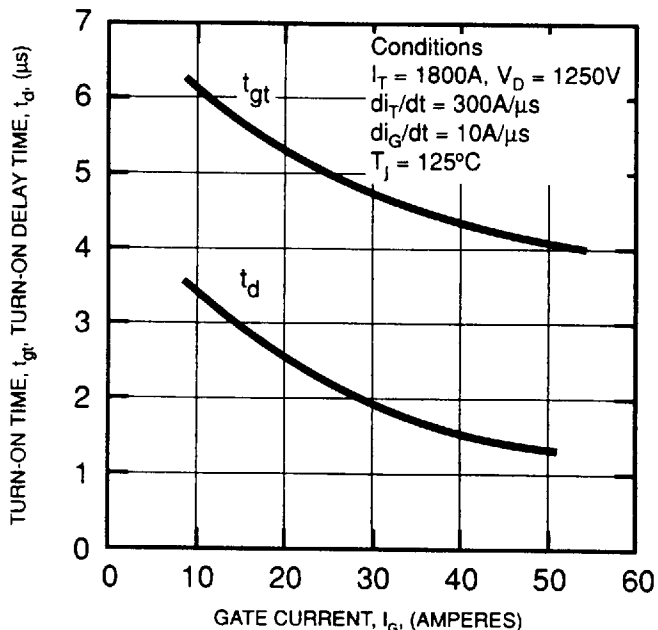
**TURN-OFF TIME, STORAGE TIME, FALL TIME VS. ON-STATE CURRENT**



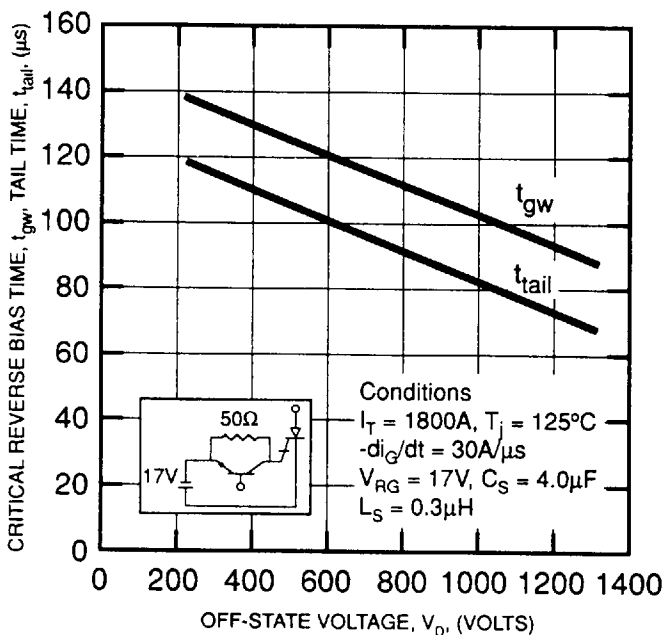
**TURN-OFF TIME, STORAGE TIME, FALL TIME VS. RATE-OF-FALL OF GATE TURN-OFF CURRENT**



**TYPICAL TURN-ON TIME, TURN-ON DELAY TIME VS. GATE CURRENT**



**MAXIMUM CRITICAL REVERSE BIAS TIME, TAIL TIME VS. OFF-STATE VOLTAGE**



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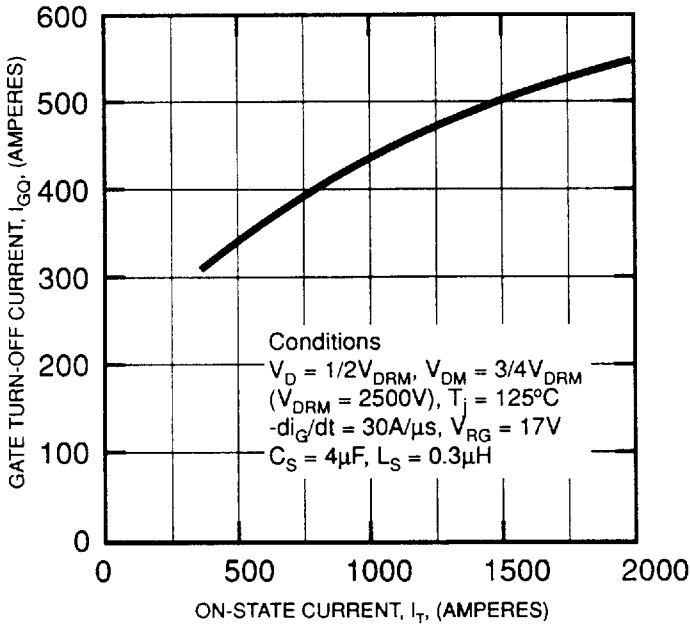
Asymmetric

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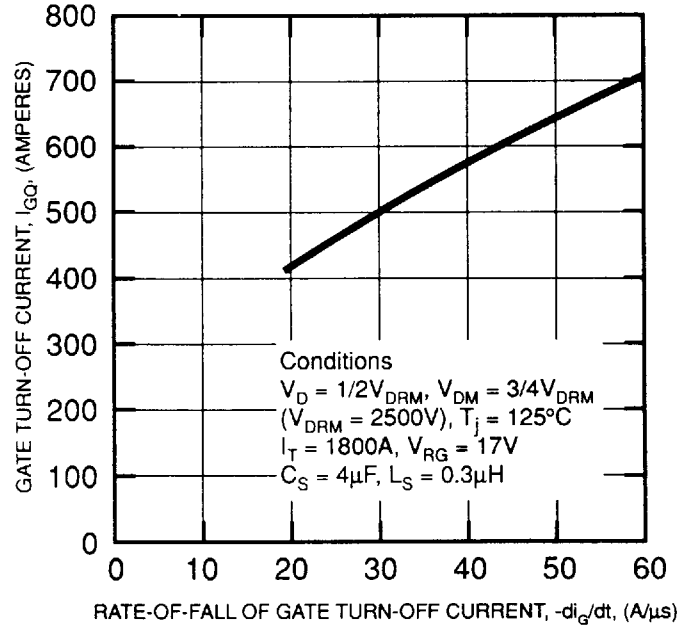
**Gate-Turn-Off Thyristors**

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**MAXIMUM GATE TURN-OFF CURRENT VS. ON-STATE CURRENT**



**MAXIMUM GATE TURN-OFF CURRENT VS. RATE-OF-FALL OF GATE TURN-OFF CURRENT**



**MAXIMUM GATE TRIGGER VOLTAGE, GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE**

