



FG450BL

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

POWEREX INC

Asymmetric Gate-Turn-Off Thyristors

450 Amperes/ 1200 & 1600 Volts

Description:

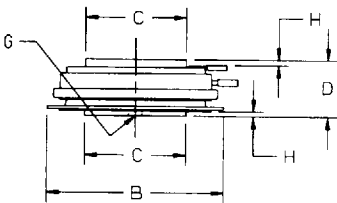
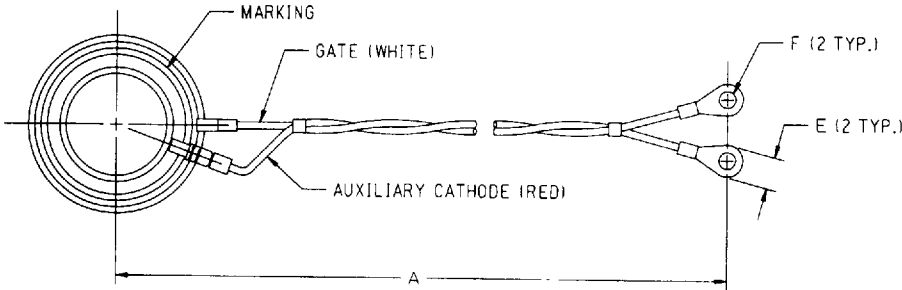
Powerex GTOs are designed for use in voltage-source inverter applications requiring fast switching GTOs with low snubber capacitances.

Features:

- Low Snubber Capacitance (2.0 μ F for 450A switch)
- Low On-State Voltage
- Low Switching Losses
- Fast Switching Time (t_{qs} = 15 μ S maximum)

Applications:

- Motor Control Inverters
- UPS Inverters
- Choppers
- Induction Heaters
- DC to DC Converters



DIM	INCHES	MILLIMETERS
A	11.1 ± 4	282 ± 10
B	2.20 DIA. MAX	MAX DIA. 56.0
C	1.26 DIA	DIA. 32.0
D	71 ± 0.2	18.0 ± 0.5
E	.39	10.0
F	.21 DIA	DIA. 5.3
G	16 DIA .08 DEEP	DIA. 4.2 DEEP 2.0
H	.015 MIN	MIN 0.40

Ordering Information

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

DEVICE	CURRENT RATING	MANU. NUMBER	TYPE	VOLTAGE RATING
FG	450	B	L	- 24 - 32
PRESS PACK GTO	I_{TOFM} 450 A		ASYMMETRIC Low Voltage	V_{DRM} 24=1200V 32=1600V



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FG450BL-24,32

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

Characteristic	Symbol	FG450BL-24	FG450BL-32	Units
Repetitive Peak Reverse Voltage	V_{RRM}	15	15	Volts
Non-Repetitive Peak Reverse Voltage	V_{DSM}	15	15	Volts
DC Reverse Voltage	$V_{R(DC)}$	15	15	Volts
Repetitive Peak Off-State Voltage	V_{ORM}	1200	1600	Volts
Non-Repetitive Peak Off-State Voltage	V_{OSM}	1350	1700	Volts
DC Off-State Voltage	$V_{O(DC)}$	960	1280	Volts
Controllable On-State Current	$V_D=1/2V_{ORM}, T_j=125^\circ\text{C}, C_s=2.0\mu\text{F}$ $L_s=0.4\mu\text{H}, I_{OQ}=-90\text{A}$		$I_{T(ORM)}$	450 A
RMS On-State Current			$I_{T(RMS)}$	200 A
Average On-State Current	Sine-wave $\Theta=180^\circ, T_c=93^\circ\text{C}, f=60\text{ Hz}$		$I_{T(AV)}$	130 A
Surge On-State Current	NON-REP, One half cycle at 60Hz		I_{TSM}	2500 A
I^2t for Fusing	One half cycle at 60 Hz		I^2t	26,000 $\text{A}^2\text{-sec}$
Critical Rate of Rise of On-State Current	$V_D=1/2 V_{ORM}, I_{GM}=10\text{A}, T_j=125^\circ\text{C}$		di/dt	300 $\text{A}/\mu\text{S}$
Peak Gate Forward Current			I_{FGM}	30 A
Peak Gate Reverse Current			I_{RGM}	200 A
Peak Gate Forward Voltage			V_{FGM}	10 V
Peak Gate Reverse Voltage			V_{RGM}	15 V
Peak Gate Forward Power Dissipation			P_{FGM}	100 W
Peak Gate Reverse Power Dissipation			P_{RGM}	2000 W
Average Gate Forward Power Dissipation			$P_{FG(AV)}$	20 W
Average Gate Reverse Power Dissipation			$P_{RG(AV)}$	30 W
Junction Temperature			T_j	-40 TO +125 $^\circ\text{C}$
Storage Temperature			T_{sq}	-40 TO +150 $^\circ\text{C}$
Mounting Force	RECOMMENDED VALUE 4.9 kN or 1120 lbs.			4.5 TO 6.0 kN 1010 TO 1340 lbs.
Weight (typical)				180 grams



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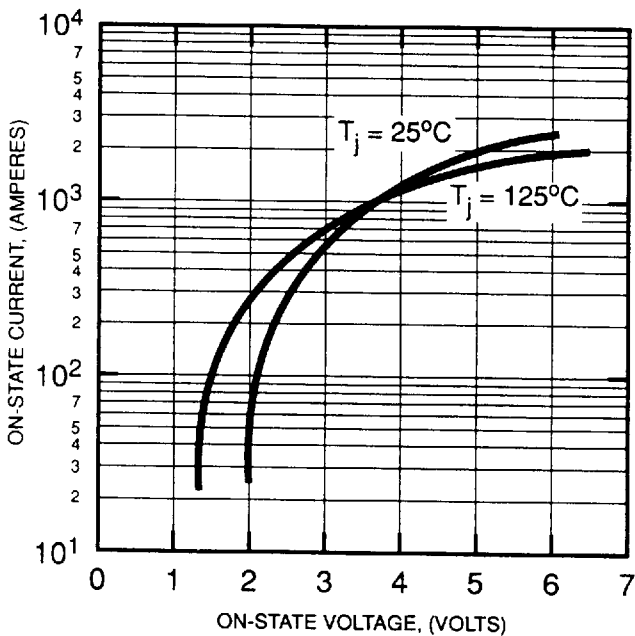
Electrical Characteristics, $T_j=25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Repetitive Peak Reverse Leakage Current	I_{RRM}	$T_j=125^\circ\text{C}, V_R=V_{RRM}$	-----	-----	100	mA
Repetitive Peak Forward Leakage Current	I_{DRM}	$T_j=125^\circ\text{C}, V_D=V_{DRM}, V_{GK}=-2\text{V}$	-----	-----	30	mA
Gate Reverse Blocking Current	I_{RG}	$T_j=125^\circ\text{C}, V_{RG}=-15\text{V}$	-----	-----	100	mA
Peak On-State Voltage	V_{TM}	$T_j=125^\circ\text{C}, I_{TM}=450\text{A}$	-----	-----	2.5	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/ μS
Turn-Off Time	t_{qf}	$I_{TM}=450\text{A}, T_j=125^\circ\text{C}, V_{RG}=15\text{V}, C_g=2.0\mu\text{F}, L_g=0.4\mu\text{H}, di/dt=20\text{A}/\mu\text{s}, V_D=50\% V_{DRM}$	-----	-----	15	μs
Turn-On Time	t_{pi}	$I_{TM}=450\text{A}, T_j=125^\circ\text{C}, I_{GM}=10\text{A}, V_D=1/2 V_{DRM}$	-----	-----	10	μs
Gate Trigger Current	I_{GT}	$V_D=5\text{V TO } 20\text{V}, I_T=25\text{A TO } 200\text{A}$	-----	-----	700	mA
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

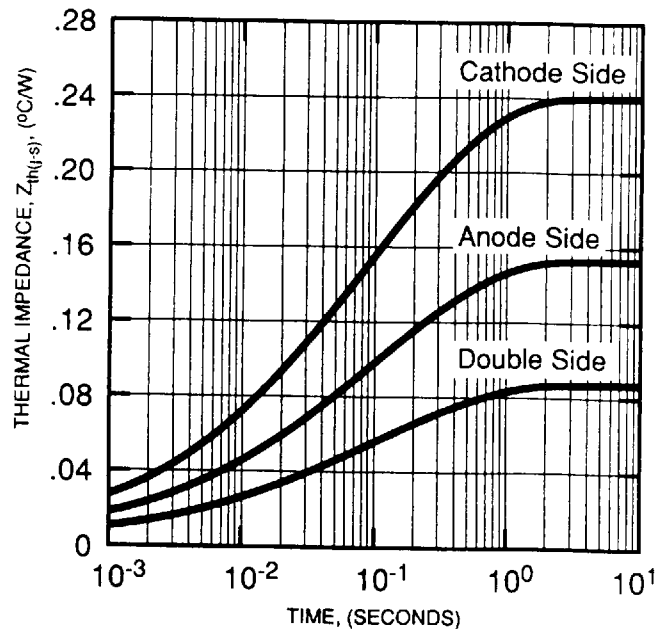
Thermal Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Units
Thermal Resistance Junction to Sink	$R_{\theta JS}$	-----	-----	0.09	$^\circ\text{C/W}$

MAXIMUM ON-STATE CHARACTERISTIC



TRANSIENT THERMAL IMPEDANCE CHARACTERISTIC, (JUNCTION TO SINK)





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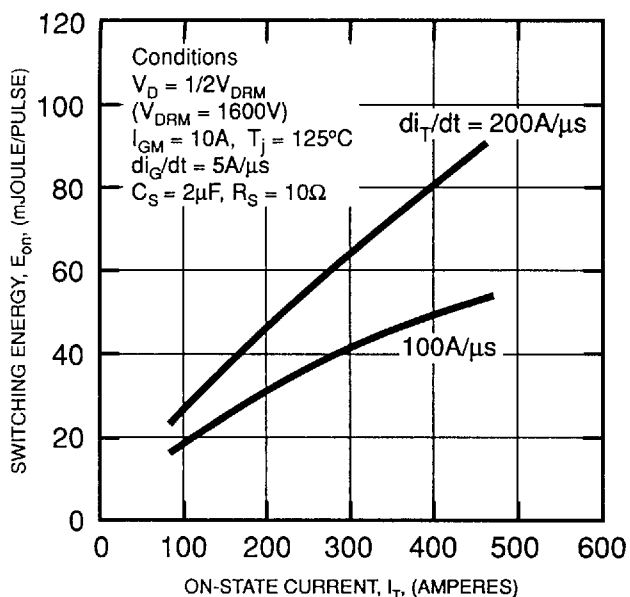
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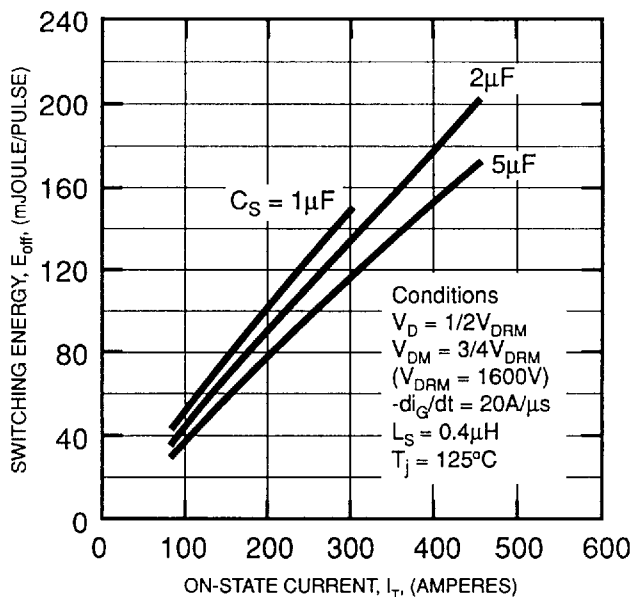
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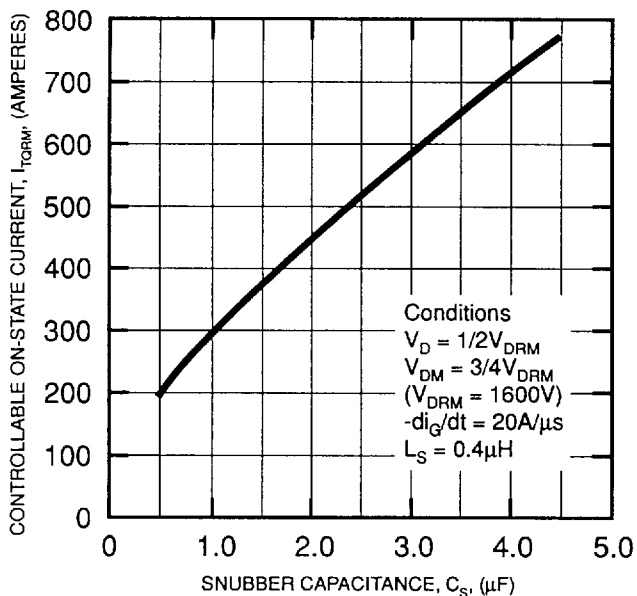
MAXIMUM TURN-ON SWITCHING ENERGY DISSIPATION PER PULSE



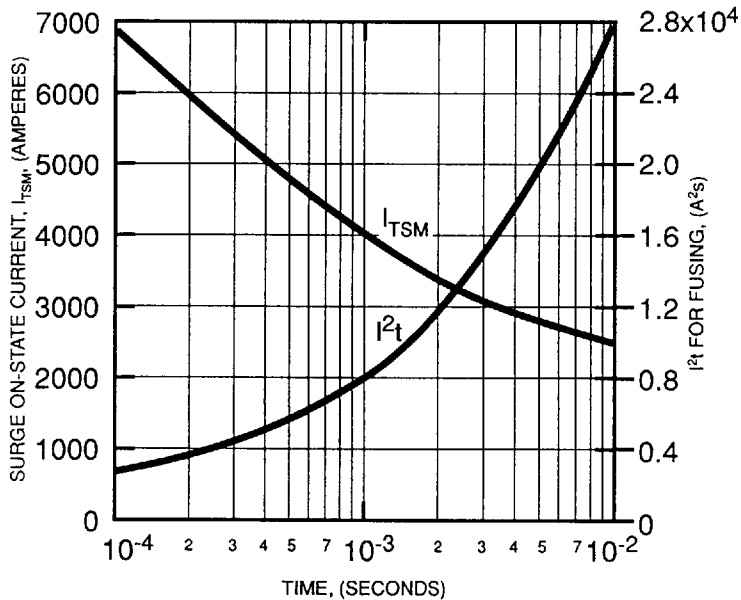
MAXIMUM TURN-OFF SWITCHING ENERGY DISSIPATION PER PULSE



MAXIMUM CONTROLLABLE ON-STATE CURRENT VS. SNUBBER CAPACITANCE



PEAK ONE-CYCLE ON-STATE SURGE CURRENT AND I²t





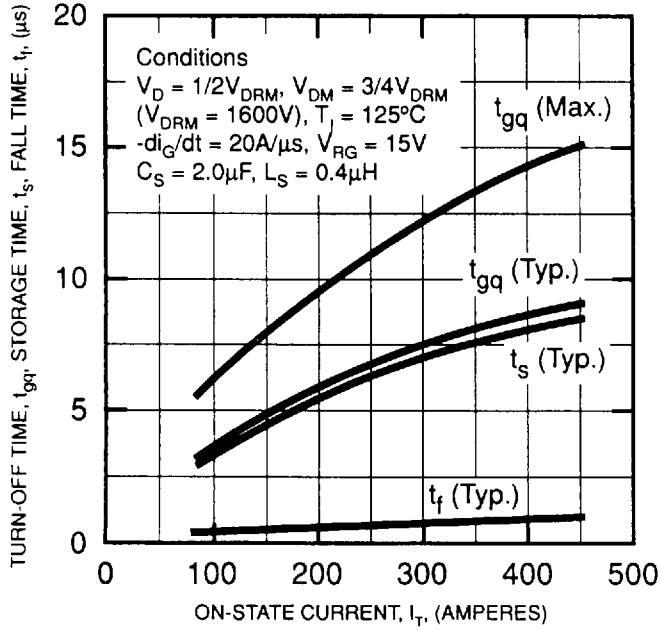
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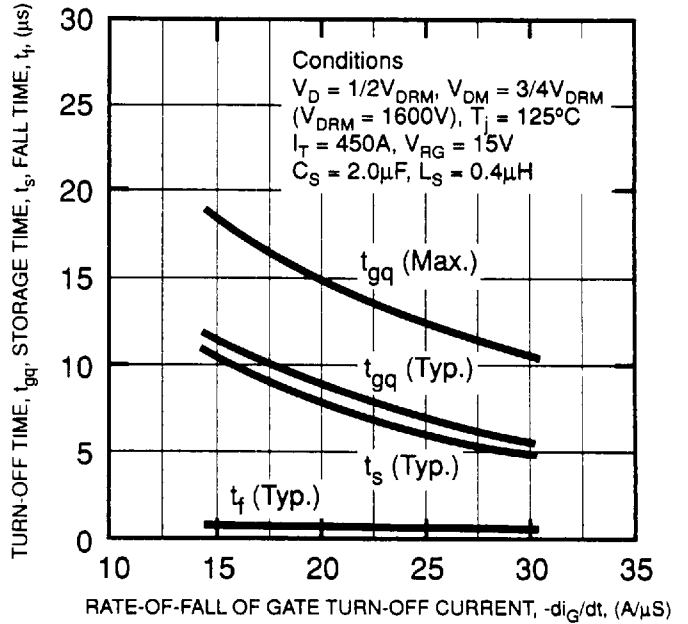
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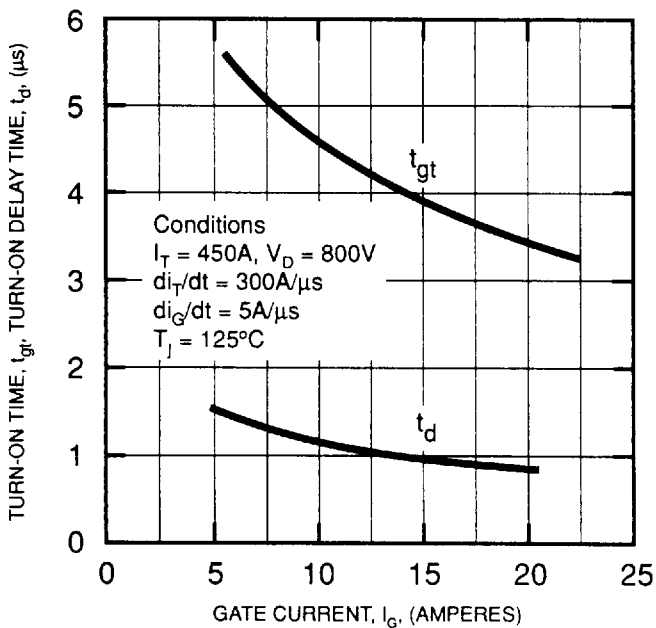
TURN-OFF TIME, STORAGE TIME, FALL TIME VS. ON-STATE CURRENT



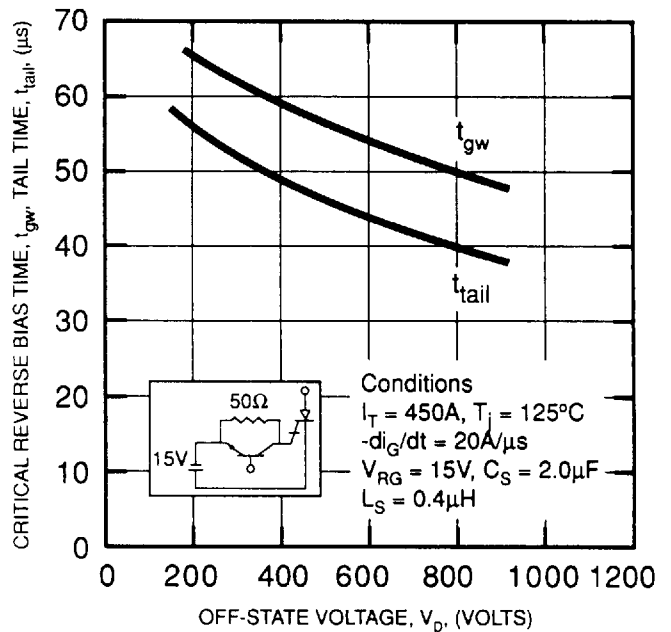
TURN-OFF TIME, STORAGE TIME, FALL TIME VS. RATE-OF-FALL OF GATE TURN-OFF CURRENT



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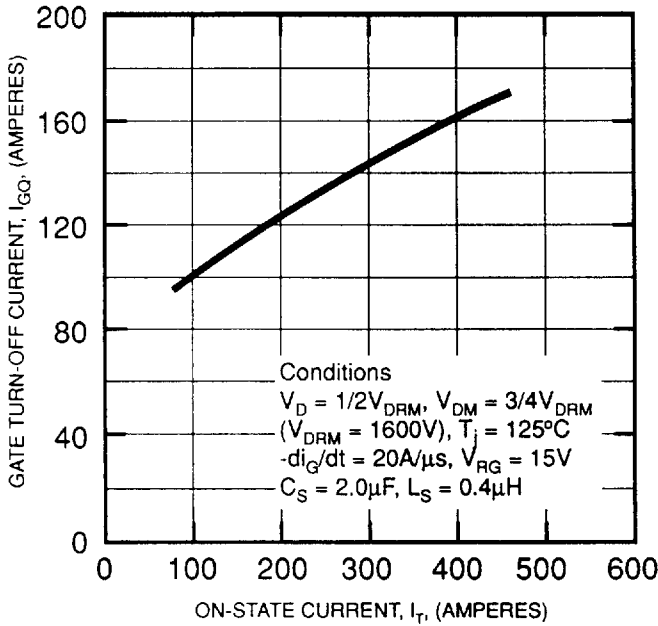
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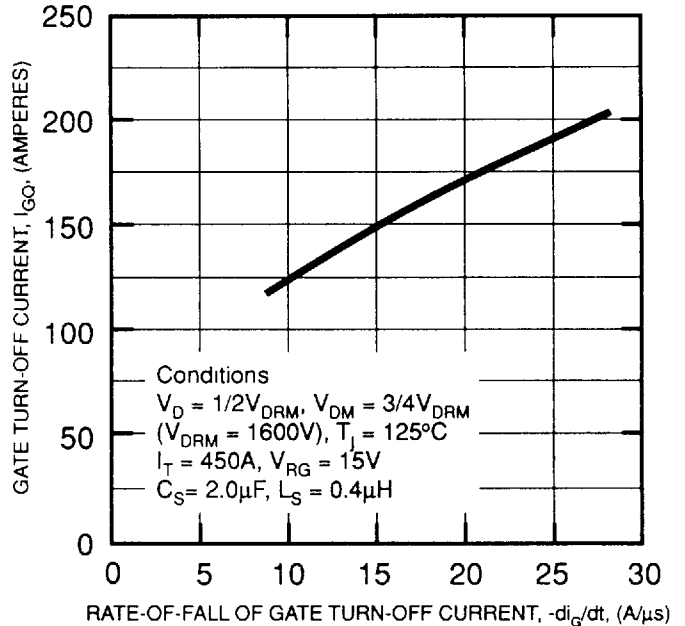
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MAXIMUM GATE TURN-OFF CURRENT VS. ON-STATE CURRENT



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



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

