

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

64E D

Asymmetric Gate-Turn-Off Thyristors

1000 Amperes/ 1200 & 1600 Volts

Description:

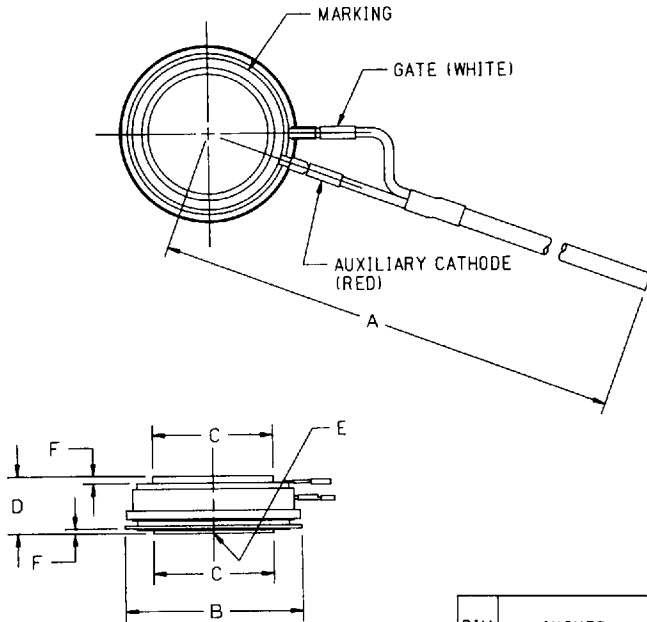
Powerex GTOs are designed for use in voltage-source inverter applications requiring fast switching GTOs with low snubber capacitances.

Features:

- Low Snubber Capacitance
(3.0 μ F for 1000A switch)
- Low On-State Voltage
- Low Switching Losses
- Fast Switching Time
(t_{gs} = 20 μ S maximum)

Applications:

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



DIM	INCHES	MILLIMETERS
A	15.4 $\pm$.4	390 $\pm$ 10
B	2.20 DIA. MAX	MAX DIA. 56.0
C	1.50 DIA.	DIA. 38.0
D	.71 $\pm$.02	18.0 $\pm$ 0.5
E	.165 $\pm$.008 DIA.	DIA. 4.20 $\pm$ 0.20
	.079 $\pm$.008 DEEP	DEEP 2.00 $\pm$ 0.20
F	.028 MIN	MIN 0.70

Ordering Information

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

DEVICE	CURRENT RATING	MANU. NUMBER	TYPE	VOLTAGE RATING
FG	1000	A	L	- 24 - 32
PRESS PACK GTO	I_{TORM} 1000 A		ASYMMETRIC Low Voltage	V_{DRM} 24=1200V 32=1600V

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

Characteristic	Symbol	FG1000AL-24	FG1000AL-32	Units
Repetitive Peak Reverse Voltage	V_{RRM}	15	15	Volts
Non-Repetitive Peak Reverse Voltage	V_{PSM}	15	15	Volts
DC Reverse Voltage	$V_{R(DC)}$	15	15	Volts
Repetitive Peak Off-State Voltage	V_{DRM}	1200	1600	Volts
Non-Repetitive Peak Off-State Voltage	V_{DSM}	1350	1700	Volts
DC Off-State Voltage	$V_{D(DC)}$	960	1280	Volts
Controllable On-State Current	$V_D=1/2 V_{DRM}$, $T_J=125^{\circ}\text{C}$, $C_g=2.0\mu\text{F}$ $L_s=0.3\mu\text{H}$, $I_{GC}=-120\text{A}$	I_{TORM}	1000	A
RMS On-State Current		$I_{T(RMS)}$	440	A
Average On-State Current	Sine-wave $\Theta=180^{\circ}$, $T_c=102^{\circ}\text{C}$, $f=60\text{ Hz}$	$I_{T(AV)}$	280	A
Surge On-State Current	NON-REP, One half cycle at 60Hz	I_{TSM}	7000	A
I^2t for Fusing	One half cycle at 60 Hz	I^2t	200,000	$\text{A}^2\text{-sec}$
Critical Rate of Rise of On-State Current	$V_c=1/2 V_{DRM}$, $I_{GM}=15\text{A}$, $T_J=125^{\circ}\text{C}$	di/dt	300	$\text{A}/\mu\text{S}$
Peak Gate Forward Current		I_{FGM}	30	A
Peak Gate Reverse Current		I_{RGM}	350	A
Peak Gate Forward Voltage		V_{FGM}	10	V
Peak Gate Reverse Voltage		V_{RGM}	15	V
Peak Gate Forward Power Dissipation		P_{FGM}	200	W
Peak Gate Reverse Power Dissipation		P_{RGM}	4000	W
Average Gate Forward Power Dissipation		$P_{FG(AV)}$	40	W
Average Gate Reverse Power Dissipation		$P_{RG(AV)}$	75	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 10.8 kN or 2420 lbs.		9.8 TO 12.7 2200 TO 2860	kN lbs.
Weight (typical)			250	grams

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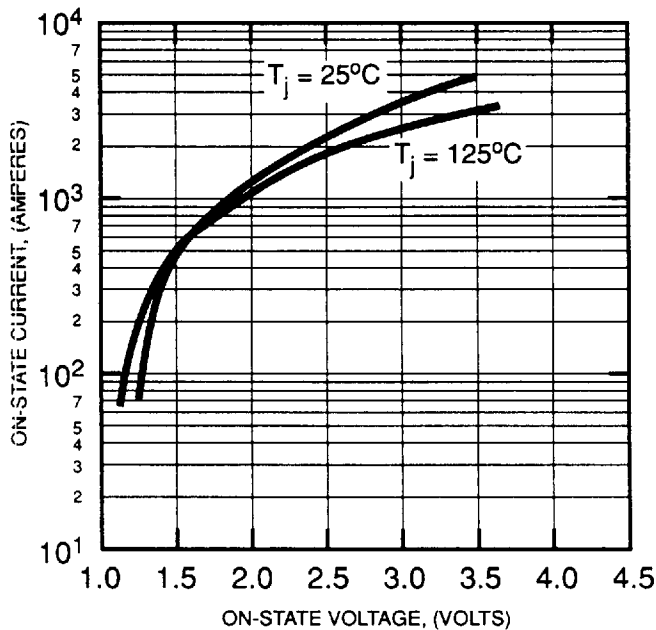
Electrical Characteristics, $T_J=25^\circ\text{C}$ unless otherwise specified

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}	$T_J=125^\circ\text{C}$, $V_D=V_{DRM}$, $V_{GK}=-2\text{V}$	-----	-----	50	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}	$T_J=125^\circ\text{C}$, $I_{TM}=1000\text{A}$	-----	-----	1.9	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_{gr}	$I_{TM}=1000\text{A}$, $T_J=125^\circ\text{C}$, $V_{RG}=15\text{V}$, $C_s=3.0\mu\text{F}$, $L_s=0.3\mu\text{H}$ $di_g/dt=20\text{A}/\mu\text{s}$, $V_D=50\% V_{DRM}$	-----	-----	20	μs
Turn-On Time	t_{gr}	$I_{TM}=1000\text{A}$, $T_J=125^\circ\text{C}$, $I_{GM}=15\text{A}$, $V_D=1/2 V_{DRM}$	-----	-----	10	μs
Gate Trigger Current	I_{GT}	$V_D=5\text{V TO } 20\text{V}$, $I_T=25\text{A TO } 200\text{A}$	-----	-----	2.0	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

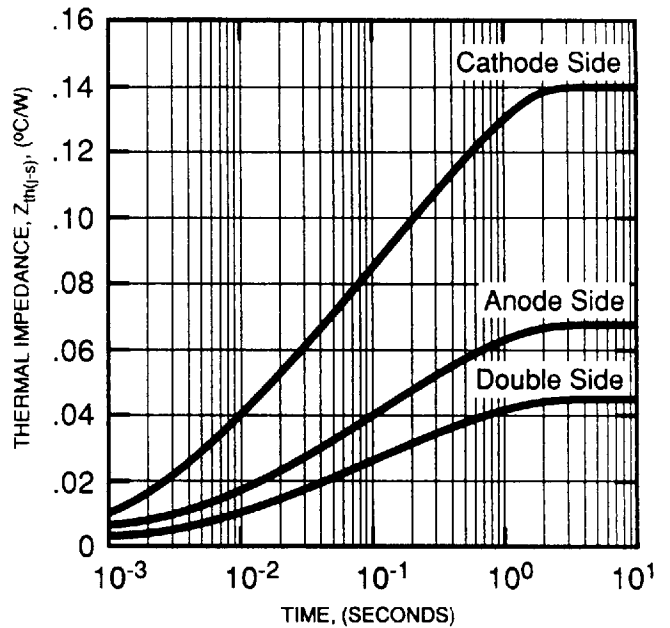
Thermal Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Units
Thermal Resistance Junction to Sink	$R_{\theta JS}$	-----	-----	0.045	$^\circ\text{C/W}$

MAXIMUM ON-STATE CHARACTERISTIC



TRANSIENT THERMAL IMPEDANCE CHARACTERISTIC, (JUNCTION TO SINK)



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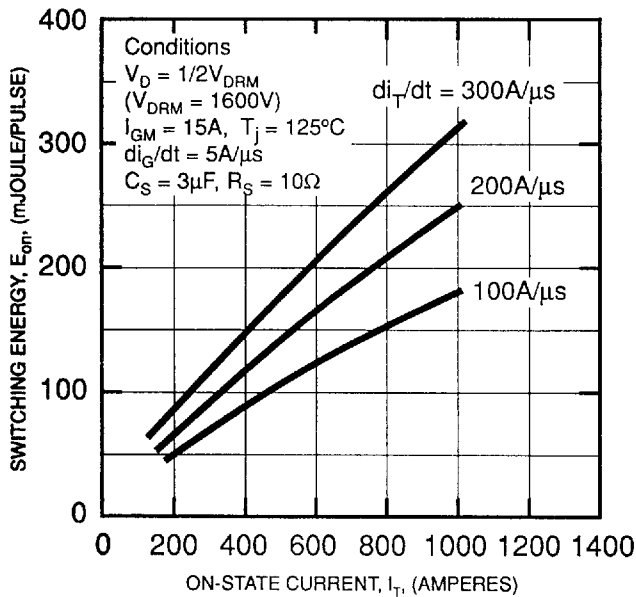
B4E D

Asymmetric

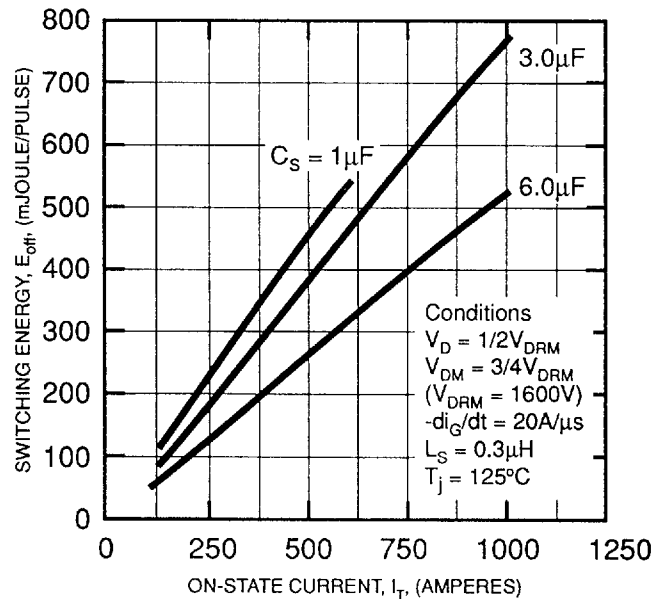
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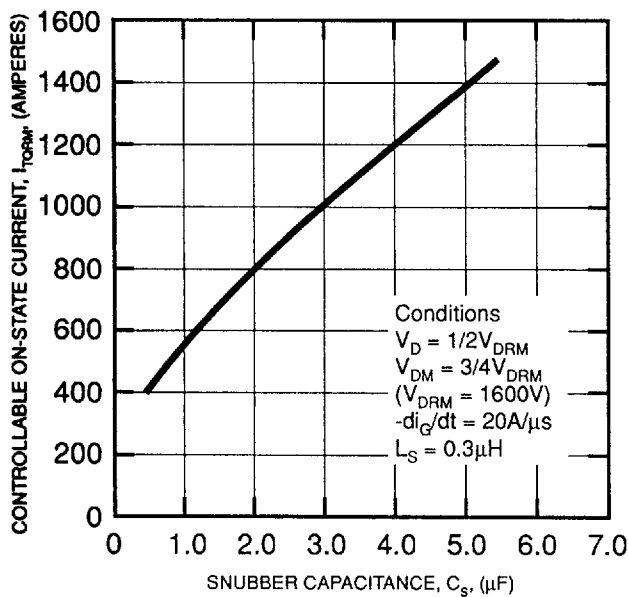
MAXIMUM TURN-ON SWITCHING ENERGY DISSIPATION PER PULSE



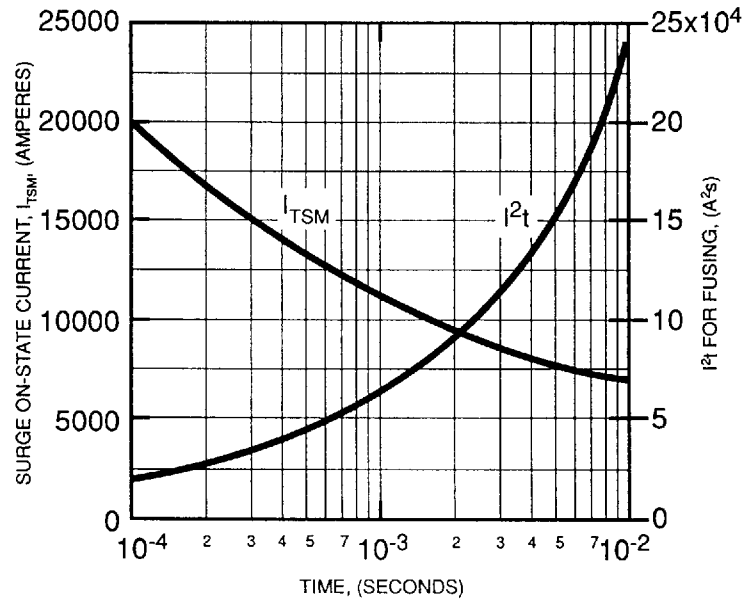
MAXIMUM TURN-OFF SWITCHING ENERGY DISSIPATION PER PULSE



MAXIMUM CONTROLLABLE ON-STATE CURRENT VS. SNUBBER CAPACITANCE



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



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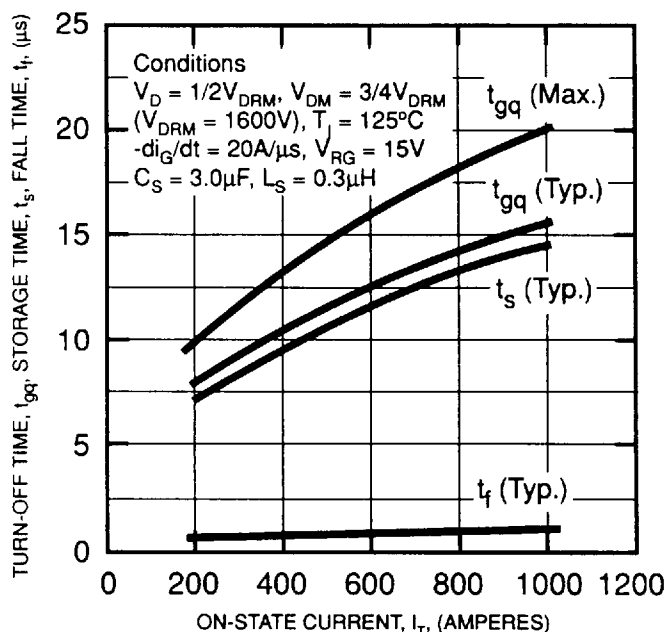
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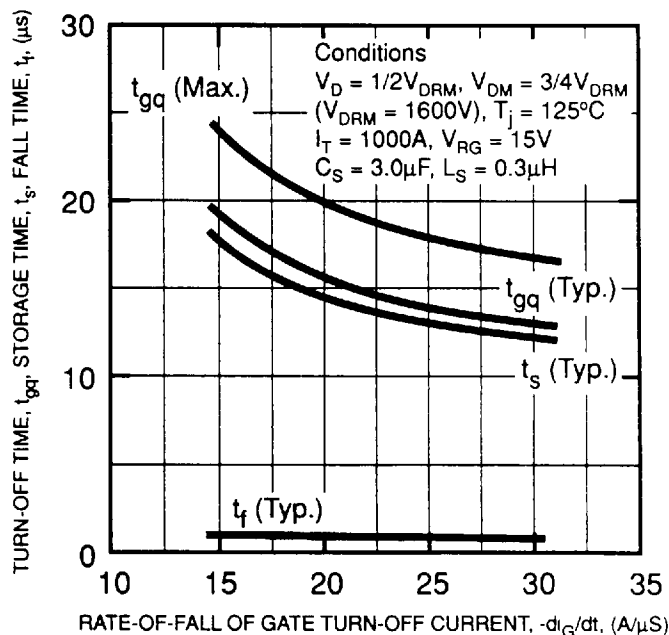
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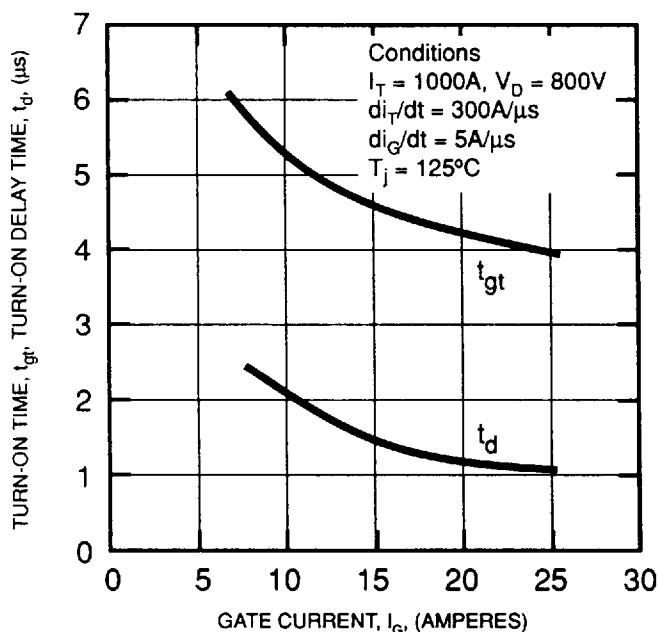
TURN-OFF TIME, STORAGE TIME, FALL TIME
VS. ON-STATE CURRENT



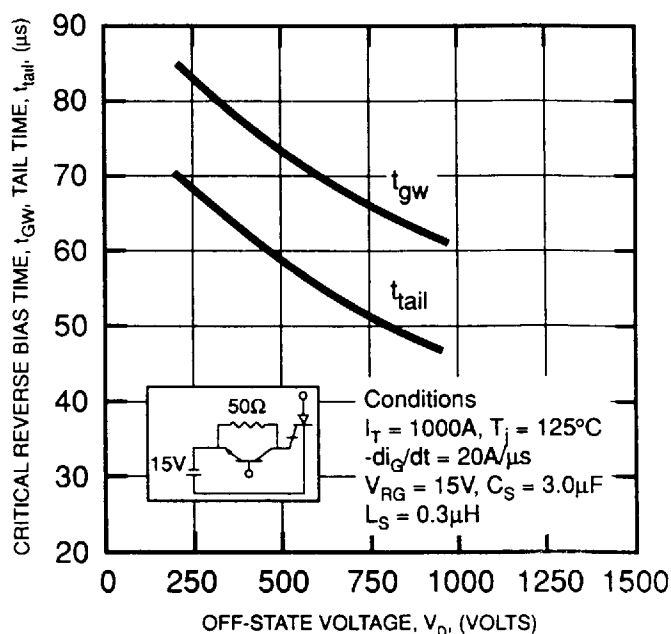
TURN-OFF TIME, STORAGE TIME, FALL TIME VS.
RATE-OF-FALL OF GATE TURN-OFF CURRENT



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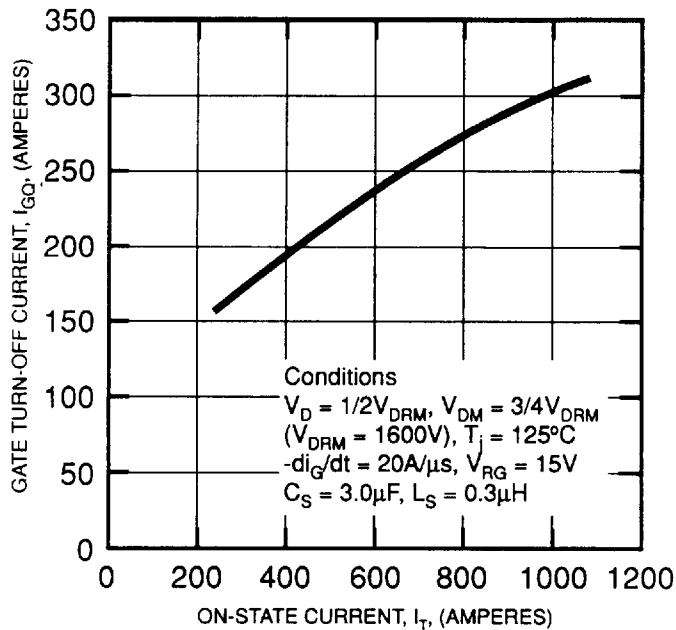
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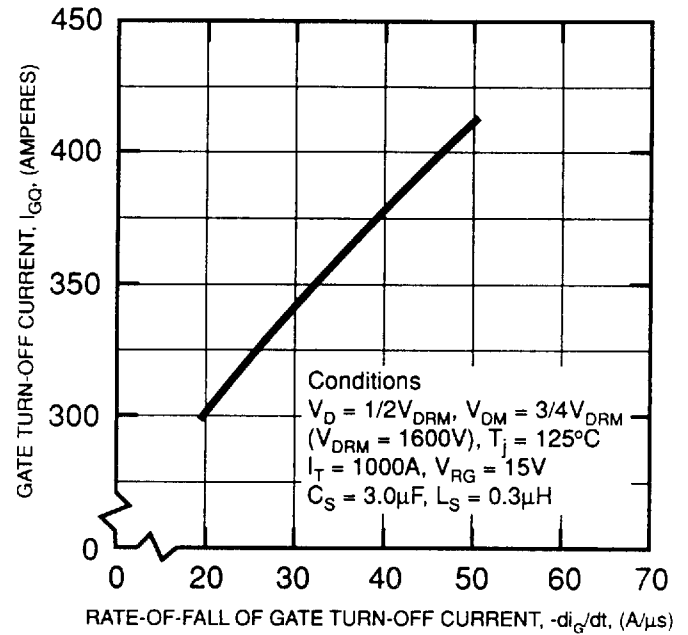
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MAXIMUM GATE TURN-OFF CURRENT VS.
ON-STATE CURRENT



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



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

