IXYS

Advance Technical Information

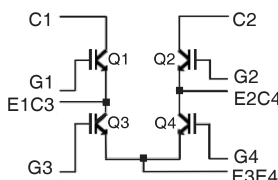
High Voltage IGBT For Capacitor Discharge Applications

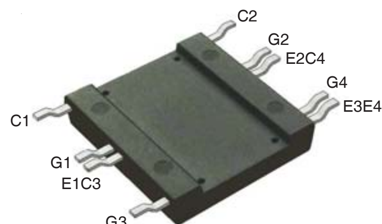
MMIX4G20N250

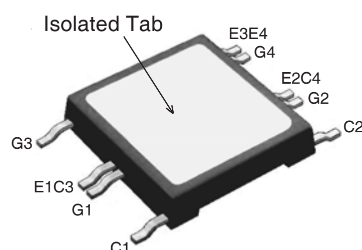
V_{CES} = 2500V
I_{C25} = 23A
$V_{CE(sat)}$ ≤ 3.1V

(Electrically Isolated Tab)

H-Bridge Configuration







G = Gate E = Emitter
C = Collector

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	2500	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	2500	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	T_C = 25°C	23	A
I_{C90}	T_C = 90°C	14	A
I_{CM}	T_C = 25°C, V_{GE} = 19V, 1ms	105	A
	10ms	55	A
SSOA	V_{GE}= 20V, T_{VJ} = 125°C, R_G = 10Ω	I_{CM} = 200	A
(RBSOA)	Clamped Inductive Load	@ 0.8 • V_{CES}	
P_C	T_C = 25°C	100	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6 mm (0.062 in.) from Case for 10s	300	°C
T_{SOLD}	Plastic Body for 10s	260	°C
F_C	Mounting Force	50..200 / 11..45	Nm/lb.in.
V_{ISOL}	50/60Hz, 1 Minute	2500	V~
Weight		8	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250µA, V_{GE} = 0V	2500			V
$V_{GE(th)}$	I_C = 250µA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = 0.8 • V_{CES}, V_{GE} = 0V			10	µA
	Note 2, T_J = 125°C			750	µA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 20A, V_{GE} = 15V, Note 1			3.1	V

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 2500V~ Electrical Isolation
- High Peak Current Capability
- Low Saturation Voltage
- Molding Epoxies Meet UL 94 V-0 Flammability Classification

Applications

- Capacitor Discharge
- Pulser Circuits

Advantages

- High Power Density
- Easy to Mount

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Symbol	Test Conditions ($T_J = 25°C$, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.
g_{fs}	$I_C = 20A$, $V_{CE} = 10V$, Note 1	8	13	S
$I_{C(ON)}$	$V_{GE} = 20V$, $V_{CE} = 15V$, Note 1		190	A
C_{ies}	$V_{CE} = 15V$, $V_{GE} = 20V$, f = 1MHz		1190	pF
C_{oes}			53	pF
C_{res}			18	pF
Q_g	$I_C = 20A$, $V_{GE} = 15V$, $V_{CE} = 1000V$		53	nC
Q_{ge}			8	nC
Q_{gc}			22	nC
$t_{d(on)}$	**Resistive Switching Times**		57	ns
t_r	$I_C = 40A$, $V_{GE} = 15V$		160	ns
$t_{d(off)}$	$V_{CE} = 1250V$, $R_G = 10\Omega$		136	ns
t_f			930	ns
R_{thJC}				1.25 °C/W
R_{thCS}			0.05	°C/W
R_{thJA}			30	°C/W

Notes:

1. Pulse test, t < 300µs, duty cycle, d < 2%.
2. Device must be heatsunk for high temperature leakage current measurements to avoid thermal runaway.

ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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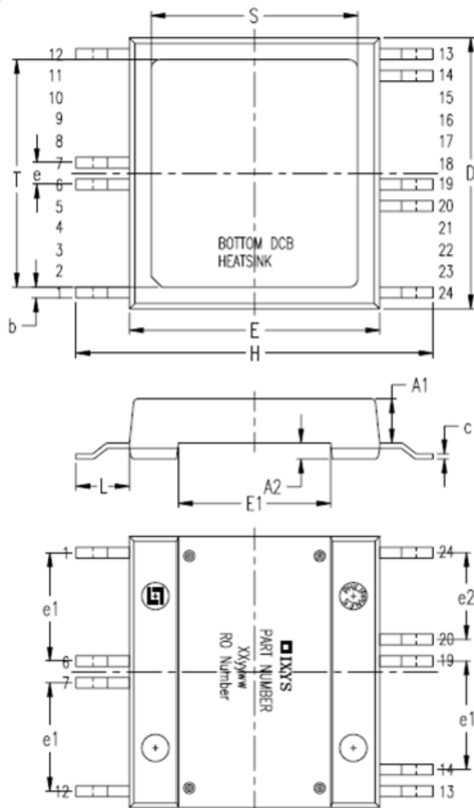
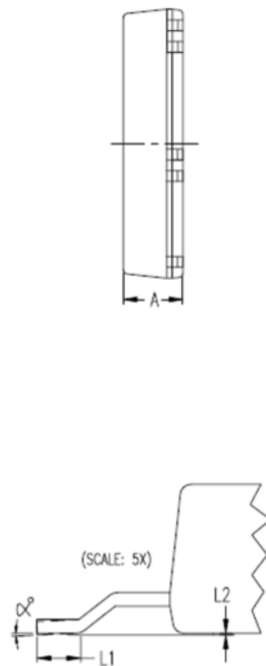
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585 7,005,734 B2 7,157,338B2 4,850,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692 7,063,975 B2 4,881,106 5,034,796 5,187,117 5,486,715 6,306,728 B1 6,583,505 6,710,463 6,771,478 B2 7,071,537

Package Outline





SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.209	.224	5.30	5.70
A1	.154	.161	3.90	4.10
A2	.055	.063	1.40	1.60
b	.035	.045	0.90	1.15
c	.018	.026	0.45	0.65
D	.976	.994	24.80	25.25
E	.898	.915	22.80	23.25
E1	.543	.559	13.80	14.20
e	.079 BSC		2.00 BSC	
e1	.394 BSC		10.00 BSC	
e2	.315 BSC		8.00 BSC	
H	1.272	1.311	32.30	33.30
L	.181	.209	4.60	5.30
L1	.051	.067	1.30	1.70
L2	.000	.006	0.00	0.15
S	.736	.760	18.70	19.30
T	.815	.839	20.70	21.30
∝	0	4°	0	4°

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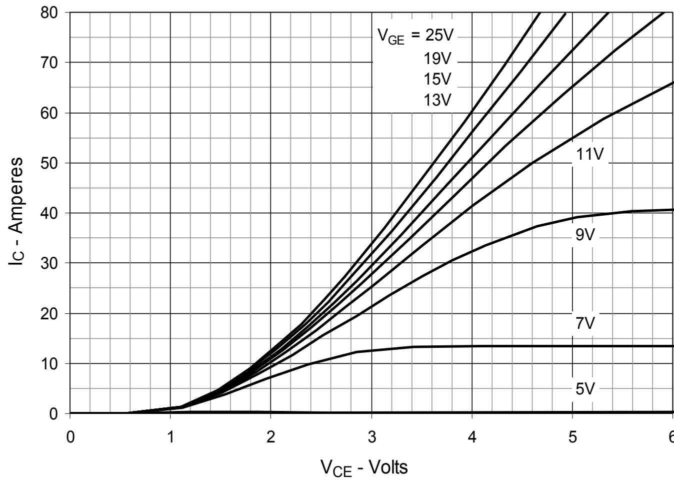

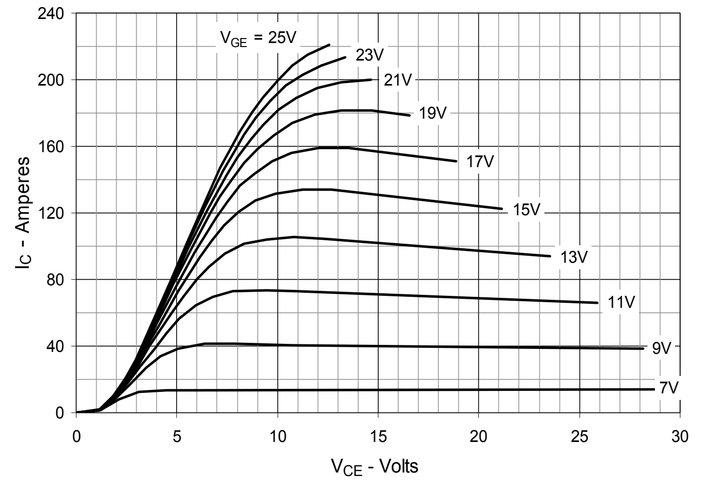

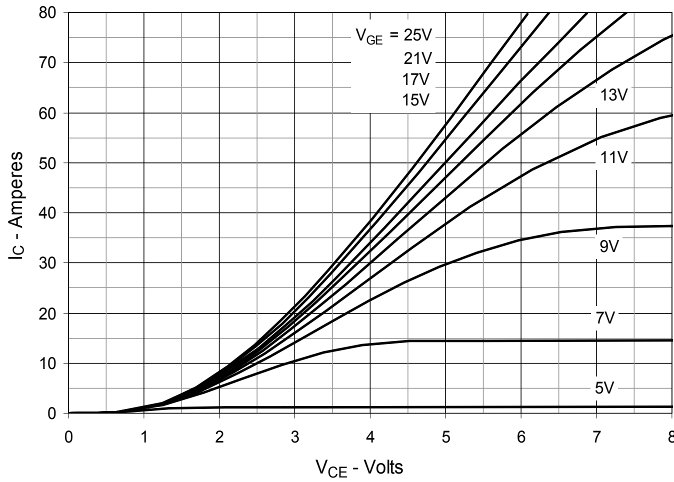

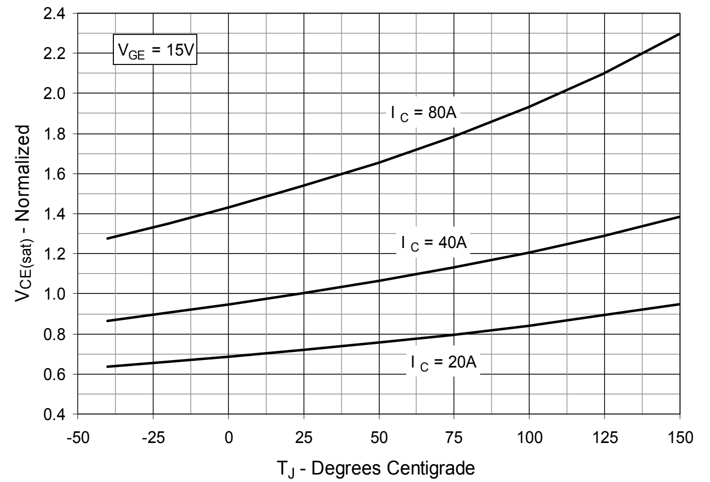

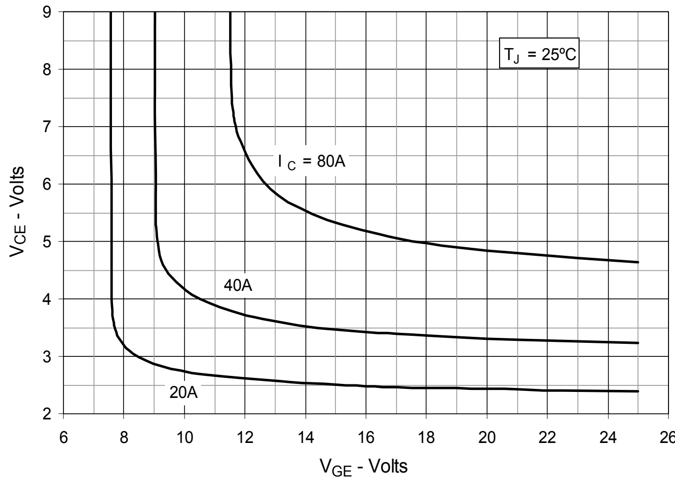

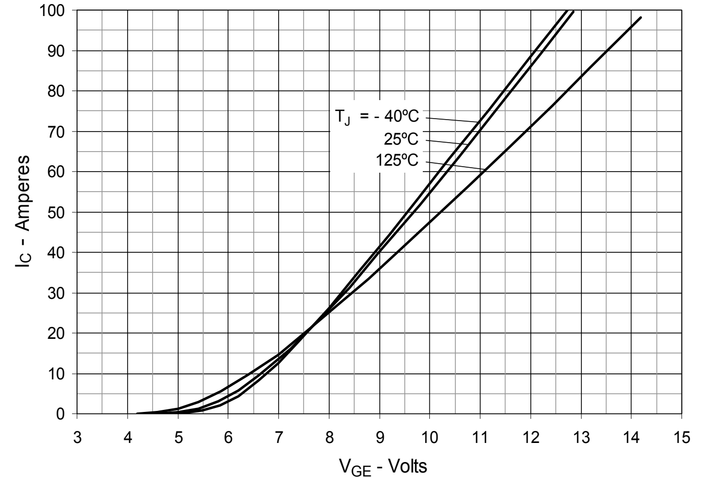

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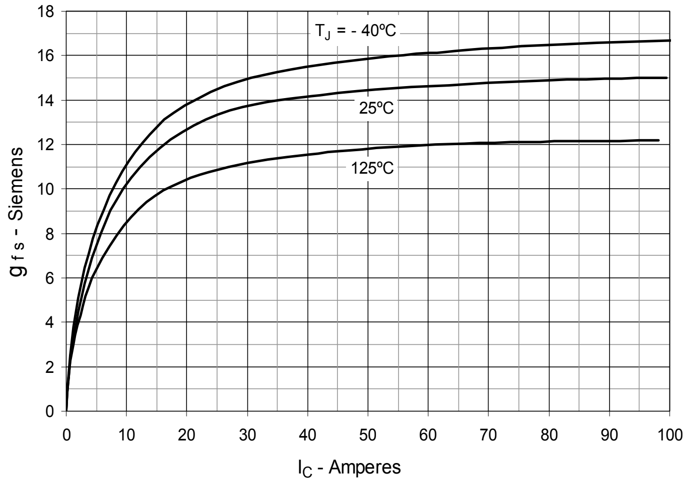

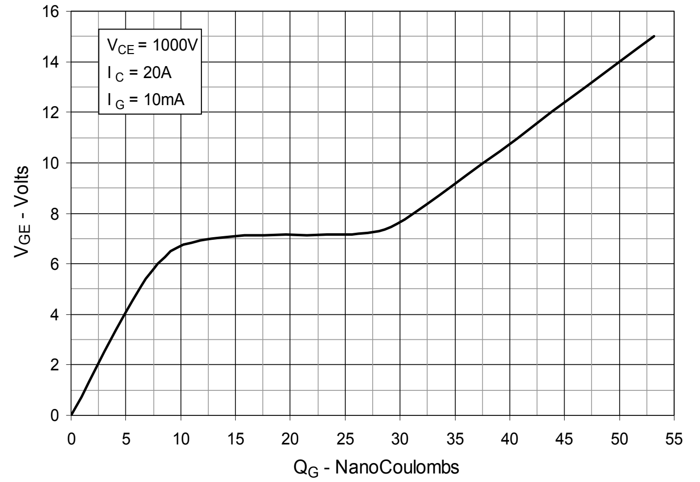

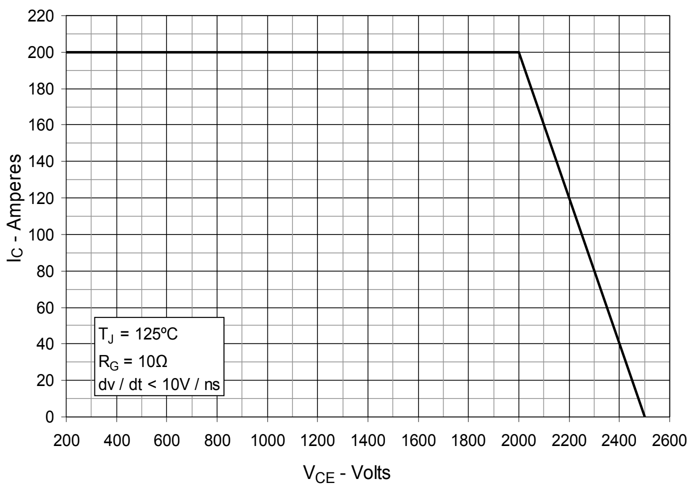

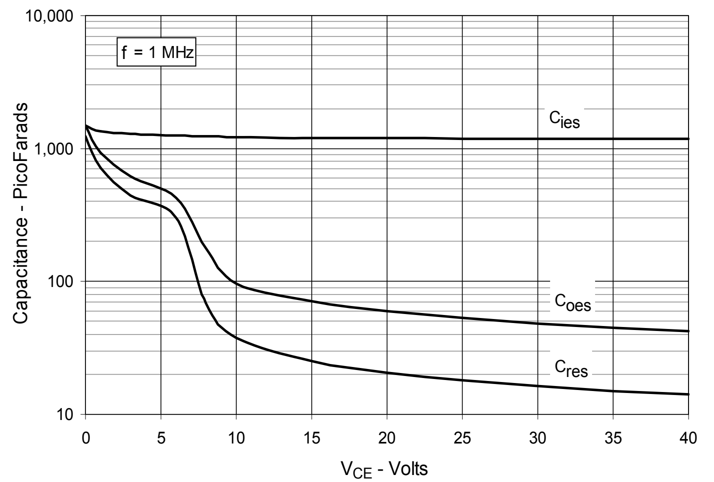

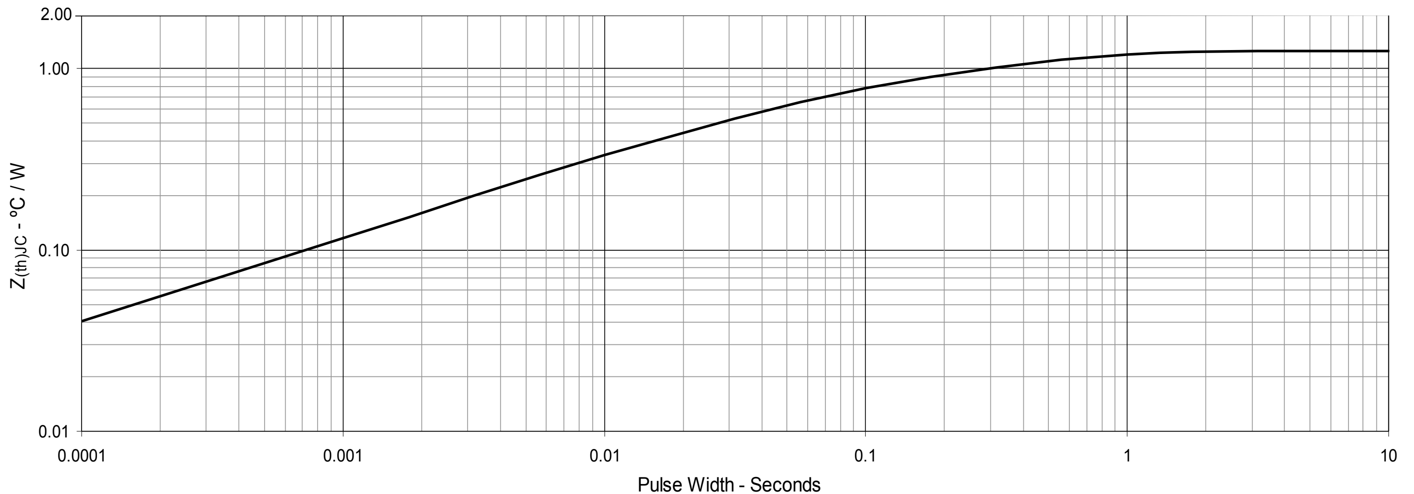

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Fig. 12. Resistive Turn-on Rise Time vs. Junction Temperature

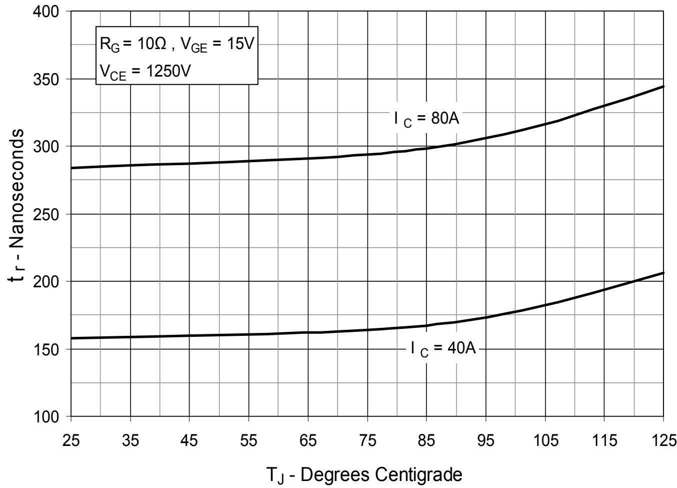


Fig. 13. Resistive Turn-on Rise Time vs. Collector Current

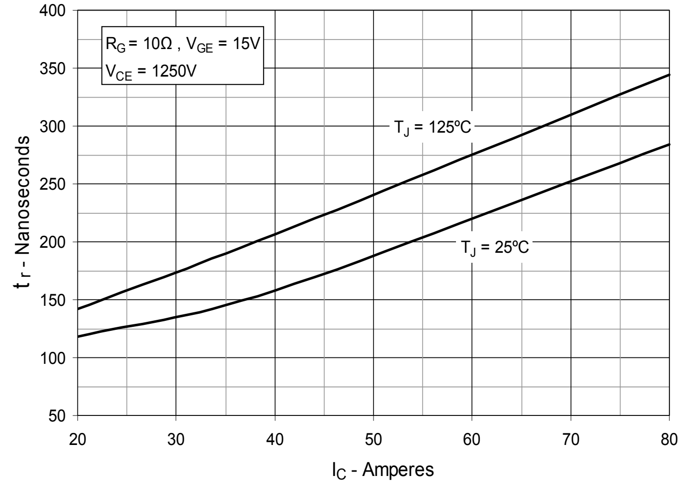


Fig. 14. Resistive Turn-on Switching Times vs. Gate Resistance

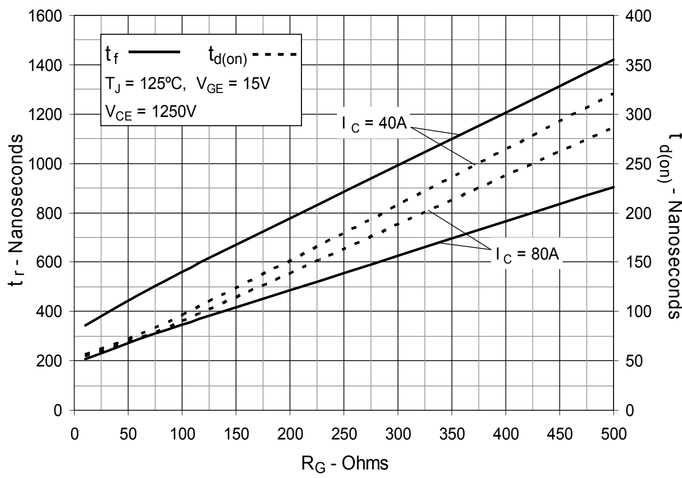


Fig. 15. Resistive Turn-off Switching Times vs. Junction Temperature

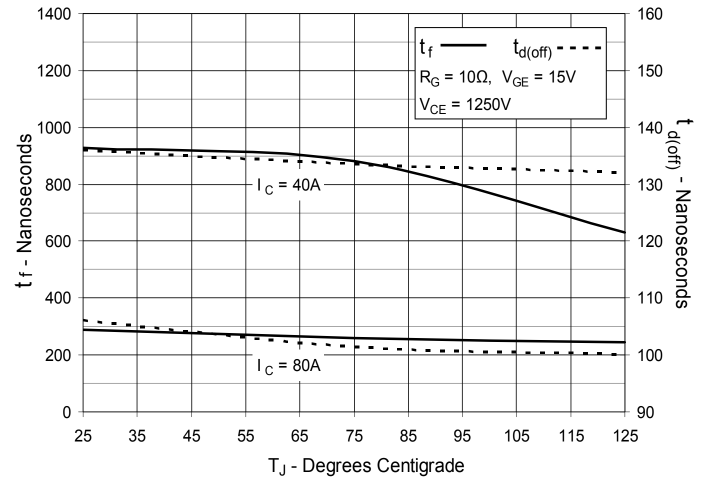


Fig. 16. Resistive Turn-off Switching Times vs. Collector Current

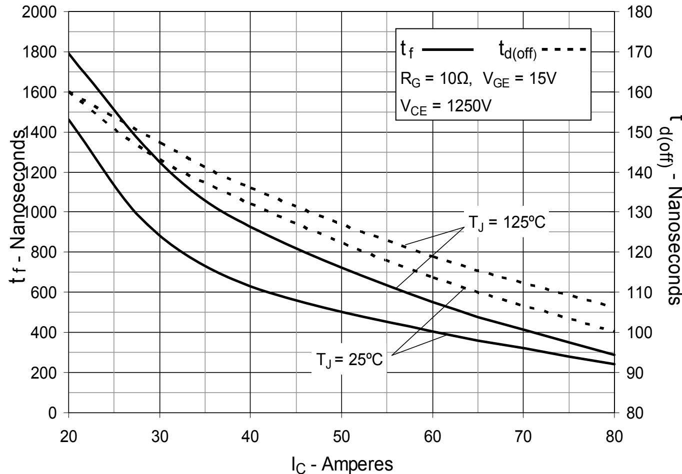
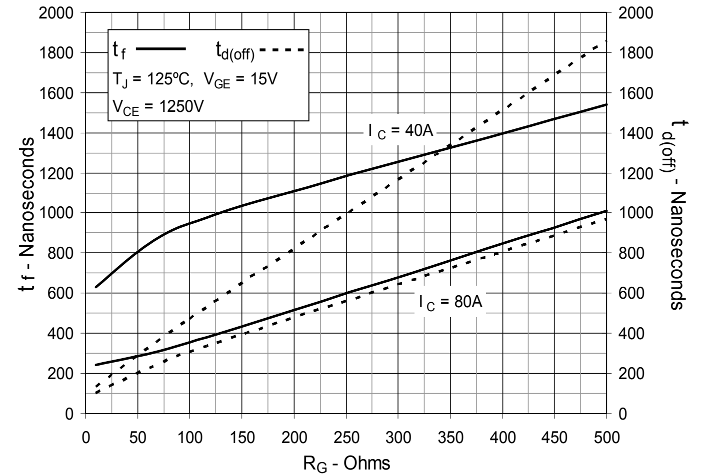


Fig. 17. Resistive Turn-off Switching Times vs. Gate Resistance



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