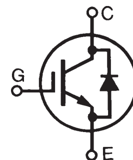
IXYS Preliminary Technical Information

High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

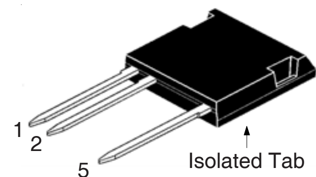
IXBF12N300

V_{CES} = 3000V
I_{C90} = 12A
$V_{CE(sat)}$ ≤ 3.2V



(Electrically Isolated Tab)

ISOPLUS i4-Pak™



1 = Gate 5 = Collector
2 = Emitter

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_C = 25°C to 150°C	3000	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	3000	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	T_C = 25°C	22	A
I_{C90}	T_C = 90°C	12	A
I_{CM}	T_C = 25°C, 1ms	100	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 30Ω Clamped Inductive Load	I_{CM} = 30 V_{CE} ≤ 0.8 • V_{CES}	A
P_C	T_C = 25°C	100	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6mm (0.062 in.) from Case for 10s	300	°C
T_{SOLD}	Plastic Body for 10 seconds	260	°C
F_C	Mounting Force	20..120 / 4.5..27	Nm/lb.in.
V_{ISOL}	50/60Hz, 1 Minute	4000	V~
Weight		5	g

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250μA, V_{GE} = 0V	3000			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			25	μA
	Note 2, T_J = 125°C			1	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V			±100	nA
$V_{CE(sat)}$	I_C = I_{C90}, V_{GE} = 15V, Note 1		2.8	3.2	V
	T_J = 125°C		3.5		V

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 4000V Electrical Isolation
- High Blocking Voltage
- High Peak Current Capability
- Low Saturation Voltage

Advantages

- Low Gate Drive Requirement
- High Power Density

Applications

- Switch-Mode and Resonant-Mode Power Supplies
- Uninterruptible Power Supplies (UPS)
- Laser Generators
- Capacitor Discharge Circuits
- AC Switches

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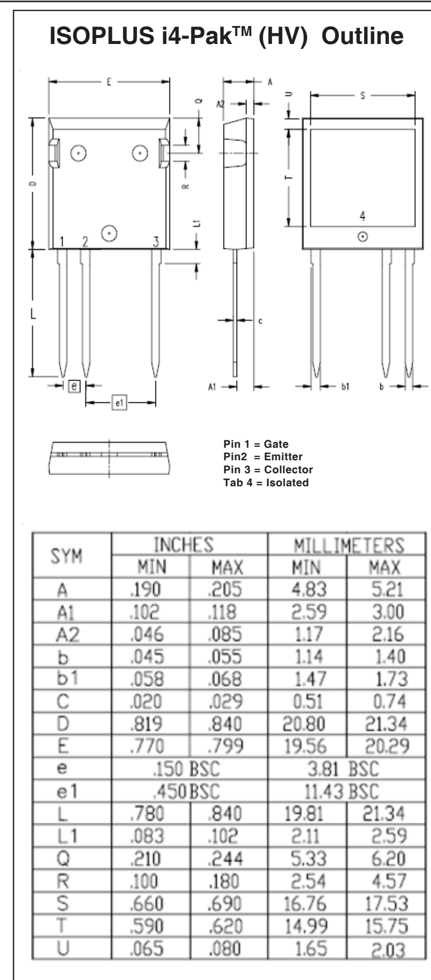
Symbol	Test Conditions ($T_J = 25°C$ Unless Otherwise Specified)	Min.	Typ.	Max.	
g_{fS}	$I_C = I_{C90}$, $V_{CE} = 10V$, Note 1	6.5	10.8		S
C_{ies}	$V_{CE} = 25V$, $V_{GE} = 0V$, f = 1MHz		1290		pF
C_{oes}			56		pF
C_{res}			19		pF
Q_g	$I_C = I_{C90}$, $V_{GE} = 15V$, $V_{CE} = 1000V$		62		nC
Q_{ge}			13		nC
Q_{gc}			8.5		nC
$t_{d(on)}$	**Resistive Switching Times, $T_J = 25°C$** $I_C = I_{C90}$ $V_{GE} = 15V$ $V_{CE} = 1250V$, $R_G = 10\Omega$		64		ns
t_r			140		ns
$t_{d(off)}$			180		ns
t_f			540		ns
$t_{d(on)}$	**Resistive Switching Times, $T_J = 125°C$** $I_C = I_{C90}$, $V_{GE} = 15V$ $V_{CE} = 1250V$, $R_G = 10\Omega$		65		ns
t_r			395		ns
$t_{d(off)}$			175		ns
t_f			530		ns
R_{thJC}				1.25	°C/W
R_{thCS}			0.15		°C/W

ISOPLUS i4-Pak™ (HV) Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.190	.205	4.83	5.21
A1	.102	.118	2.59	3.00
A2	.046	.085	1.17	2.16
b	.045	.055	1.14	1.40
b1	.058	.068	1.47	1.73
C	.020	.029	0.51	0.74
D	.819	.840	20.80	21.34
E	.770	.799	19.56	20.29
e	.150 BSC		3.81 BSC	
e1	.450BSC		11.43 BSC	
L	.780	.840	19.81	21.34
L1	.083	.102	2.11	2.59
Q	.210	.244	5.33	6.20
R	.100	.180	2.54	4.57
S	.660	.690	16.76	17.53
T	.590	.620	14.99	15.75
U	.065	.080	1.65	2.03

Reverse Diode

Symbol	Test Conditions ($T_J = 25°C$ Unless Otherwise Specified)	Min.	Typ.	Max.	
V_F	$I_F = I_{C90}$, $V_{GE} = 0V$			2.1	V
t_{rr}	$I_F = 6A$, $V_{GE} = 0V$, $-di_F/dt = 100A/\mu s$ $V_R = 100V$, $V_{GE} = 0V$		1.4		μs
I_{RM}			21		A

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.

PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

IXYS Reserves the Right to Change Limits, Test Conditions and Dimensions.

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

Fig. 1. Output Characteristics @ T_J = 25ºC

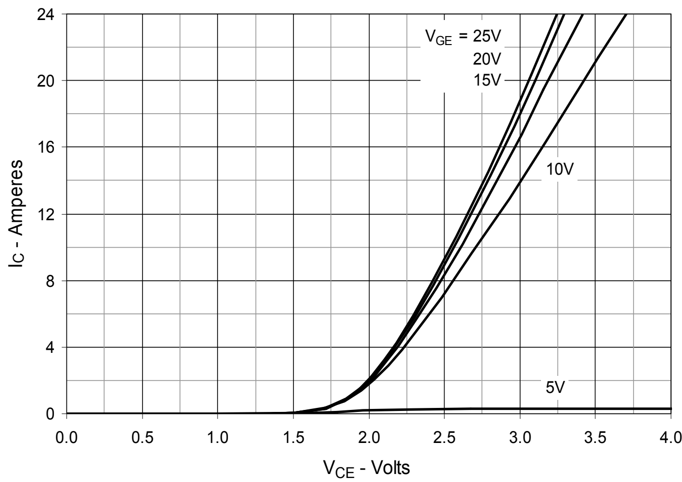


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

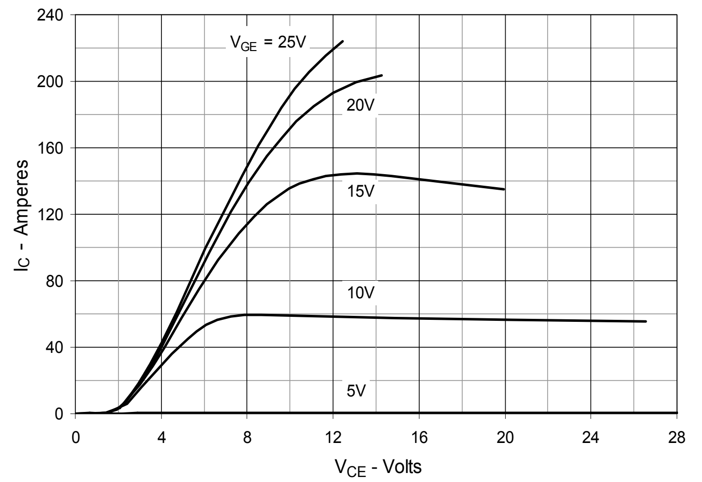


Fig. 3. Output Characteristics @ T_J = 125ºC

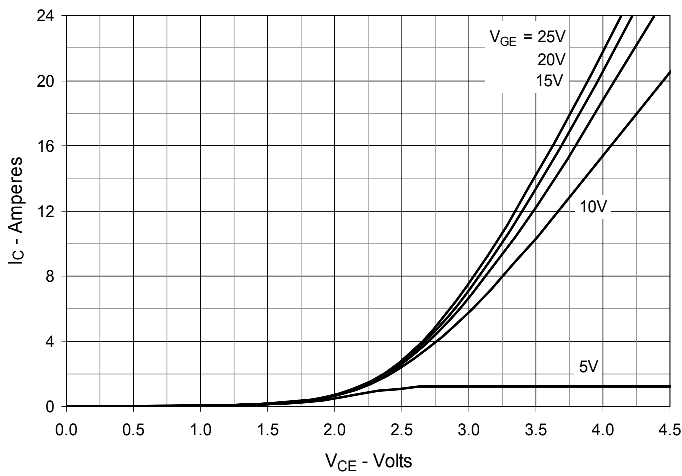


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

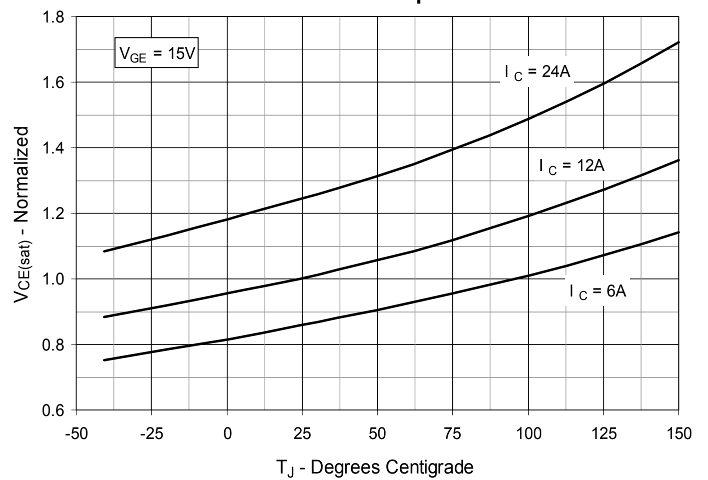


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

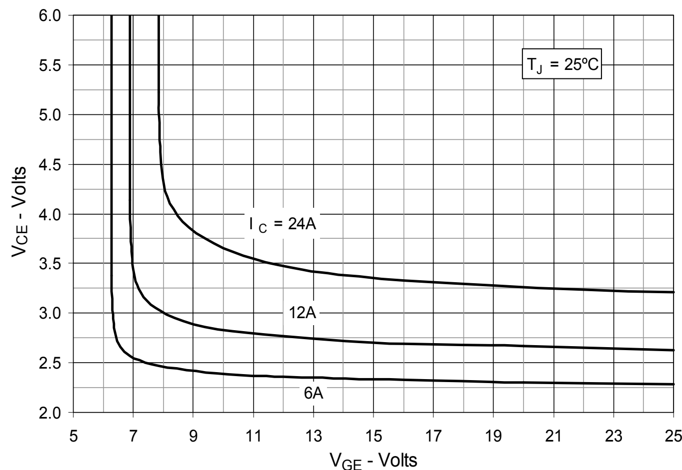
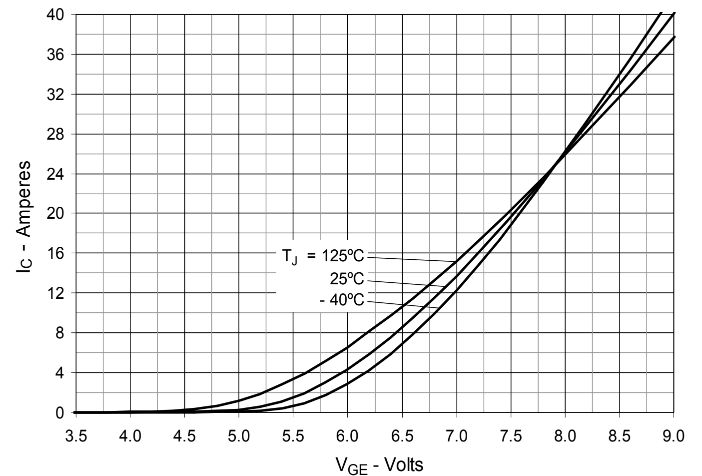


Fig. 6. Input Admittance



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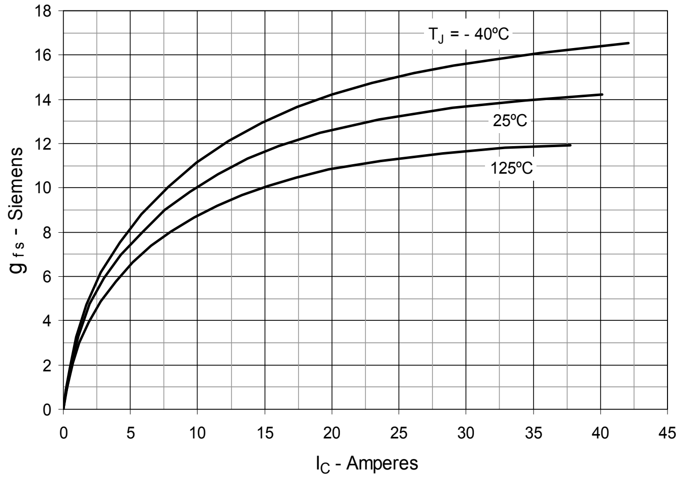
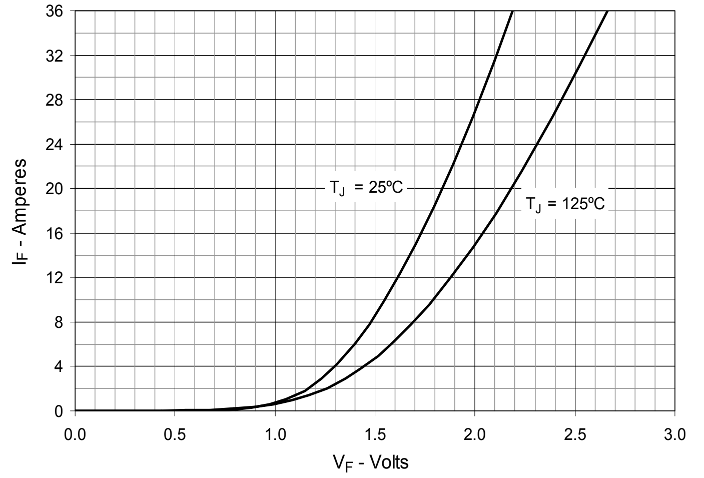
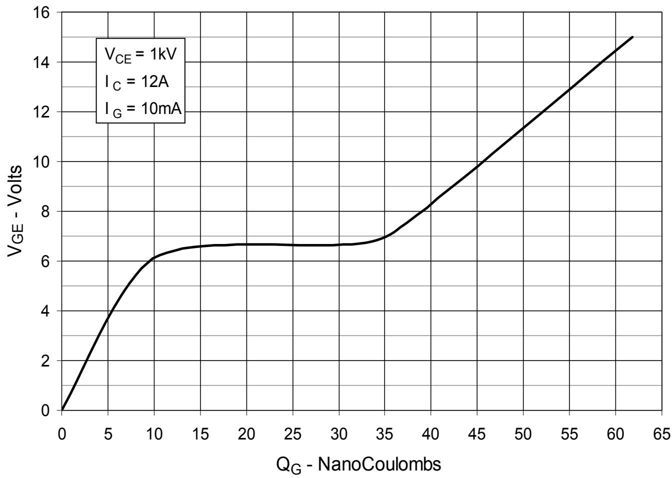
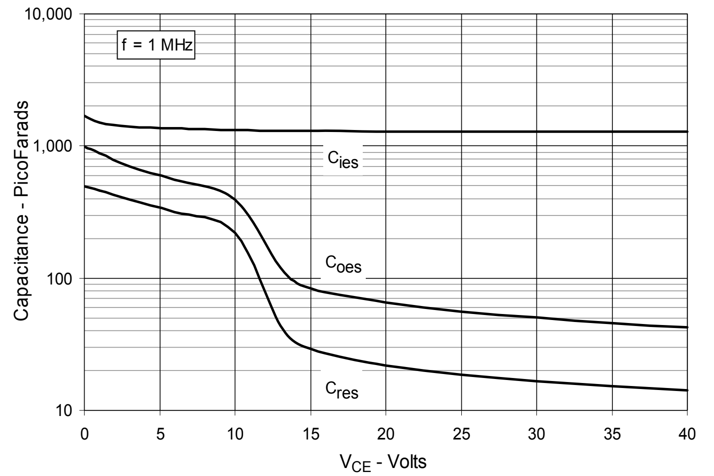
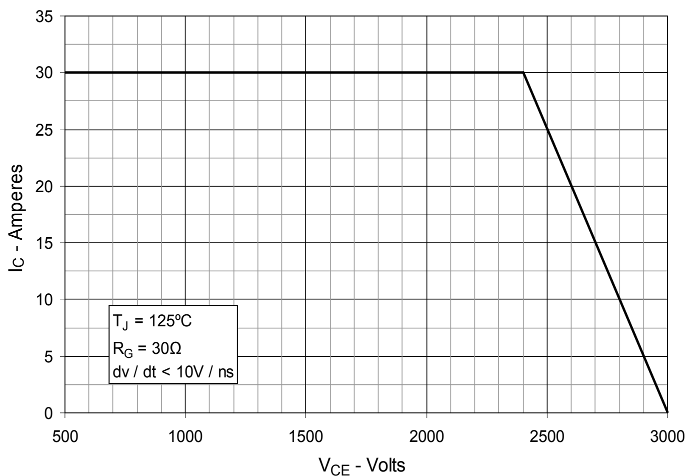
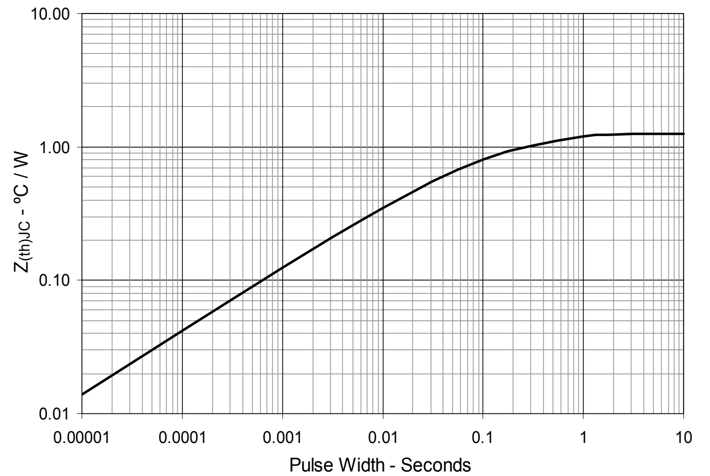












IXYS Reserves the Right to Change Limits, Test Conditions and Dimensions.

Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

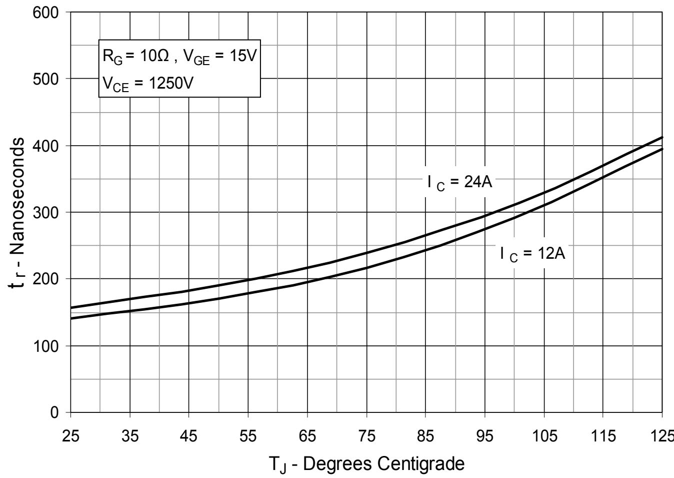


Fig. 14. Resistive Turn-on Rise Time vs. Collector Current

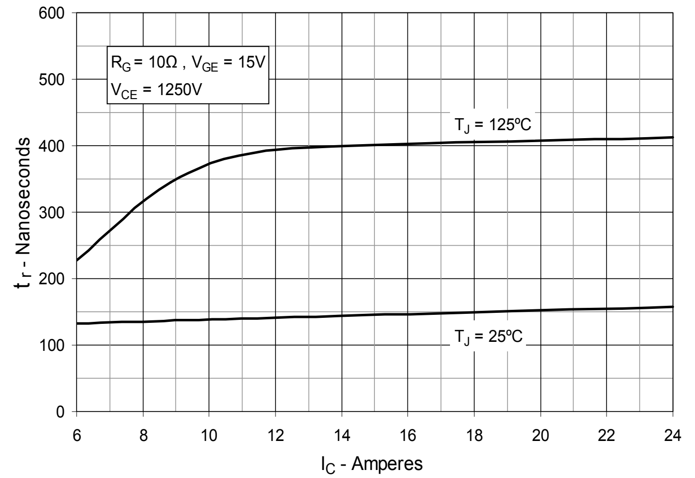


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

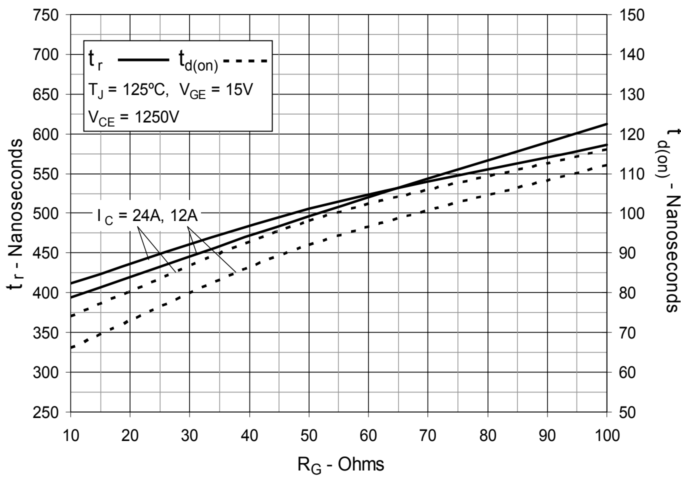


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

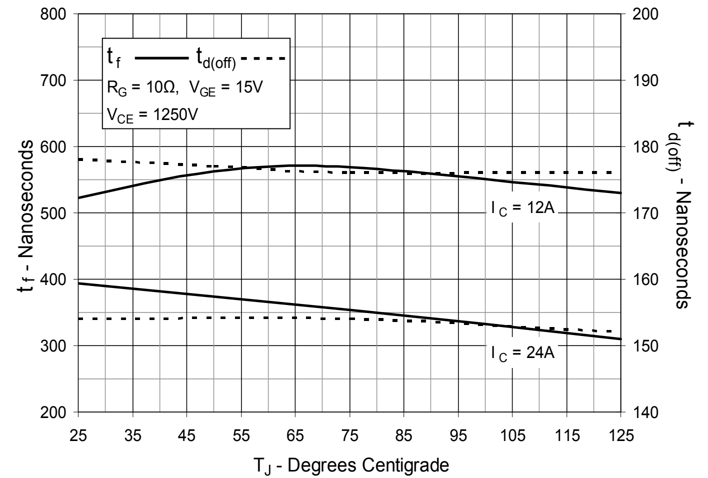


Fig. 17. Resistive Turn-off Switching Times vs. Collector Current

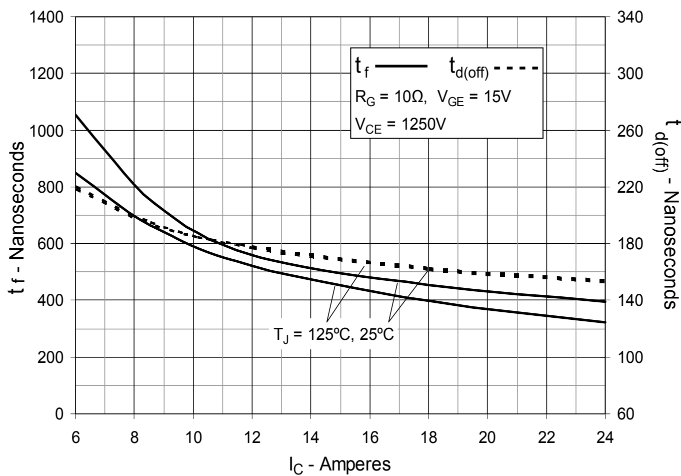
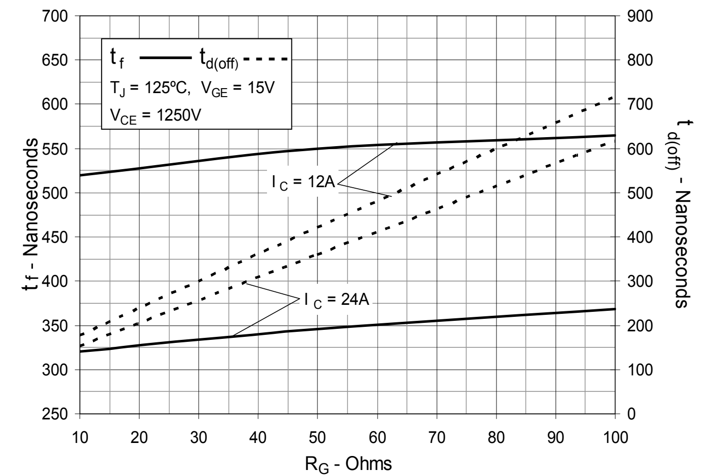


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance



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