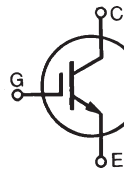
IXYS

High Voltage IGBT
For Capacitor Discharge Applications

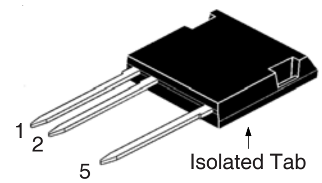
(Electrically Isolated Tab)

IXGF20N300

V_{CES} = 3000V
I_{C25} = 22A
$V_{CE(sat)}$ ≤ 3.2V



ISOPLUS i4-Pak™



1 = Gate
2 = Emitter
5 = Collector

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 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	14	A
I_{CM}	T_C = 25°C, V_{GE} = 20V, 1ms	103	A
SSOA (RBSOA)	V_{GE}= 20V, T_{VJ} = 125°C, R_G = 10Ω Clamped Inductive Load	I_{CM} = 200 @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	1.6 mm (0.062 in.) from Case for 10s	300	°C
T_{SOLD}	Plastic Body for 10s	260	°C
F_C	Mounting Force	20..120/4.5..27	Nm/lb-in.
V_{ISOL}	50/60Hz, 1 Minute	4000	V~
Weight		6	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			2	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 20A, V_{GE} = 15V, Note 1			3.2	V

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 4000V Electrical Isolation
- High Peak Current Capability
- Low Saturation Voltage
- Molding Epoxies Meet UL 94 V-0 Flammability Classification

Applications

- Capacitor Discharge
- Pulser Circuits

Advantages

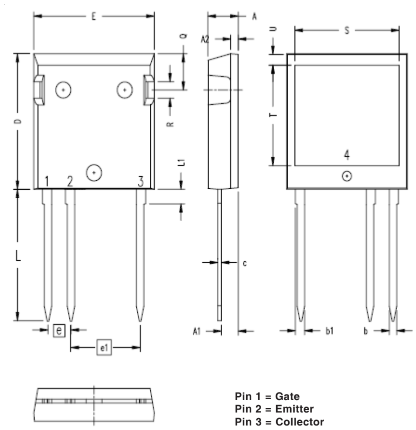
- High Power Density
- Easy to Mount

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	12	S
$I_{C(ON)}$	$V_{GE} = 20V$, $V_{CE} = 20V$, Note 1		180	A
C_{ies}	$V_{CE} = 25V$, $V_{GE} = 0V$, f = 1MHz		1125	pF
C_{oes}			48	pF
C_{res}			16	pF
Q_g	$I_C = 20A$, $V_{GE} = 15V$, $V_{CE} = 600V$		31	nC
Q_{ge}			5.8	nC
Q_{gc}			12	nC
$t_{d(on)}$	**Resistive Switching Times**		38	ns
t_r	$I_C = 20A$, $V_{GE} = 15V$		486	ns
$t_{d(off)}$	$V_{CE} = 960V$, $R_G = 10\Omega$		145	ns
t_f			210	ns
R_{thJC}				1.25 °C/W
R_{thCS}			0.15	°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.

ISOPLUS i4-Pak™ (HV) Outline



Pin 1 = Gate
Pin 2 = Emitter
Pin 3 = Collector
Tab 4 = Isolated

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	.450 BSC		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

Fig. 1. Output Characteristics @ T_J = 25ºC

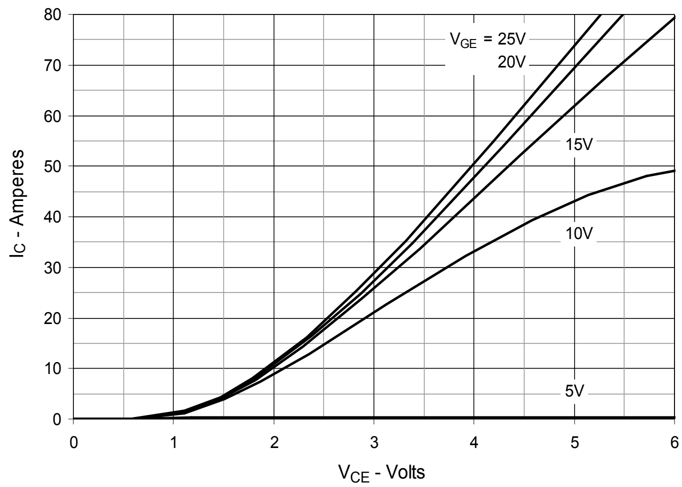


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

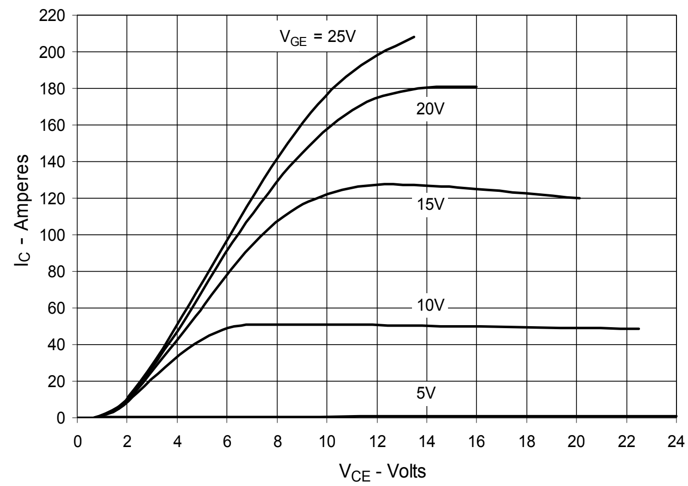


Fig. 3. Output Characteristics @ T_J = 125ºC

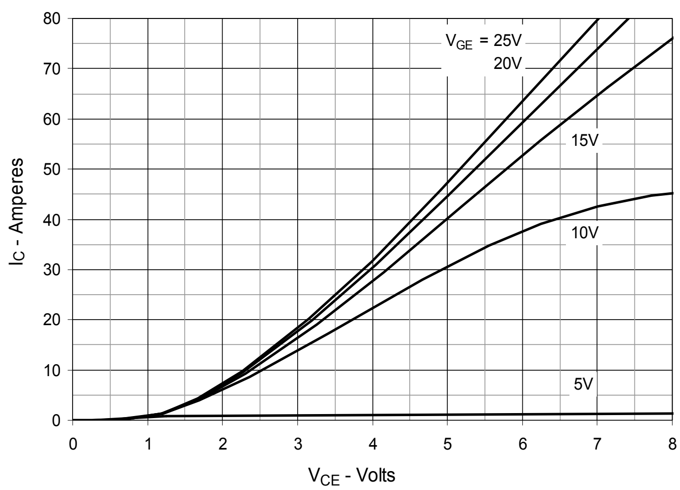


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

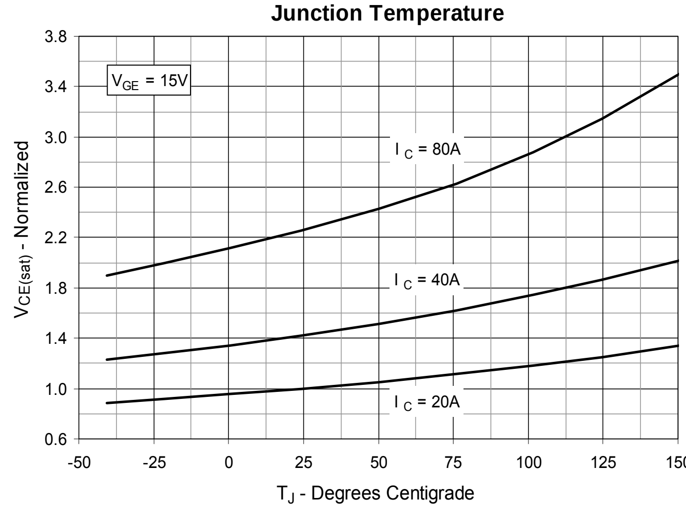


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

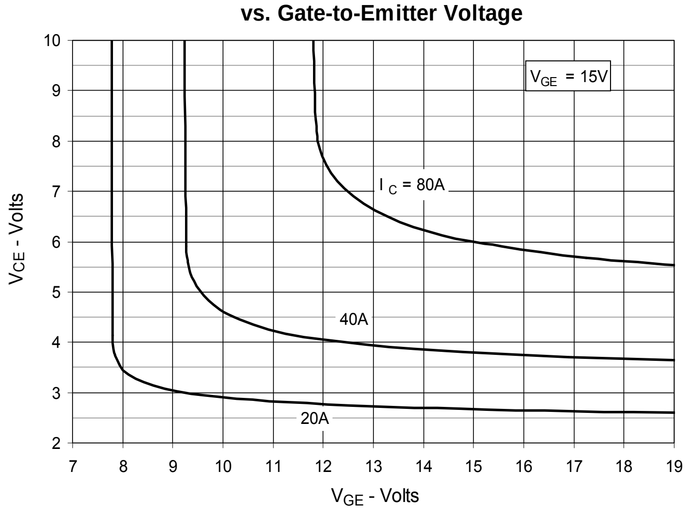


Fig. 6. Input Admittance

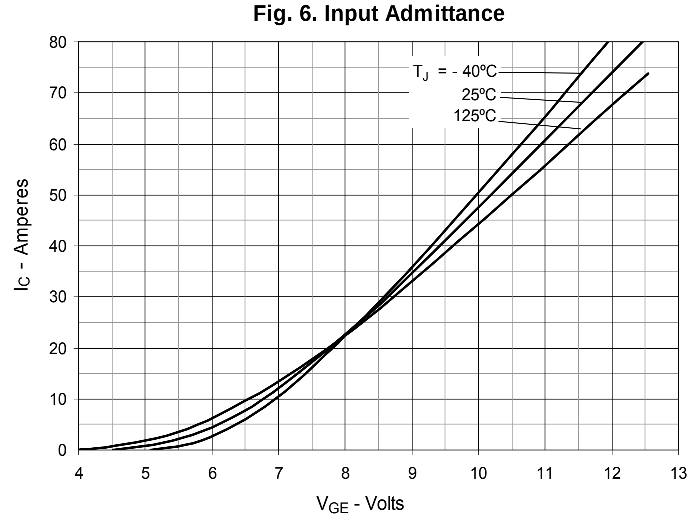


Fig. 7. Transconductance

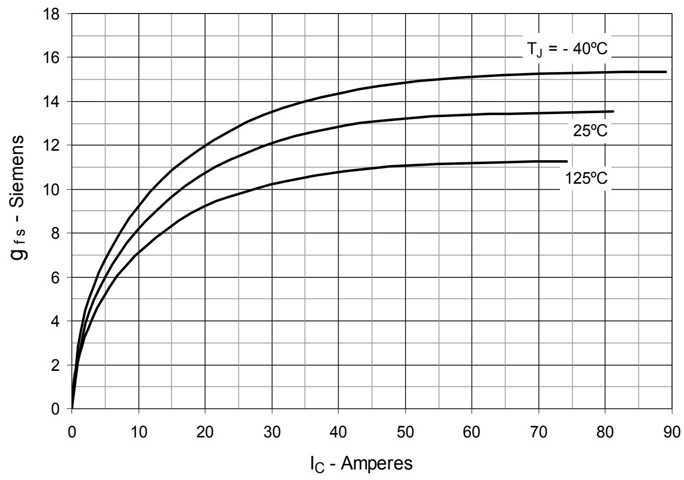


Fig. 8. Gate Charge

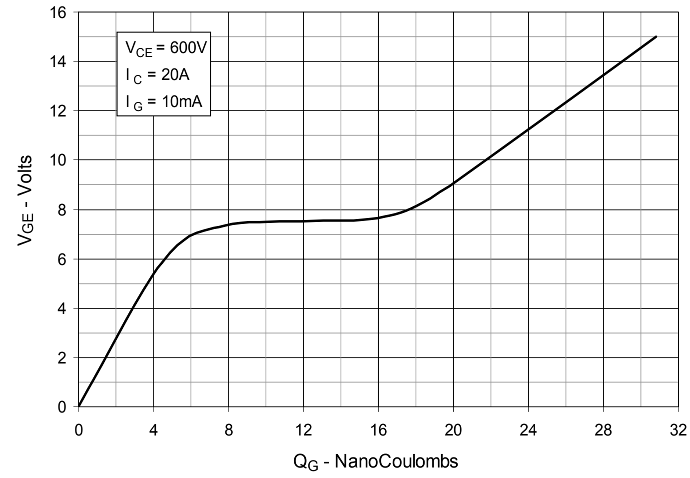


Fig. 9. Reverse-Bias Safe Operating Area

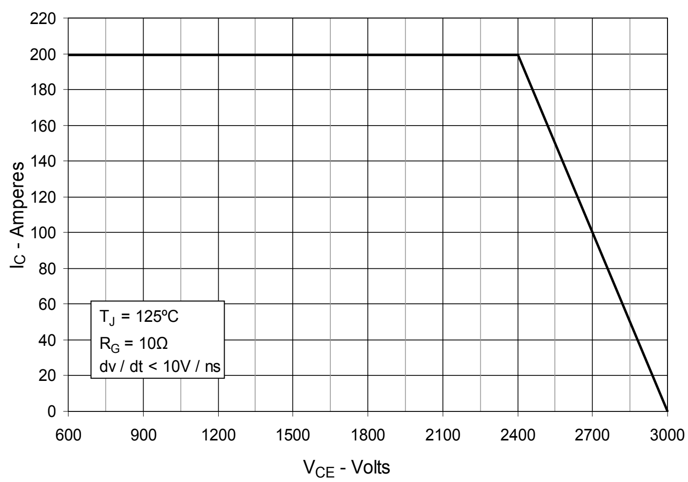


Fig. 10. Capacitance

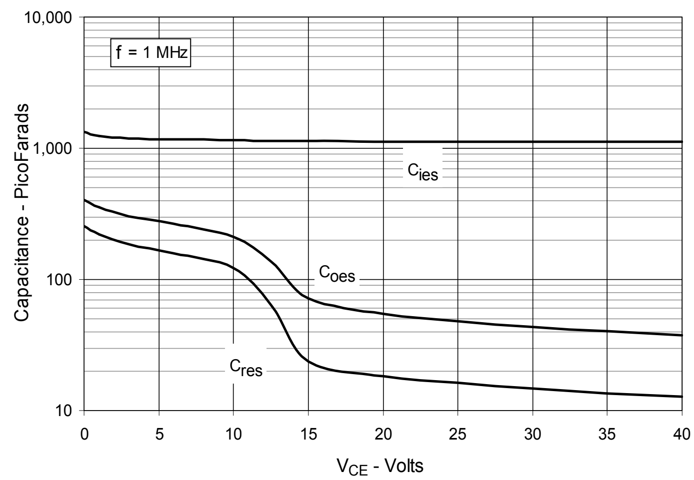


Fig. 11. Maximum Transient Thermal Impedance

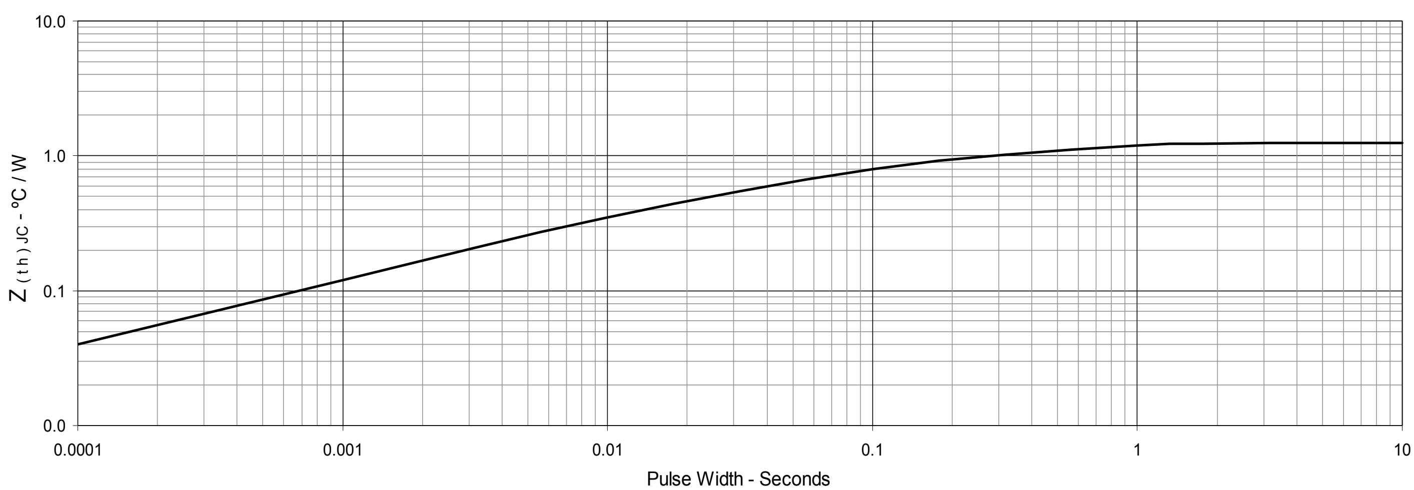


Fig. 12. Resistive Turn-on Rise Time vs. Junction Temperature

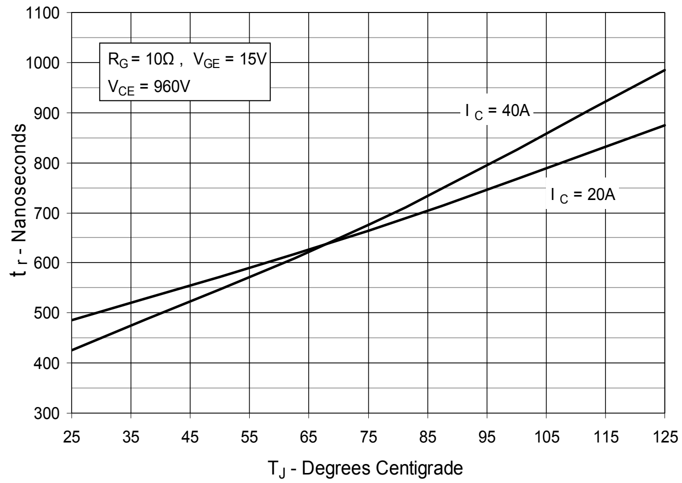


Fig. 13. Resistive Turn-on Rise Time vs. Collector Current

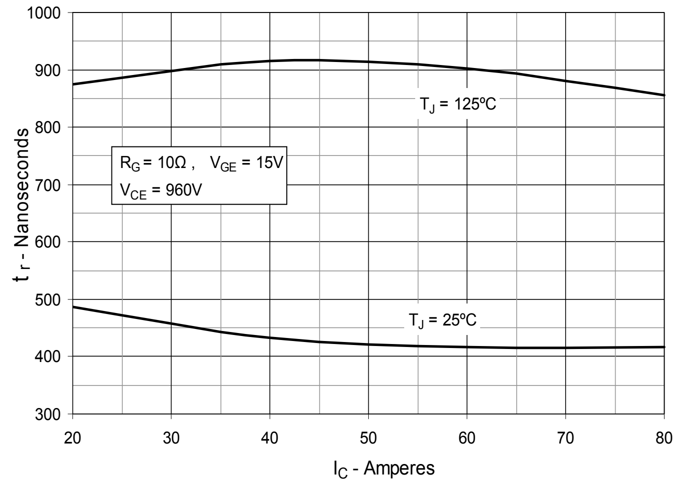


Fig. 14. Resistive Turn-on Switching Times vs. Gate Resistance

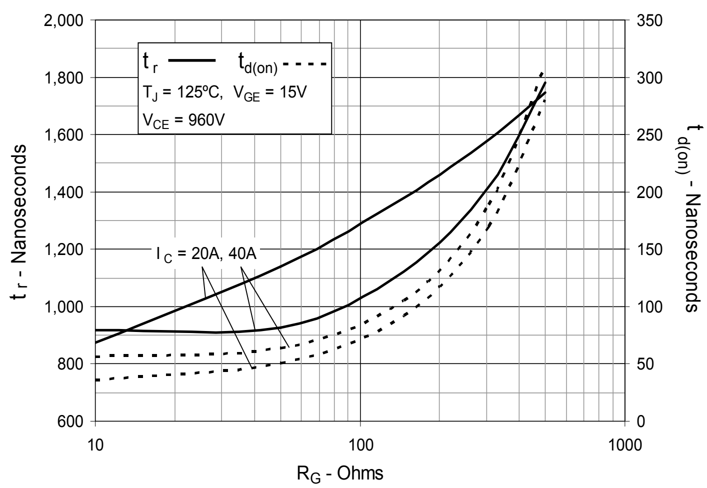


Fig. 15. Resistive Turn-off Switching Times vs. Junction Temperature

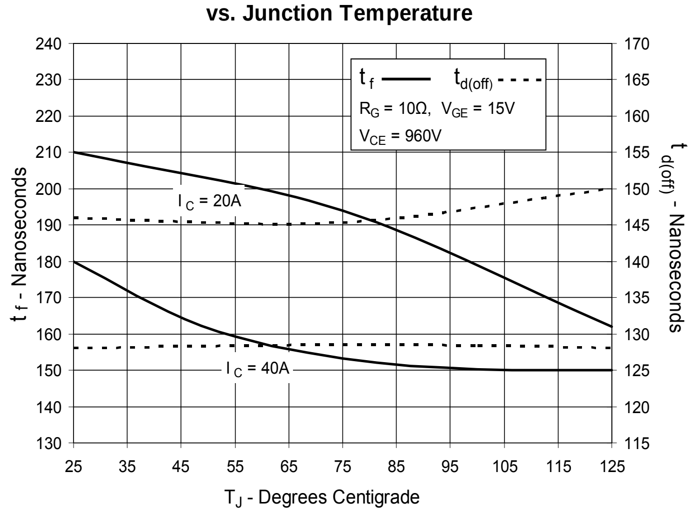


Fig. 16. Resistive Turn-off Switching Times vs. Collector Current

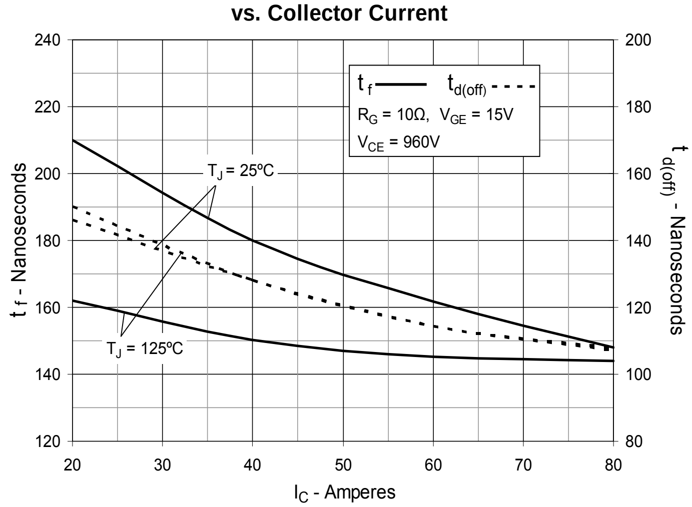


Fig. 17. Resistive Turn-off Switching Times vs. Gate Resistance