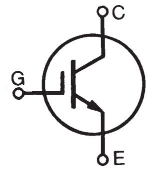
High Voltage IGBT

Low $V_{CE(sat)}$

IXGH 40N120A2
IXGT 40N120A2

V_{CES} = 1200 V
I_{C25} = 75 A
$V_{CE(sat)}$ ≤ 2.0 V

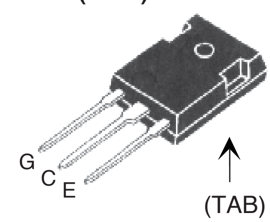
Preliminary Data Sheet



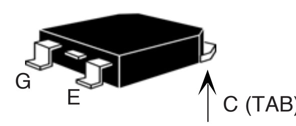
Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	1200	V
V_{CES}	T_J = 25°C to 150°C	1200	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	T_C = 25°C, IGBT chip capability	75	A
I_{C110}	T_C = 110°C	40	A
I_{CM}	T_J ≤ 150°C, tp < 300 µs	160	A
SSOA (RBSOA)	V_{GE} = 15 V, T_{VJ} = 150°C, R_G = 5 Ω Clamped inductive load, V_{CE} < 960 V	I_{CM} = 80	A
P_C	T_C = 25°C	360	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 seconds	300	°C
T_{SOLD}	Plastic body for 10 seconds	260	°C
M_d	Mounting torque (ixgh)	1.3/10	Nm/lb.in.
Weight	(IXGH)	6.0	g
	(IXGT)	4.0	g

Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
$V_{GE(th)}$	I_C = 1 mA, V_{GE} = 0 V	1200			V
$V_{GE(th)}$	I_C = 250 µA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = V_{CES}			50	µA
	V_{GE} = 0 V, T_J = 125°C			1	mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V			± 100	nA
$V_{CE(sat)}$	I_C = I_{C110}, V_{GE} = 15V			2.0	V

TO-247 (IXFH)



TO-268 (IXGT)



G = Gate C = Collector
E = Emitter TAb = Collector

Features

- International standard packages
- Low $V_{CE(sat)}$
  - for minimum on-state conduction losses
- MOS Gate turn-on
  - drive simplicity

Applications

- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switch-mode and resonant-mode power supplies
- Capacitor discharge

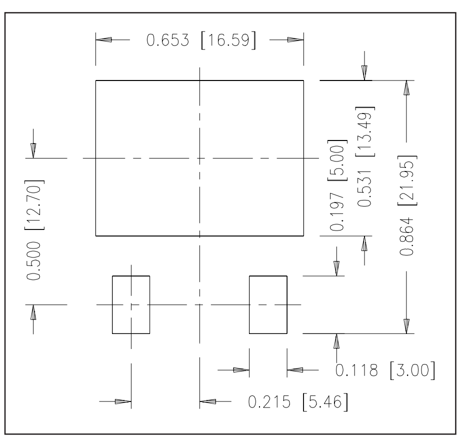
Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Min.	Typ.	Max.	
g_{fs}	$I_C = I_{C110}$, V_{CE} = 10 V	28	40		S
$I_{C(ON)}$	V_{GE} = 10 V, V_{CE} = 10 V		195		A
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		3150		pF
C_{oes}			165		pF
C_{res}			70		pF
Q_g	$I_C = I_{C110}$, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}		136		nC
Q_{ge}			19		nC
Q_{gc}			54		nC
$t_{d(on)}$	Inductive load, T_J = 25°C		22		ns
t_{ri}	$I_C = I_{C110}$, V_{GE} = 15 V		41		ns
$t_{d(off)}$	V_{CE} = 0.8 V_{CES}, R_G = 2 Ω		420	800	ns
t_{fi}			800	1200	ns
E_{off}			15	25	mJ
$t_{d(on)}$	Inductive load, T_J = 125°C		19		ns
t_{ri}	$I_C = I_{C110}$, V_{GE} = 15 V		36		ns
E_{on}	V_{CE} = 0.8 V_{CES}, R_G = 2 Ω		3.5		mJ
$t_{d(off)}$			730		ns
t_{fi}			1570		ns
E_{off}			35		mJ
R_{thJC}				0.35	K/W
R_{thCS}	(TO-247)		0.25		K/W

Note 1: Pulse test, t ≤ 300 μs, duty cycle ≤ 2 %

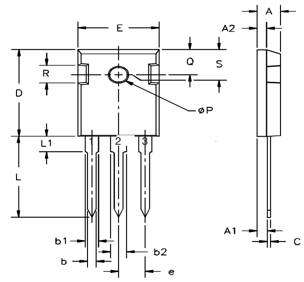
PRELIMINARY TECHNICAL INFORMATION

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 subjective pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

TO-268: Min. Recommended Footprint



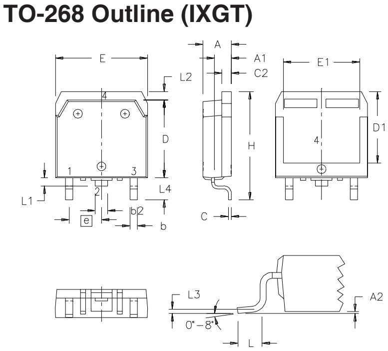
TO-247 AD Outline



Terminals: 1 - Gate, 2 - Drain, 3 - Source, Tab - Drain

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
∅P	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15 BSC		242 BSC	

TO-268 Outline (IXGT)



Terminals: 1 - Gate, 2 - Drain, 3 - Source, Tab - Drain

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

Fig. 1. Output Characteristics @ 25ºC

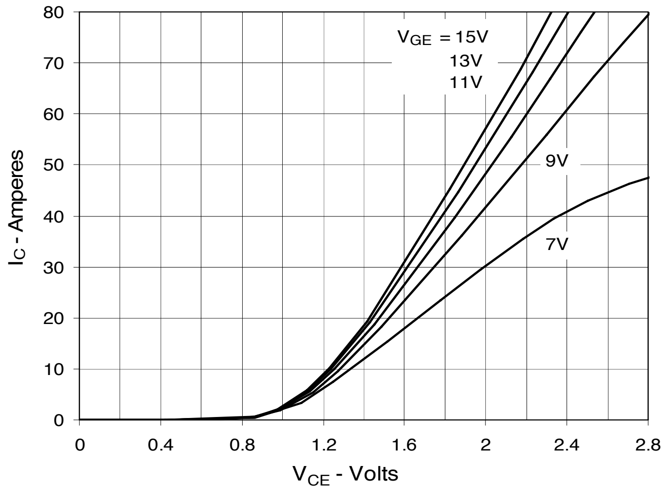


Fig. 2. Exteded Output Characteristics @ 25ºC

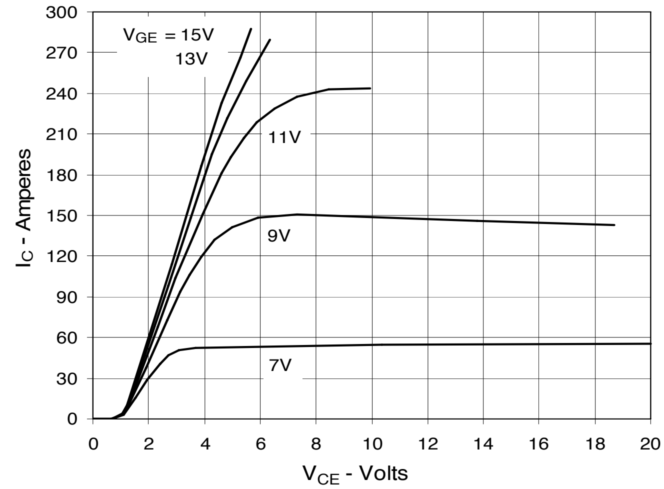


Fig. 3. Output Characteristics @ 125ºC

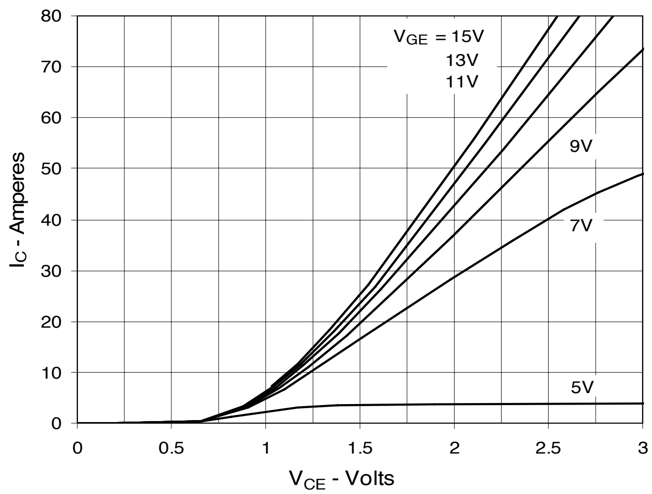


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

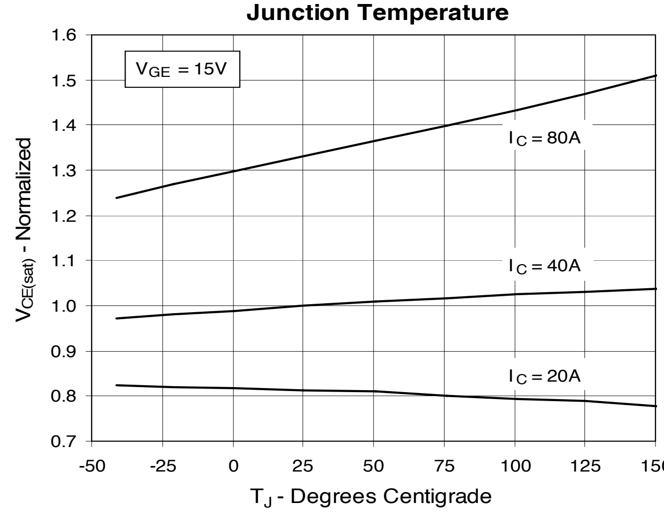


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

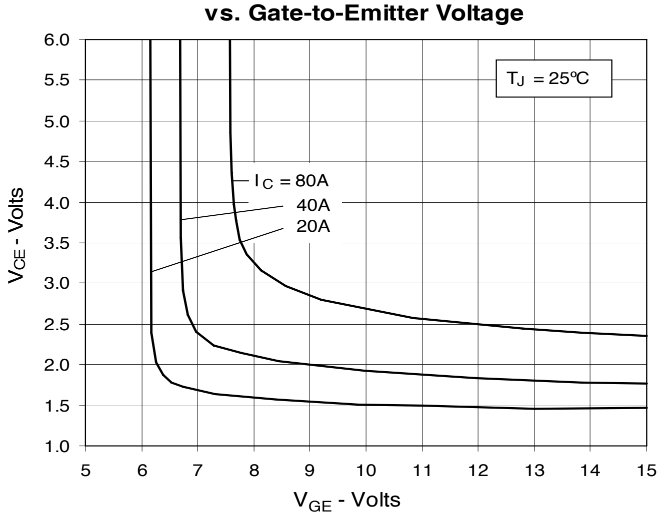


Fig. 6. Input Admittance

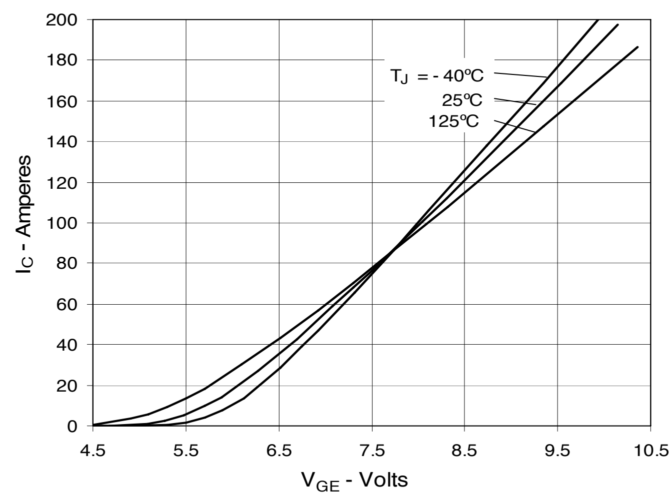


Fig. 7. Transconductance

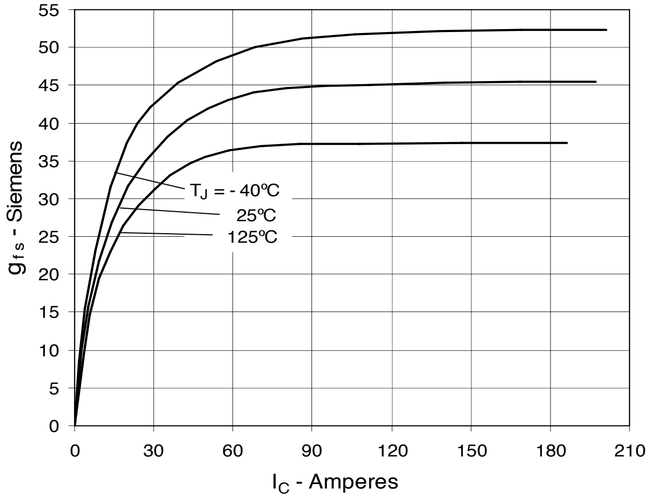


Fig. 8. Inductive Turn-off Switching Times vs. Gate Resistance

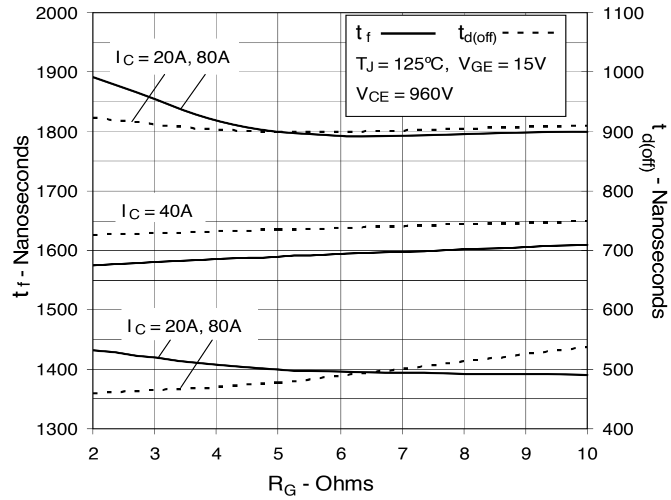


Fig. 9. Inductive Turn-off Switching Times vs. Collector Current

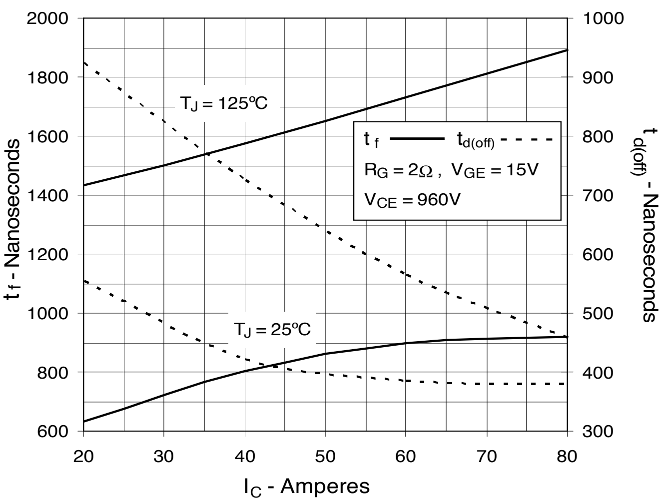


Fig. 10. Inductive Turn-off Switching Times vs. Junction Temperature

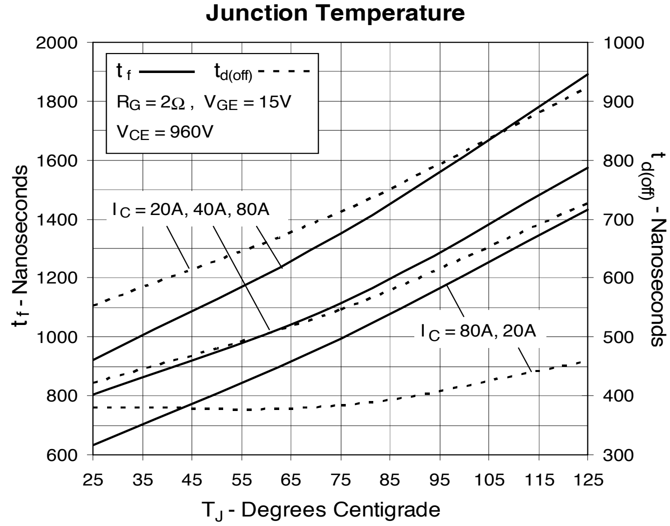


Fig. 11. Inductive Turn-on Switching Times vs. Gate Resistance

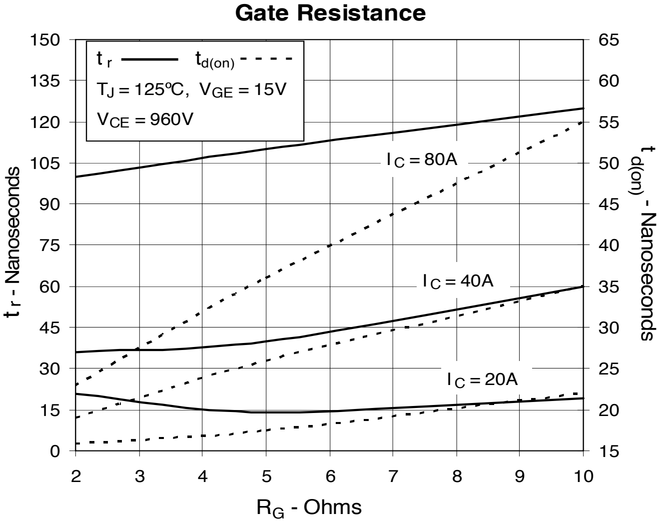


Fig. 12. Inductive Turn-on Switching Times vs. Collector Current

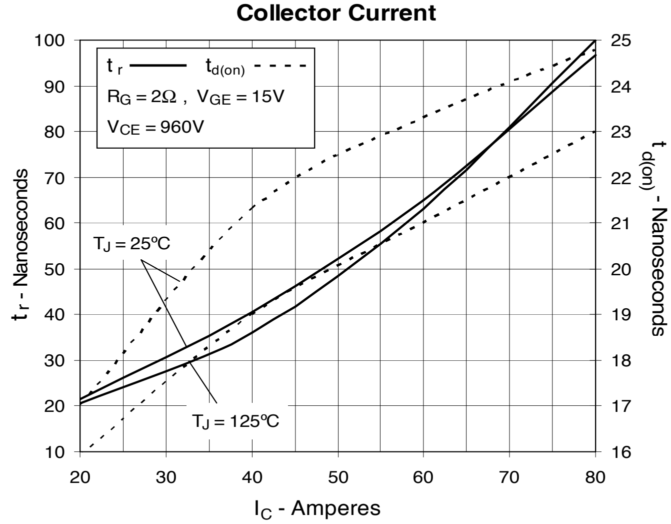


Fig. 13. Inductive Turn-on Switching Times vs. Junction Temperature

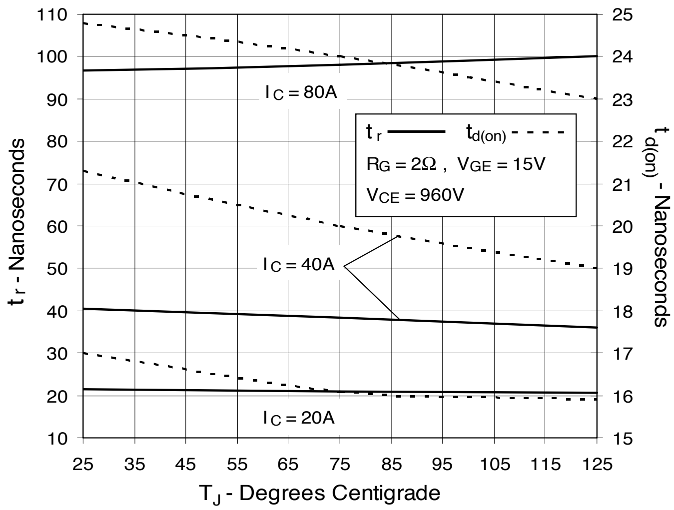


Fig. 14. Gate Charge

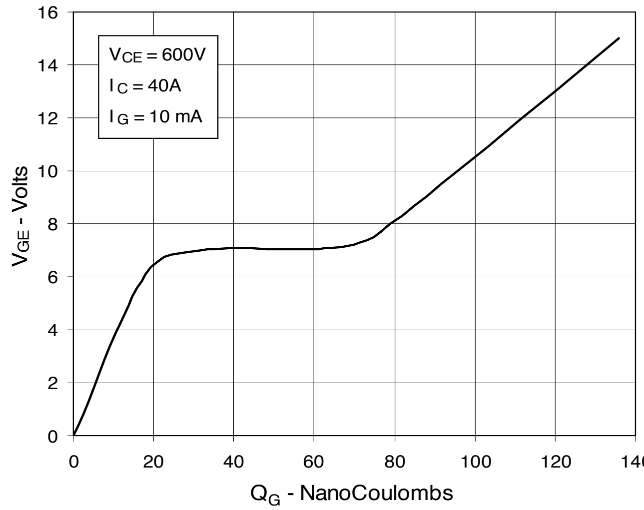


Fig. 15. Capacitance

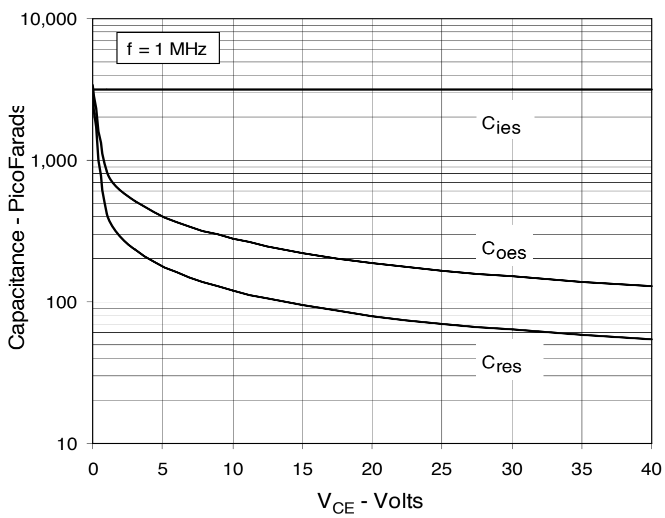


Fig. 16. Reverse-Bias Safe Operating Area

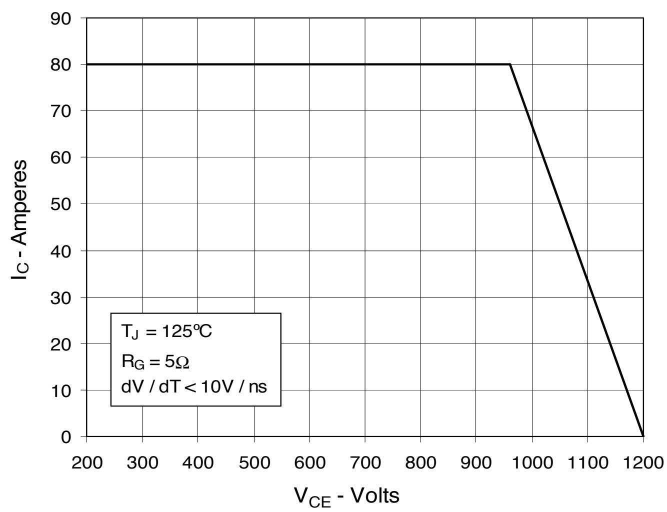


Fig. 17. Maximum Transient Thermal Resistance