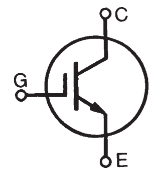
High Voltage IGBT

Low $V_{CE(sat)}$

IXGH 40N120A2
IXGT 40N120A2

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

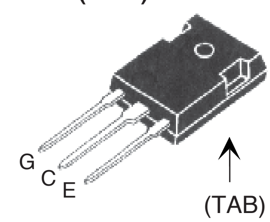
Preliminary Data Sheet



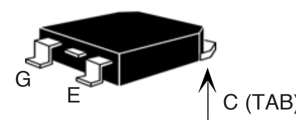
Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	1200	V
V_{CES}	T_J = 25°C to 150°C	1200	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	T_C = 25°C, IGBT chip capability	75	A
I_{C110}	T_C = 110°C	40	A
I_{CM}	T_J ≤ 150°C, tp < 300 µs	160	A
SSOA (RBSOA)	V_{GE} = 15 V, T_{VJ} = 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

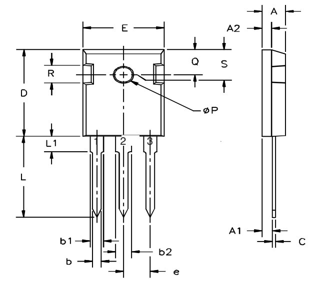
Applications

- 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 %

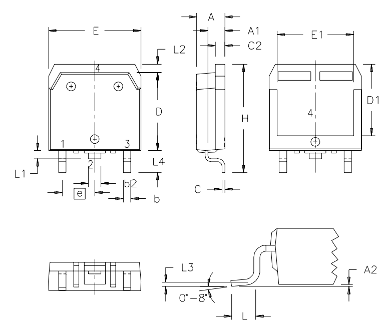
TO-247 AD Outline



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

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

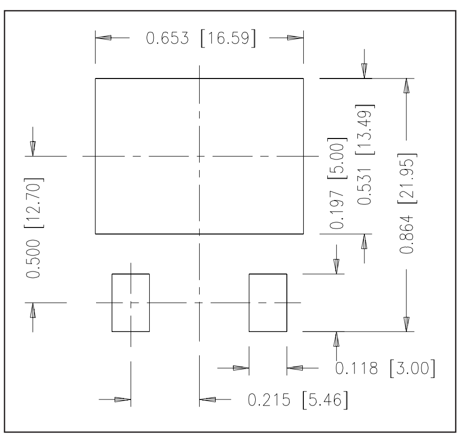


Fig. 1. Output Characteristics @ 25ºC

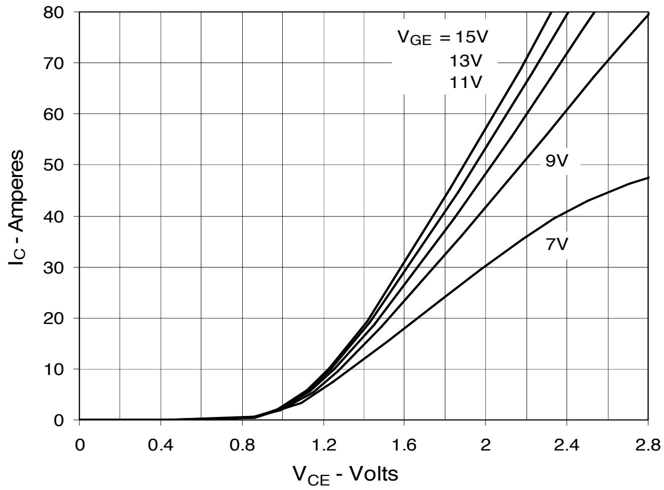


Fig. 2. Exteded Output Characteristics @ 25ºC

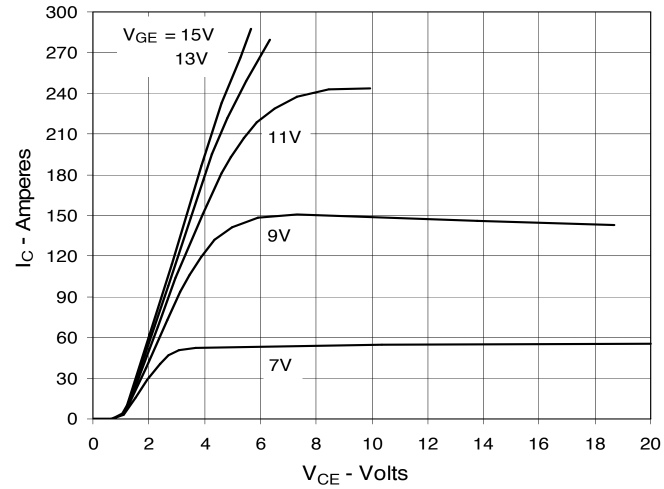


Fig. 3. Output Characteristics @ 125ºC

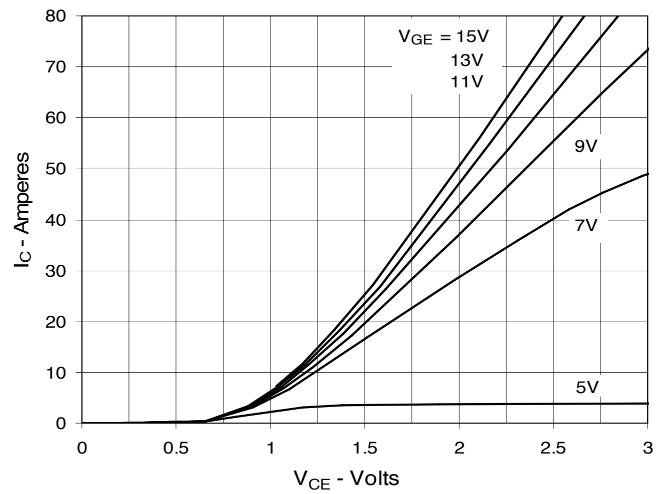


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

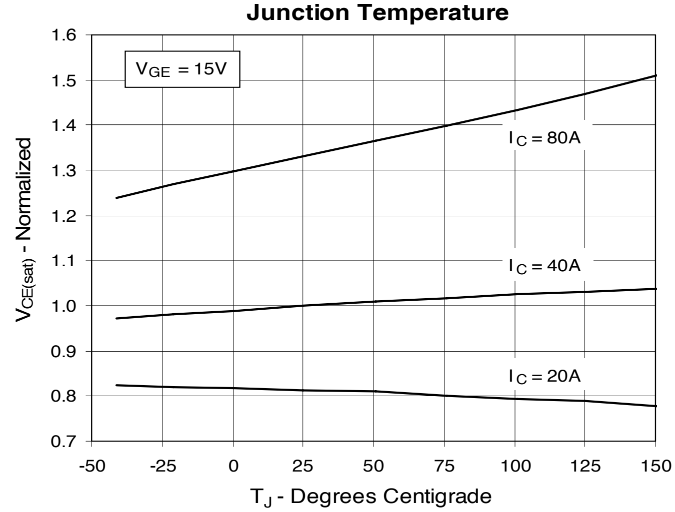


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

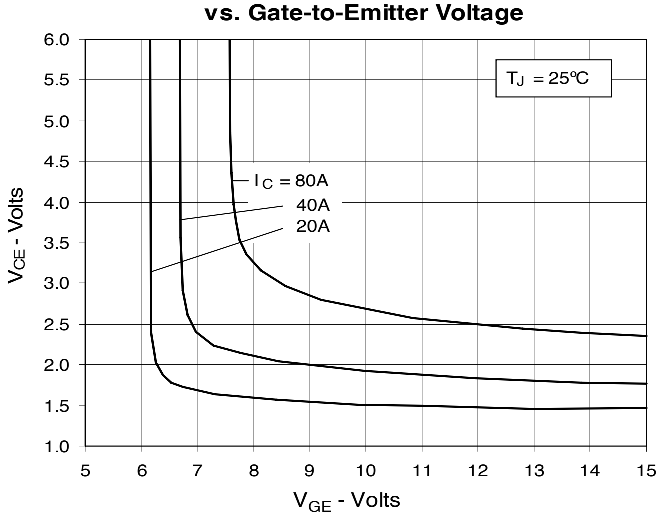


Fig. 6. Input Admittance

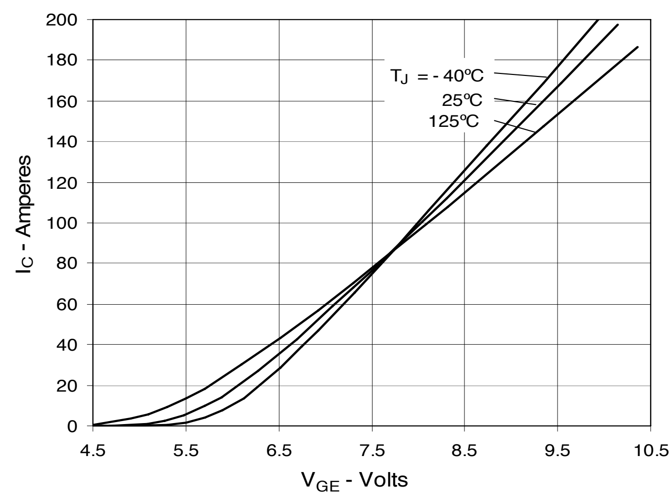


Fig. 7. Transconductance

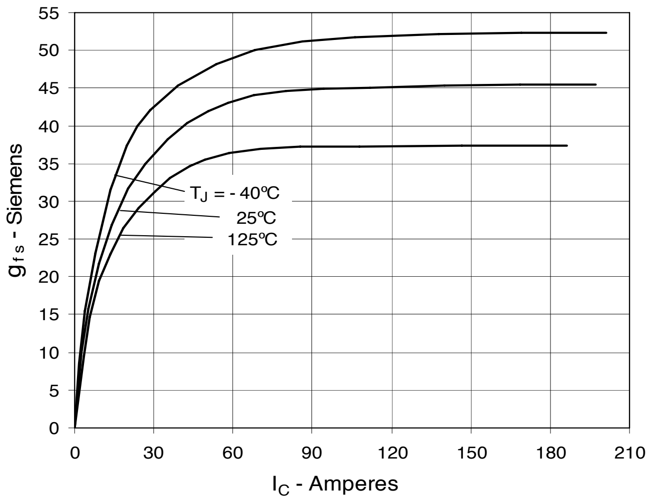


Fig. 8. Inductive Turn-off Switching Times vs. Gate Resistance

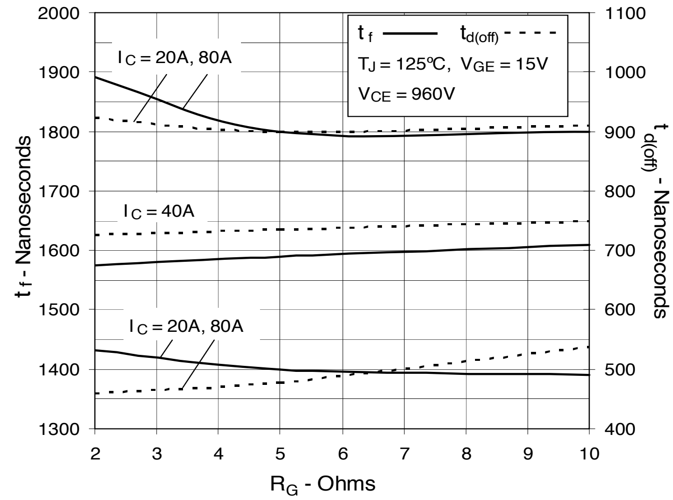


Fig. 9. Inductive Turn-off Switching Times vs. Collector Current

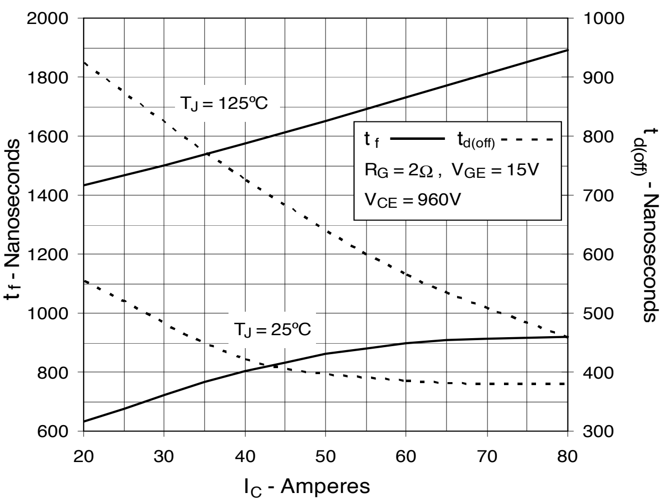


Fig. 10. Inductive Turn-off Switching Times vs. Junction Temperature

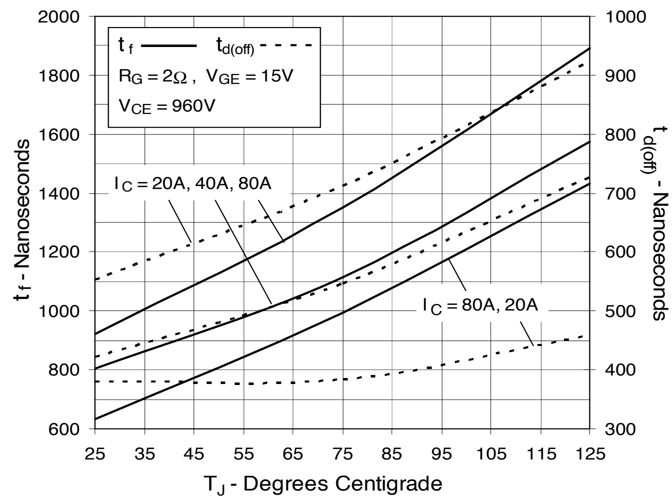


Fig. 11. Inductive Turn-on Switching Times vs. Gate Resistance

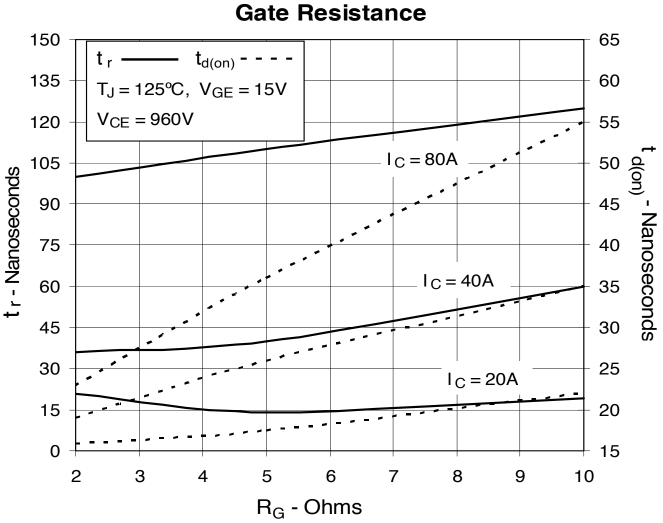


Fig. 12. Inductive Turn-on Switching Times vs. Collector Current

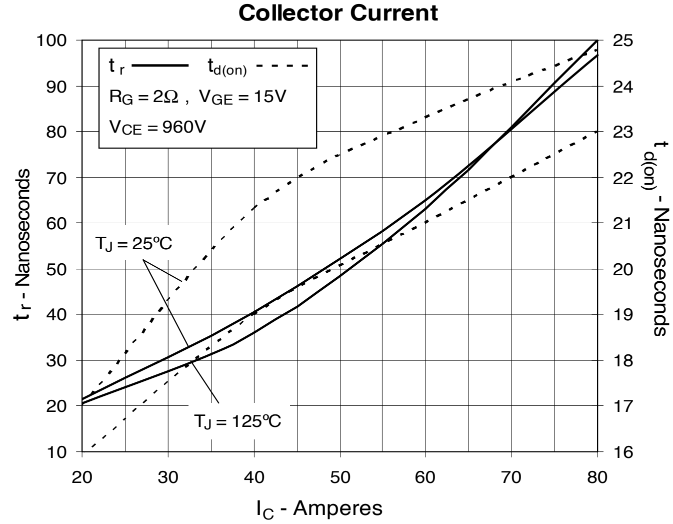


Fig. 13. Inductive Turn-on Switching Times vs. Junction Temperature

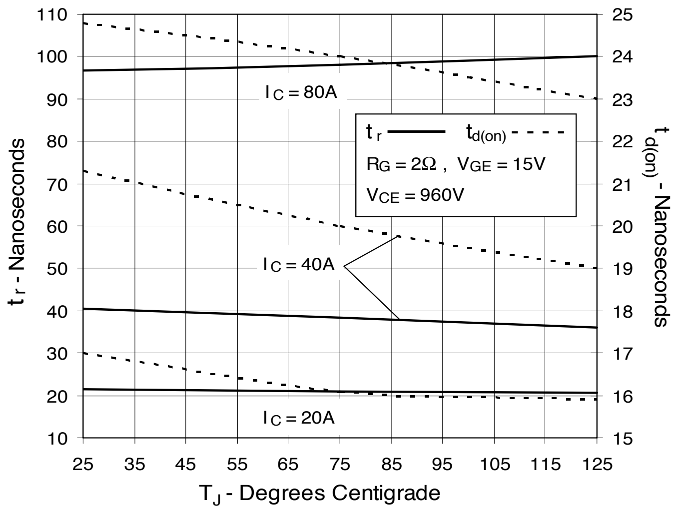


Fig. 14. Gate Charge

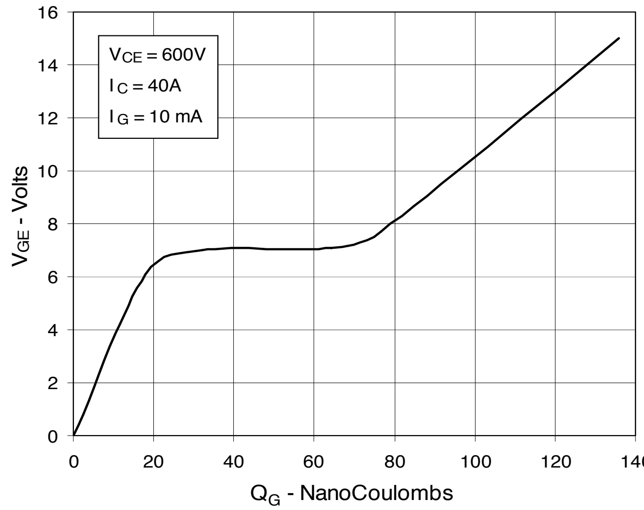


Fig. 15. Capacitance

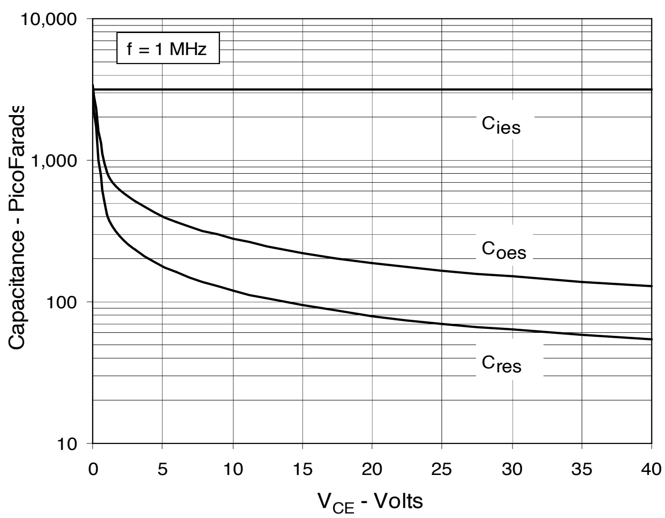


Fig. 16. Reverse-Bias Safe Operating Area

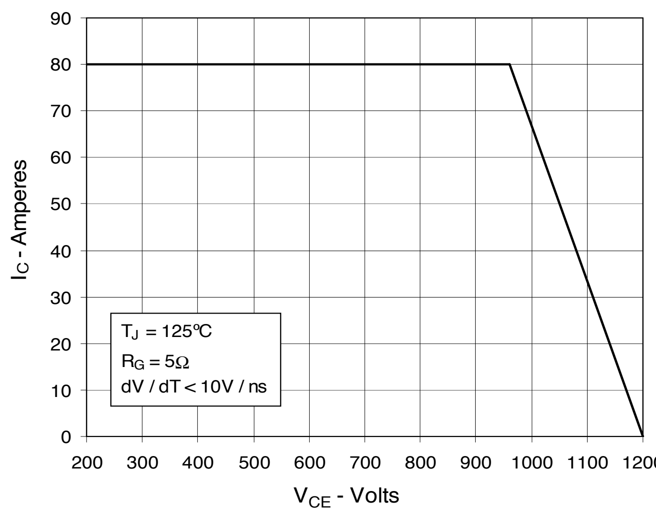
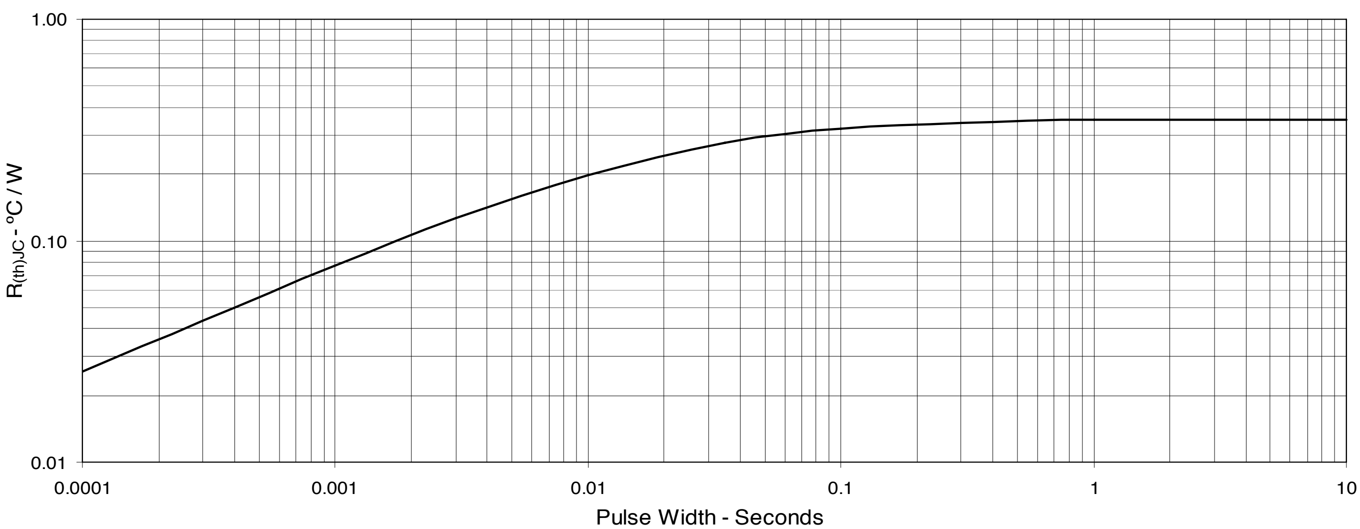


Fig. 17. Maximum Transient Thermal Resistance



A Littelfuse Technology