

# High Voltage IGBT

**IXGH 25N160**  
**IXGT 25N160**

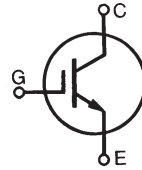
$$V_{CES} = 1600 \text{ V}$$

$$I_{C25} = 75 \text{ A}$$

$$V_{CE(sat)} = 2.5 \text{ V}$$

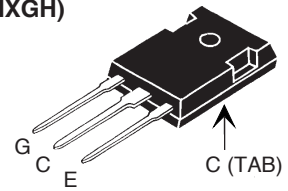
## For Capacitor Discharge Applications

### Preliminary Data Sheet

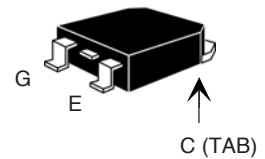


Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	1600	V
$V_{CGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GE} = 1 \text{ M}\Omega$	1600	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ\text{C}$	75	A
$I_{C110}$	$T_C = 110^\circ\text{C}$	25	A
$I_{CM}$	$T_C = 25^\circ\text{C}$ , $V_{GE} = 20 \text{ V}$ , 1 ms	200	A
<b>SSOA (RBSOA)</b>	$V_{GE} = 15 \text{ V}$ , $T_{VJ} = 125^\circ\text{C}$ , $R_G = 20 \Omega$ Clamped inductive load	$I_{CM} = 100$ @ $0.8 V_{CES}$	A
$P_C$	$T_C = 25^\circ\text{C}$	300	W
$T_J$		-55 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		-55 ... +150	$^\circ\text{C}$
Maximum Lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	$^\circ\text{C}$
Maximum Tab temperature for soldering SMD devices for 10 s		260	$^\circ\text{C}$
$M_d$	Mounting torque (TO-247)	1.13/10	Nm/lb-in
<b>Weight</b>		TO-247	6 g
		TO-268	4 g

TO-247 (IXGH)



TO-268 (IXGT)



G = Gate, C = Collector,  
E = Emitter, TAB = Collector

### Features

- High peak current capability
- Low saturation voltage
- MOS Gate turn-on -drive simplicity
- Rugged NPT structure
- International standard packages
  - JEDEC TO-268 and
  - JEDEC TO-247 AD
- Molding epoxies meet UL 94 V-0 flammability classification

### Applications

- Capacitor discharge
- Pulser circuits

### Advantages

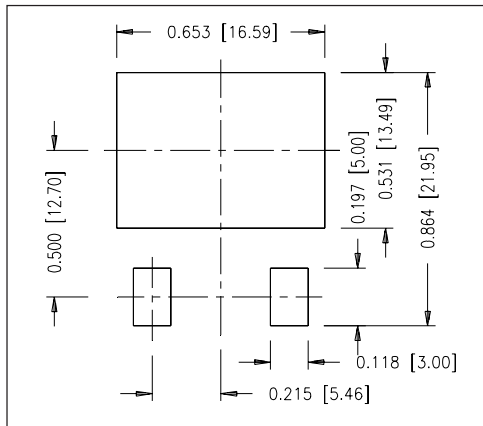
- High power density
- Suitable for surface mounting
- Easy to mount with 1 screw, (isolated mounting screw hole)

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ unless otherwise specified)		
		min.	typ.	max.
$BV_{CES}$	$I_C = 250 \mu\text{A}$ , $V_{GE} = 0 \text{ V}$	1600		V
$V_{GE(th)}$	$I_C = 250 \mu\text{A}$ , $V_{CE} = V_{GE}$	3.0		V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0 \text{ V}$ $T_J = 125^\circ\text{C}$			50 $\mu\text{A}$ 1 mA
$I_{GES}$	$V_{CE} = 0 \text{ V}$ , $V_{GE} = \pm 30 \text{ V}$			$\pm 100 \text{ nA}$
$V_{CE(sat)}$	$I_C = I_{C110}$ , $V_{GE} = 15 \text{ V}$			2.5 V
	$I_C = 100 \text{ A}$ , $V_{GE} = 20 \text{ V}$			4.7 V

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ unless otherwise specified)		
		min.	typ.	max.
$g_{fs}$	$I_C = 50\text{ A}$ ; $V_{CE} = 10\text{ V}$ , Note 1	14	21	S
$I_{C(ON)}$	$V_{GE} = 15\text{ V}$ , $V_{CE} = 10\text{ V}$ , Note 1		200	A
$C_{ies}$	$V_{CE} = 25\text{ V}$ , $V_{GE} = 0\text{ V}$ , $f = 1\text{ MHz}$		2090	pF
$C_{oes}$			94	pF
$C_{res}$			34	pF
$Q_g$	$I_C = 50\text{ A}$ , $V_{GE} = 15\text{ V}$ , $V_{CE} = 0.5 V_{CES}$		84	nC
$Q_{ge}$			15	nC
$Q_{gc}$			37	nC
$t_{d(on)}$	<b>Resistive load</b>		47	ns
$t_{ri}$	$I_C = 100\text{ A}$ , $V_{GE} = 15\text{ V}$ , Note 1		236	ns
$t_{d(off)}$	$V_{CE} = 1200\text{ V}$ , $R_G = 10\ \Omega$		86	ns
$t_{fi}$			440	ns
$R_{thJC}$				0.42 K/W
$R_{thCK}$	(TO-247)		0.25	K/W

Notes: 1. Pulse test,  $t < 300\ \mu\text{s}$ , duty cycle  $< 2\%$

### TO-268: Minimum Recommended Footprint



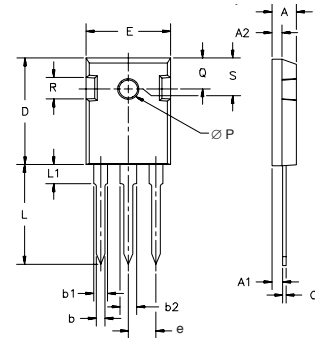
### PRELIMINARY TECHNICAL INFORMATION

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.

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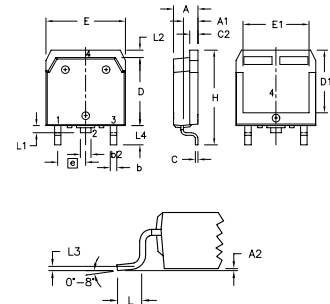
IXYS MOSFETs and IGBTs are covered by 4,835,592 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585  
one or more of the following U.S. patents: 4,850,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692  
4,881,106 5,034,796 5,187,117 5,486,715 6,306,728 B1 6,583,505 6,710,463 6771478 B2

### TO-247 AD Outline



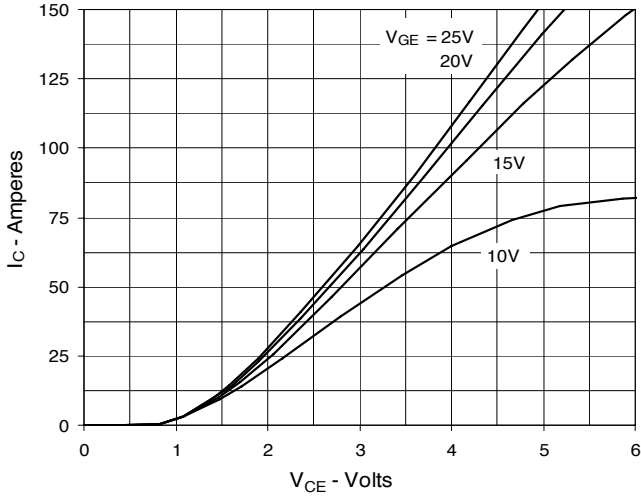
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
ØP	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S			242 BSC	

### TO-268 Outline

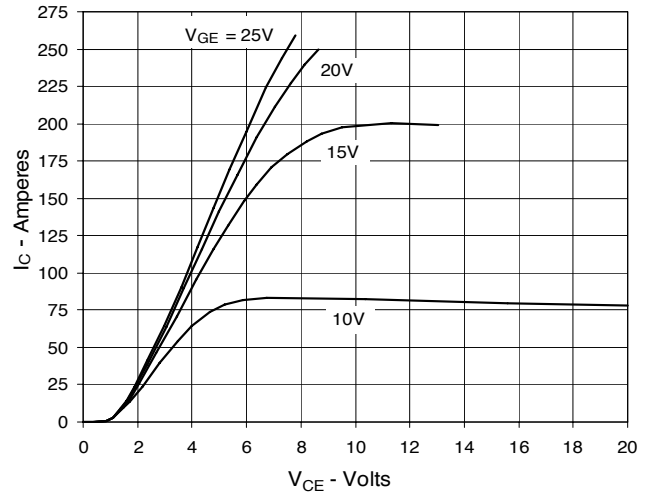


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.9	5.1	.193	.201
A <sub>1</sub>	2.7	2.9	.106	.114
A <sub>2</sub>	.02	.25	.001	.010
b	1.15	1.45	.045	.057
b <sub>2</sub>	1.9	2.1	.75	.83
C	.4	.65	.016	.026
D	13.80	14.00	.543	.551
E	15.85	16.05	.624	.632
E <sub>1</sub>	13.3	13.6	.524	.535
e	5.45 BSC		.215 BSC	
H	18.70	19.10	.736	.752
L	2.40	2.70	.094	.106
L1	1.20	1.40	.047	.055
L2	1.00	1.15	.039	.045
L3	0.25 BSC		.010 BSC	
L4	3.80	4.10	.150	.161

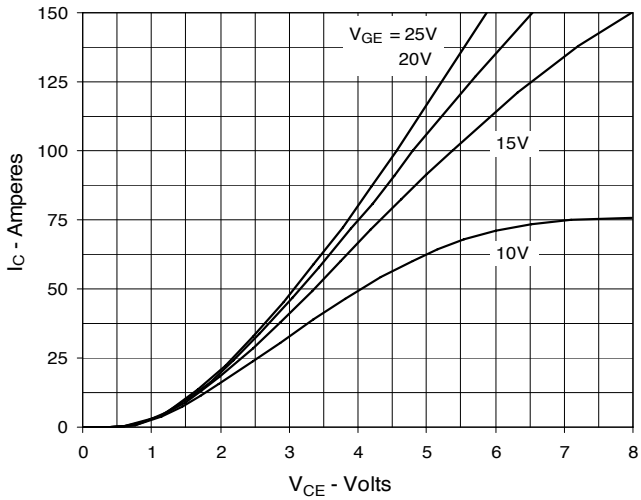
**Fig. 1. Output Characteristics @ 25°C**



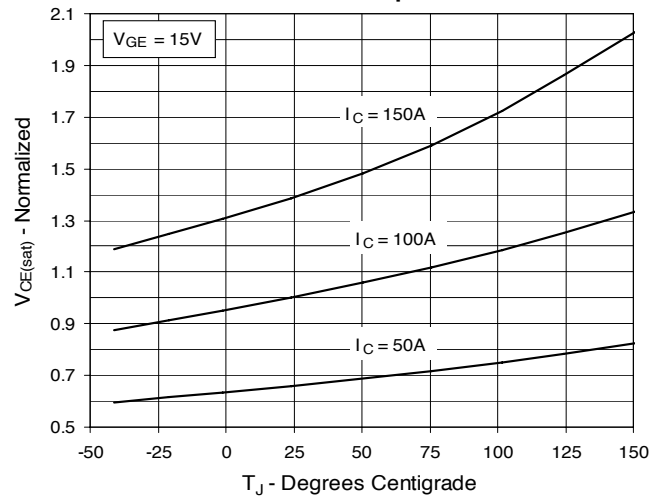
**Fig. 2. Extended Output Characteristics @ 25°C**



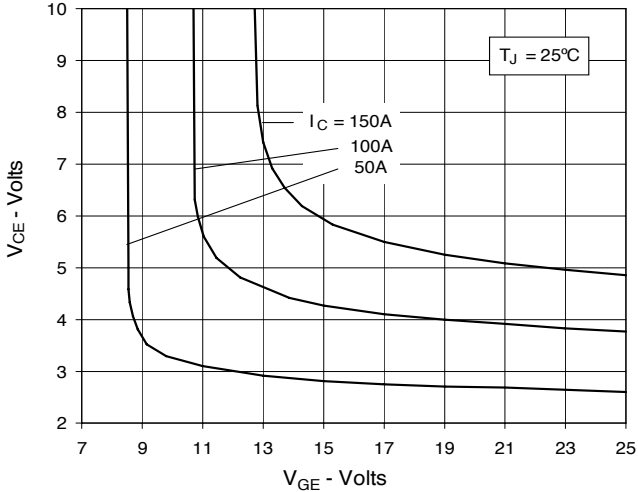
**Fig. 3. Output Characteristics @ 125°C**



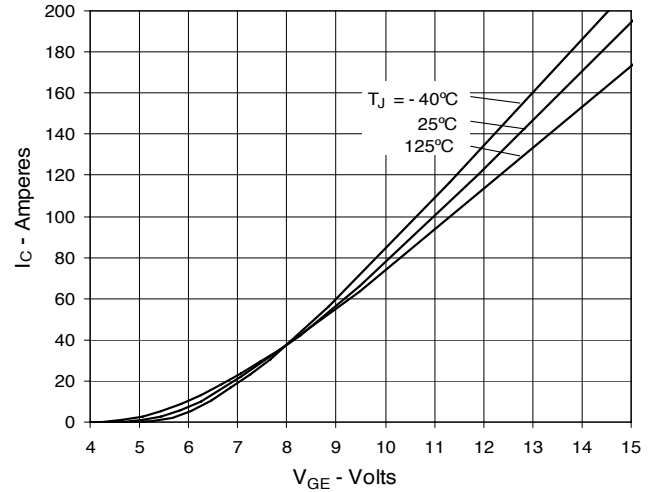
**Fig. 4. Dependence of  $V_{CE(sat)}$  on Junction Temperature**



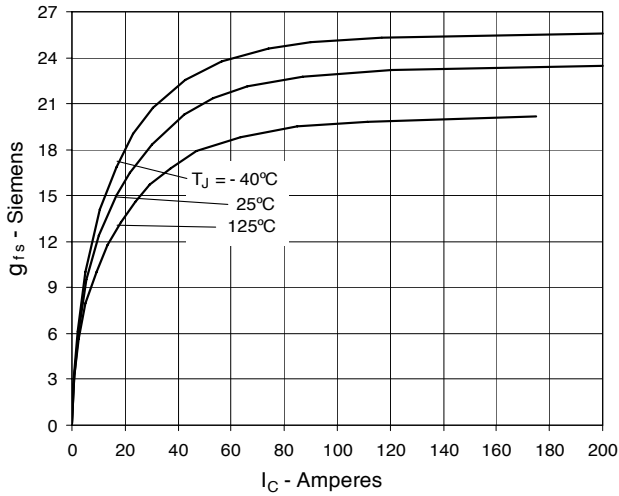
**Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage**



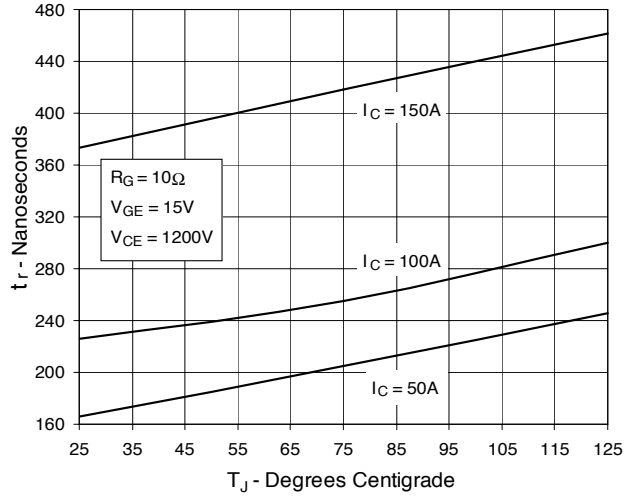
**Fig. 6. Input Admittance**



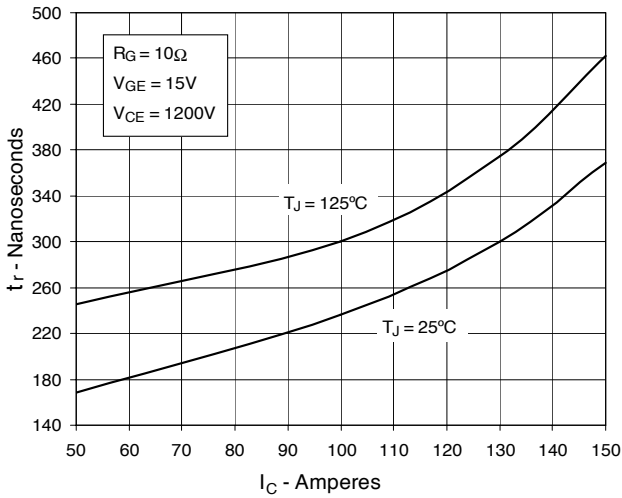
**Fig. 7. Transconductance**



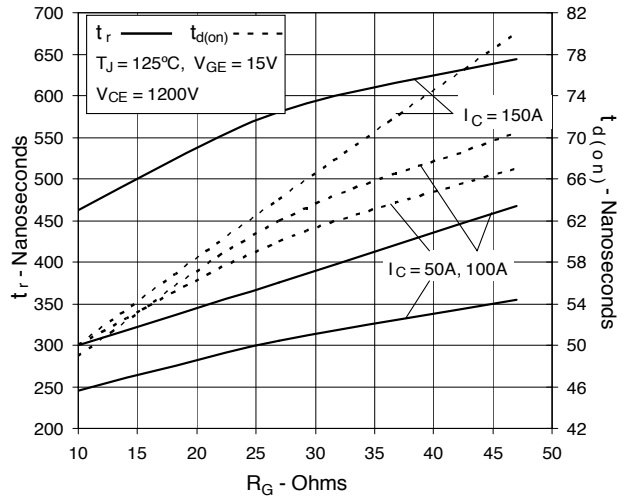
**Fig. 8. Resistive Turn-On Rise Time vs. Junction Temperature**



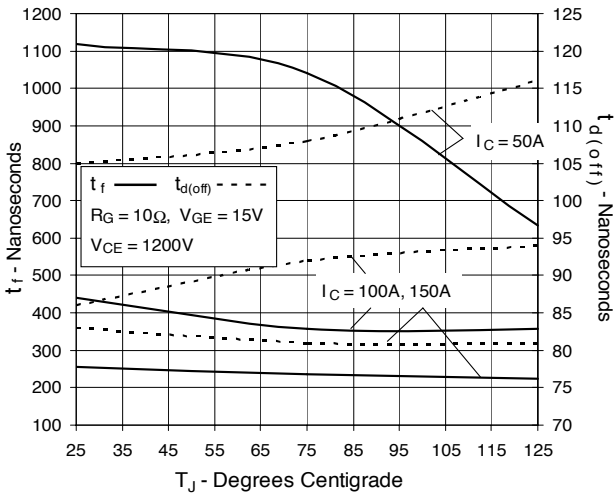
**Fig. 9. Resistive Turn-On Rise Time vs. Collector Current**



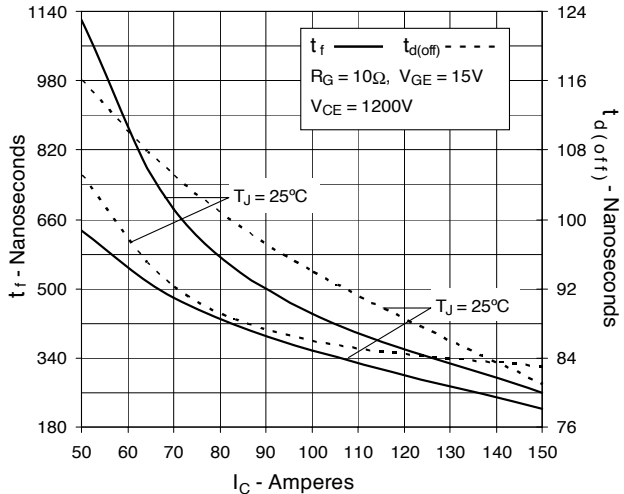
**Fig. 10. Resistive Turn-On Switching Times vs. Gate Resistance**



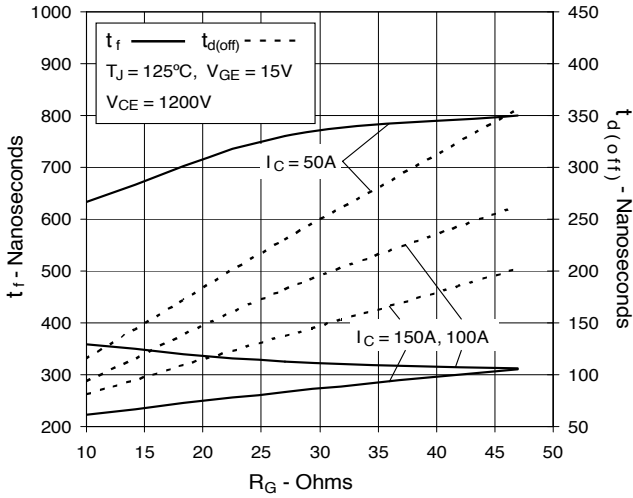
**Fig. 11. Resistive Turn-Off Switching Times vs. Junction Temperature**



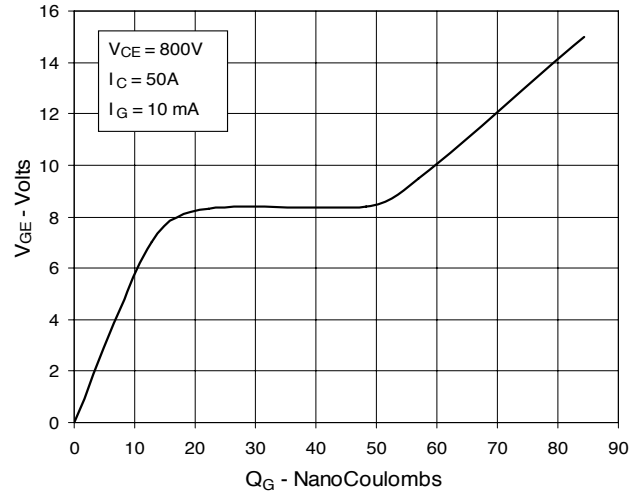
**Fig. 12. Resistive Turn-Off Switching Times vs. Collector Current**



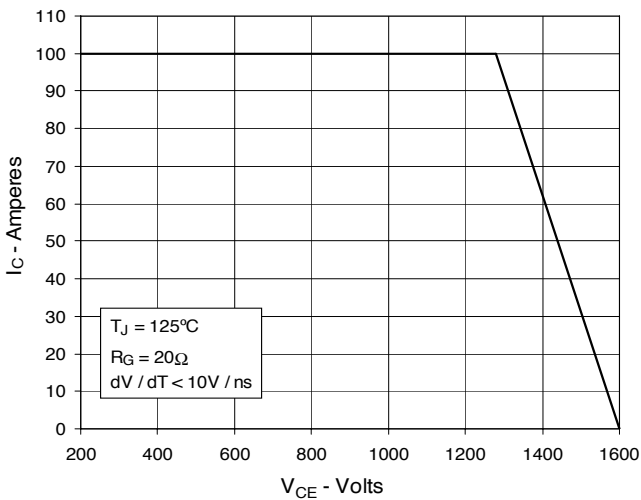
**Fig. 13. Resistive Turn-Off Switching Times vs. Gate Resistance**



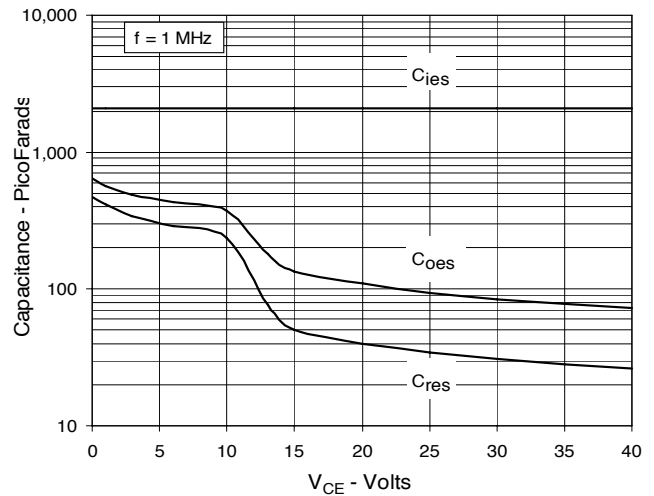
**Fig. 14. Gate Charge**



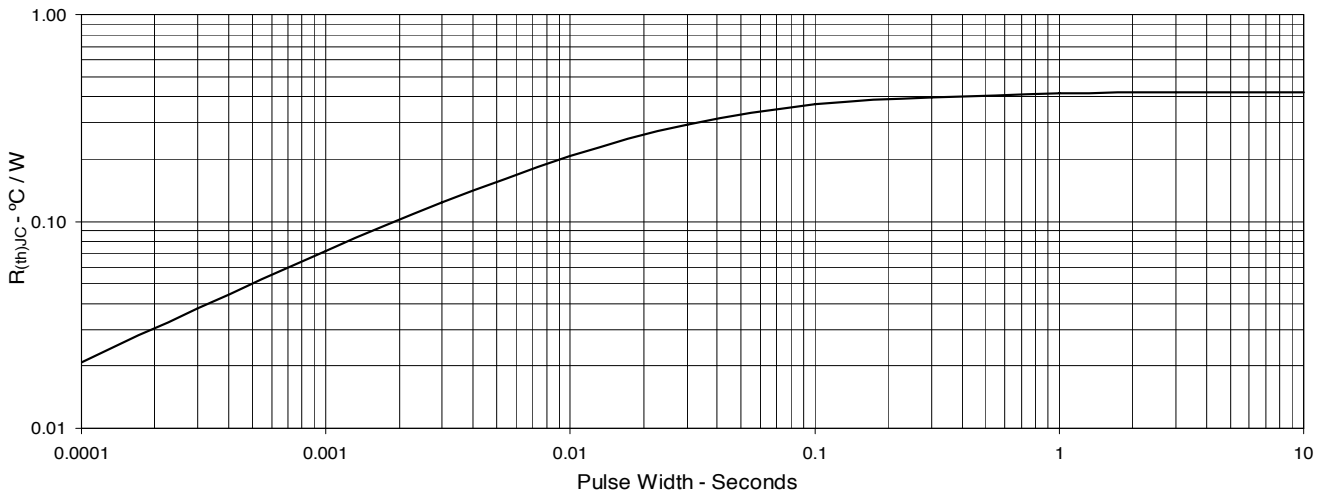
**Fig. 15. Reverse-Bias Safe Operating Area**



**Fig. 16. Capacitance**



**Fig. 17. Maximum Transient Thermal Resistance**





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