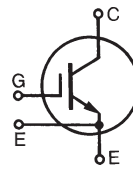




**THE DATASHEET OF  
IXGN400N60B3**



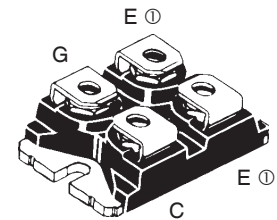
Medium-Speed Low-Vsat PT IGBT for 5-40 kHz Switching



$V_{CES} = 600V$   
 $I_{C25} = 430A$   
 $V_{CE(sat)} \leq 1.50V$

Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ C$ to $150^\circ C$	600	V
$V_{CGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GE} = 1M\Omega$	600	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ C$ (Chip Capability)	430	A
$I_{C110}$	$T_C = 110^\circ C$	200	A
$I_{LRMS}$	Terminal Current Limit	200	A
$I_{CM}$	$T_C = 25^\circ C$ , 1ms	1500	A
<b>SSOA</b>	$V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 1\Omega$	$I_{CM} = 400$	A
<b>(RBSOA)</b>	Clamped Inductive Load	@ $V_{CE} \leq V_{CES}$	V
$P_C$	$T_C = 25^\circ C$	1000	W
$T_J$		-55 ... +150	$^\circ C$
$T_{JM}$		150	$^\circ C$
$T_{stg}$		-55 ... +150	$^\circ C$
$V_{ISOL}$	50/60Hz	t = 1min	2500 V~
	$I_{ISOL} \leq 1mA$	t = 1s	3000 V~
$M_d$	Mounting Torque	1.5/13	Nm/lb.in
	Terminal Connection Torque (M4)	1.3/11.5	Nm/lb.in
<b>Weight</b>		30	g

SOT-227B, miniBLOC  
 E153432



G = Gate, C = Collector, E = Emitter  
 ① either emitter terminal can be used as Main or Kelvin Emitter

### Features

- Optimized for Low Conduction and Switching Losses
- Square RBSOA
- High Current Capability
- Isolation Voltage 3000 V~
- International Standard Package

### Advantages

- High Power Density
- Low Gate Drive Requirement

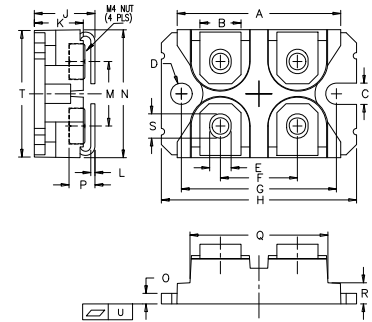
### Applications

- Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Battery Chargers
- Welding Machines
- Lamp Ballasts

Symbol	Test Conditions ( $T_J = 25^\circ C$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{CES}$	$I_C = 1mA$ , $V_{GE} = 0V$	600		V
$V_{GE(th)}$	$I_C = 8mA$ , $V_{CE} = V_{GE}$	3.0		5.0 V
$I_{CES}$	$V_{CE} = V_{CES}$ , $V_{GE} = 0V$ $T_J = 125^\circ C$			100 $\mu A$
				4 mA
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 20V$			$\pm 400$ nA
$V_{CE(sat)}$	$I_C = 100A$ , $V_{GE} = 15V$ , Note 1 $I_C = 400A$		1.25	1.50 V
			1.80	V

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$I_C = 60\text{A}, V_{CE} = 10\text{V}$ , Note 1	85	140	S
$C_{ies}$	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		31	nF
$C_{oes}$			1560	pF
$C_{res}$			68	pF
$Q_g$	$I_C = 100\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$		900	nC
$Q_{ge}$			140	nC
$Q_{gc}$			300	nC
$t_{d(on)}$	<b>Inductive Load, <math>T_J = 25^\circ\text{C}</math></b> $I_C = 100\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 480\text{V}, R_G = 1\Omega$		50	ns
$t_{ri}$			50	ns
$E_{on}$			2.95	mJ
$t_{d(off)}$			220	ns
$t_{fi}$			125	200 ns
$E_{off}$			2.30	4.40 mJ
$t_{d(on)}$	<b>Inductive Load, <math>T_J = 125^\circ\text{C}</math></b> $I_C = 100\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 480\text{V}, R_G = 1\Omega$		50	ns
$t_{ri}$			50	ns
$E_{on}$			4.40	mJ
$t_{d(off)}$			295	ns
$t_{fi}$			225	ns
$E_{off}$			4.25	mJ
$R_{thJC}$		0.05	0.125 °C/W	
$R_{thCS}$				

### SOT-227B miniBLOC (IXGN)

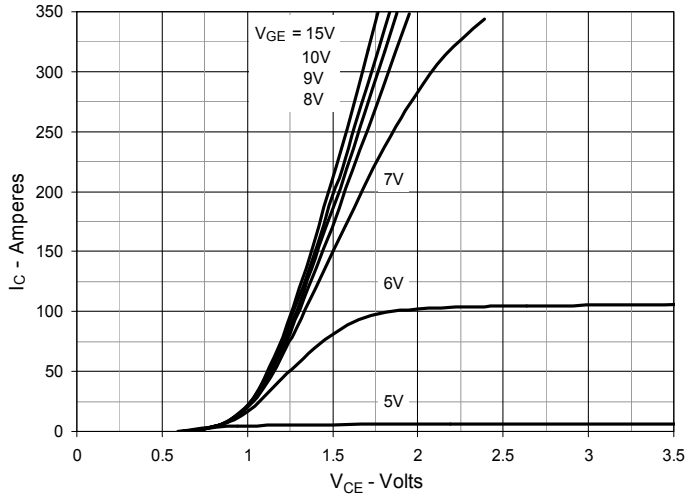
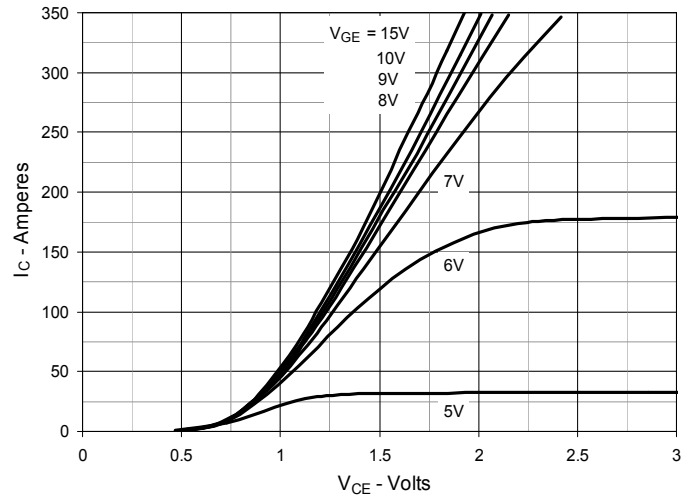
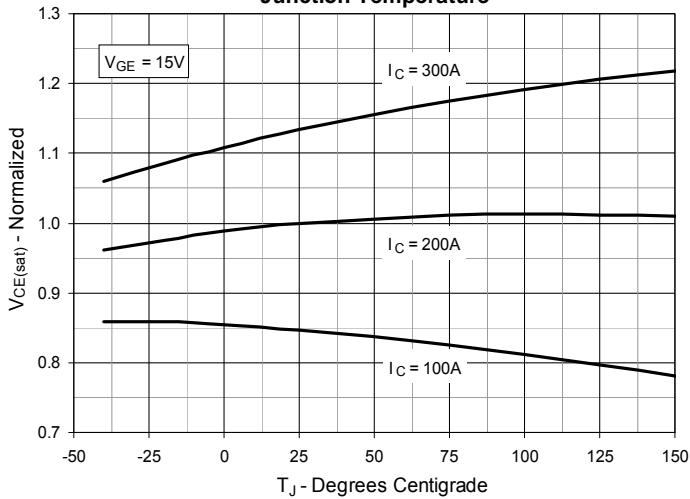
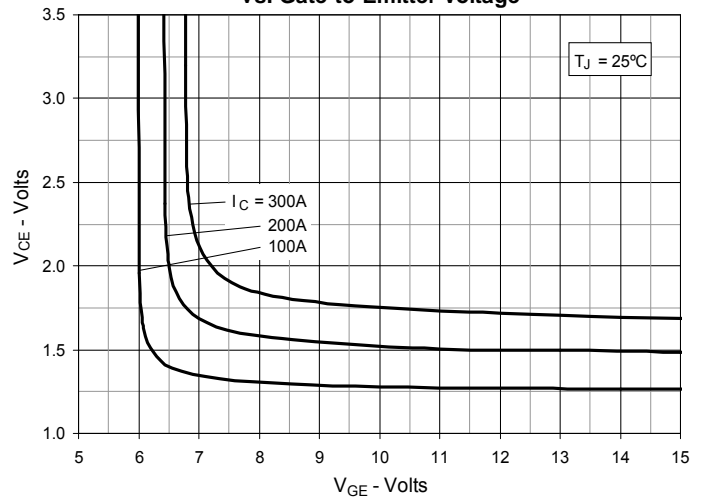
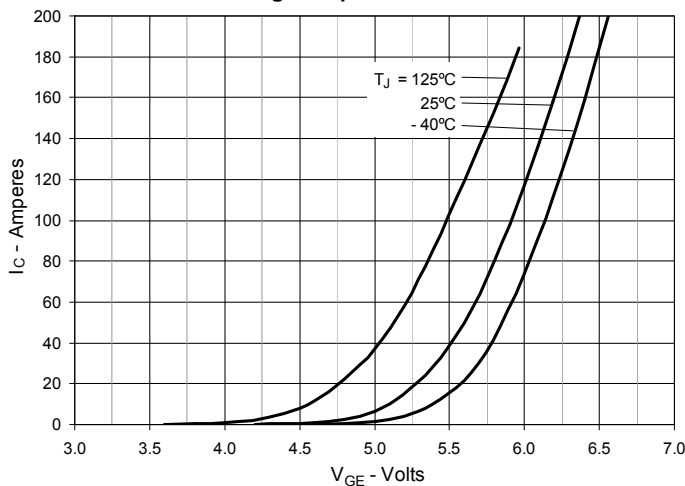
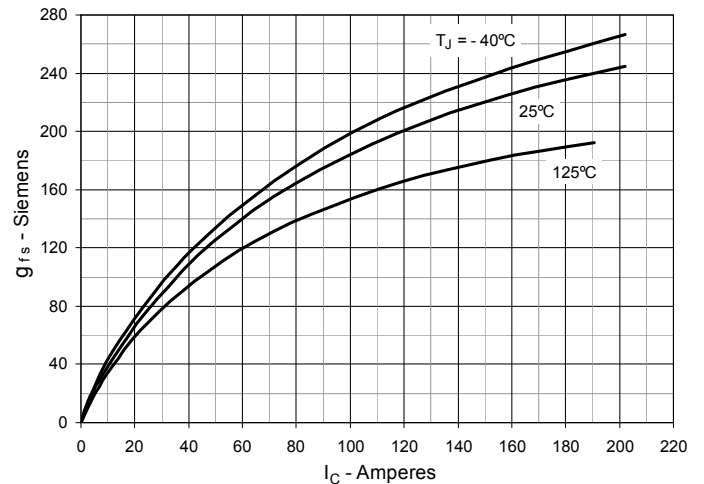


SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.240	1.255	31.50	31.88
B	.307	.323	7.80	8.20
C	.161	.169	4.09	4.29
D	.161	.169	4.09	4.29
E	.161	.169	4.09	4.29
F	.587	.595	14.91	15.11
G	1.186	1.193	30.12	30.30
H	1.496	1.505	38.00	38.23
J	.460	.481	11.68	12.22
K	.351	.378	8.92	9.60
L	.030	.033	0.76	0.84
M	.496	.506	12.60	12.85
N	.990	1.001	25.15	25.42
O	.078	.084	1.98	2.13
P	.195	.235	4.95	5.97
Q	1.045	1.059	26.54	26.90
R	.155	.174	3.94	4.42
S	.186	.191	4.72	4.85
T	.968	.987	24.59	25.07
U	-.002	.004	-0.05	0.1

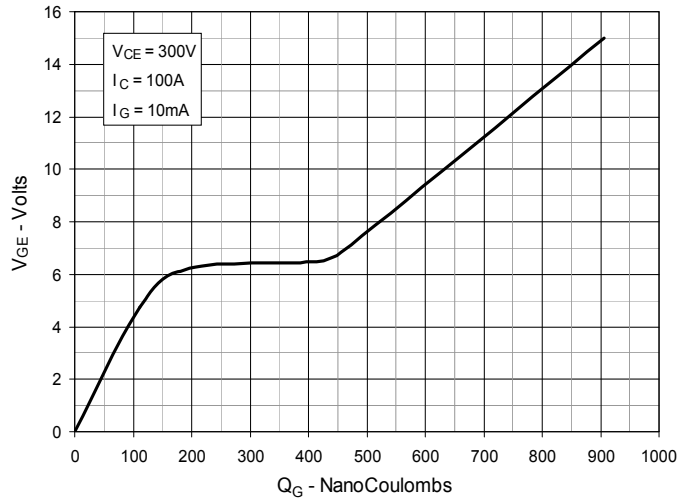
Note 1. Pulse test,  $t \leq 300\mu\text{s}$ ; duty cycle,  $d \leq 2\%$ .

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

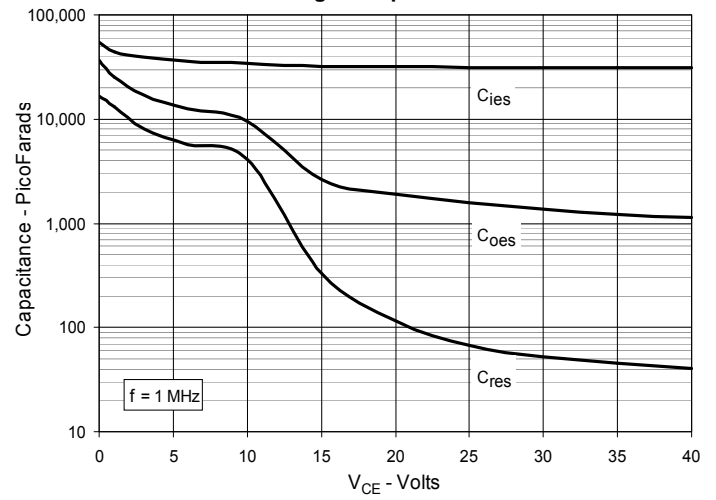
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:	4,835,592	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065 B1	6,683,344	6,727,585	7,005,734 B2	7,157,338B2
	4,860,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692	7,063,975 B2	
	4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	6,771,478 B2	7,071,537	

**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$** 

**Fig. 2. Output Characteristics @  $T_J = 125^\circ\text{C}$** 

**Fig. 3. Dependence of  $V_{CE(sat)}$  on Junction Temperature**

**Fig. 4. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage**

**Fig. 5. Input Admittance**

**Fig. 6. Transconductance**


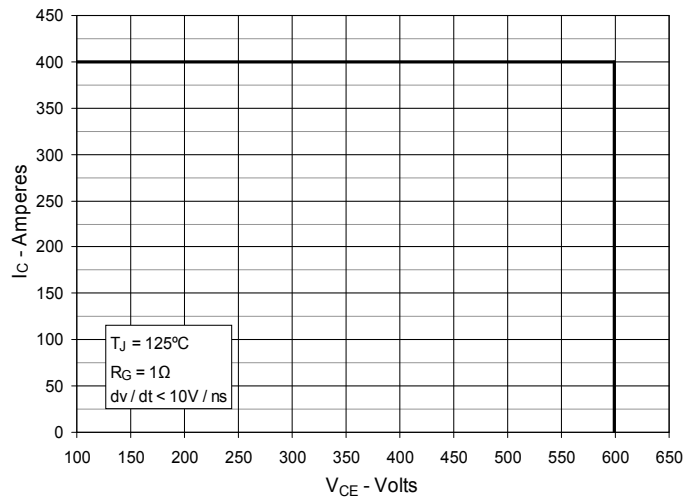
**Fig. 7. Gate Charge**



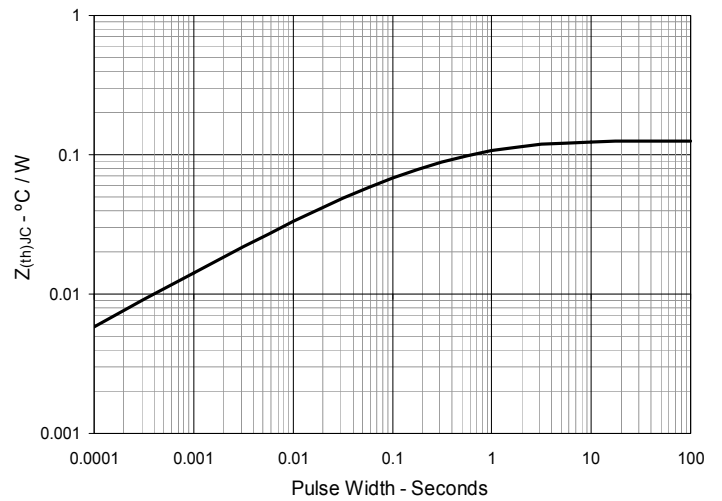
**Fig. 8. Capacitance**

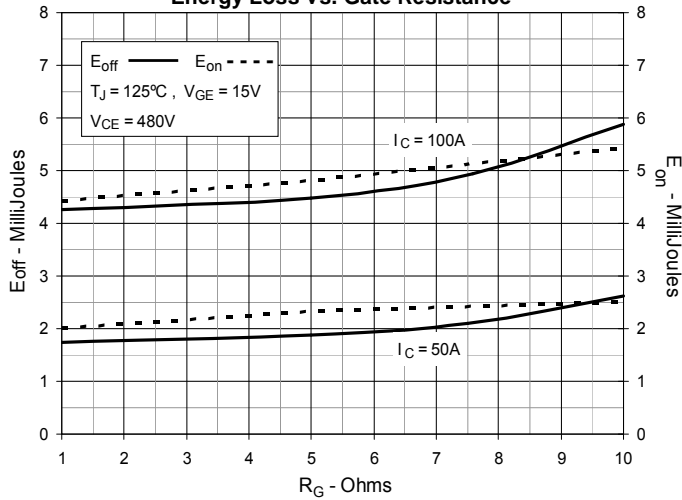
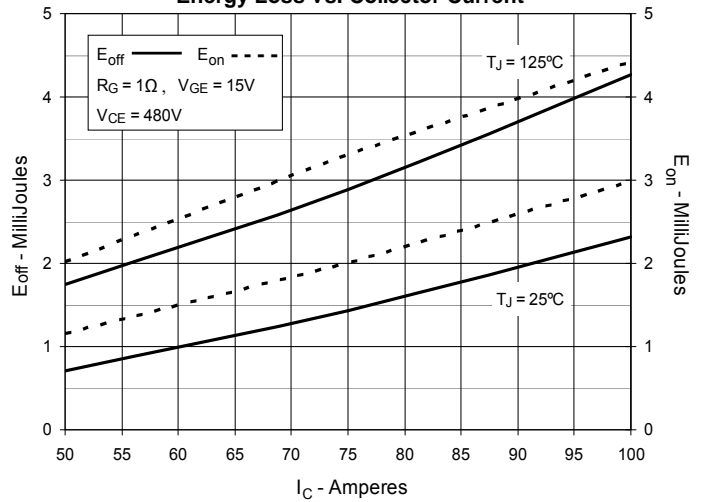
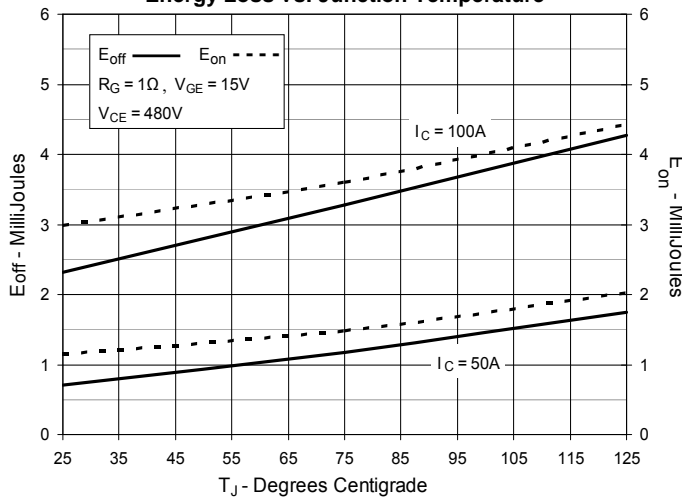
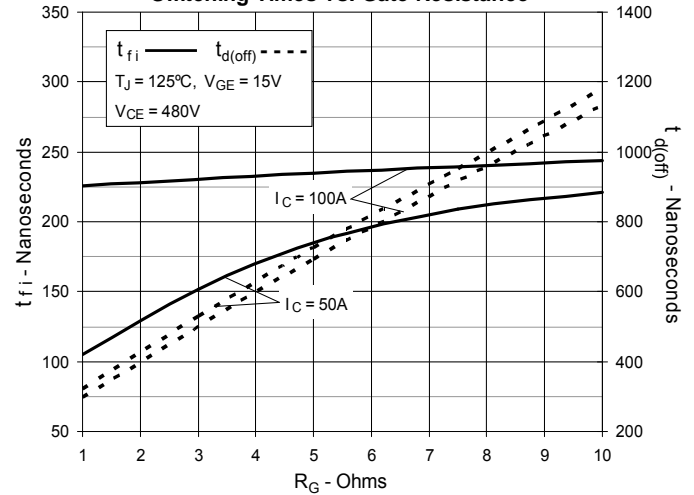
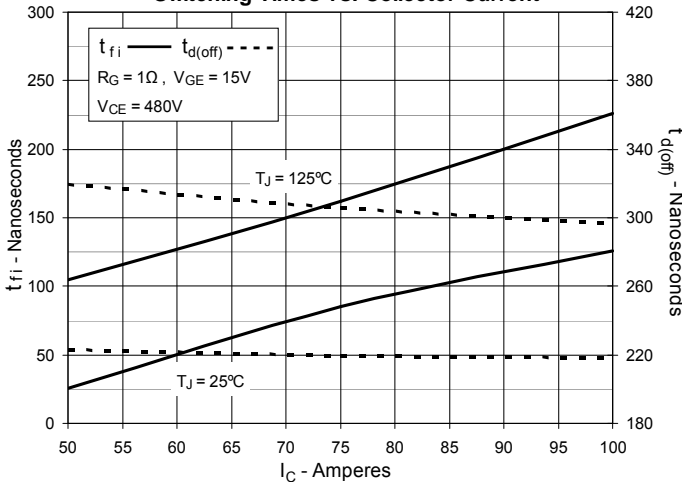
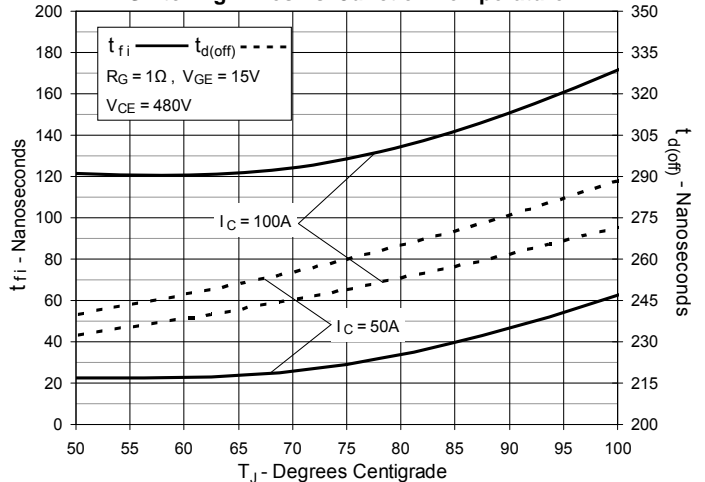


**Fig. 10. Reverse-Bias Safe Operating Area**

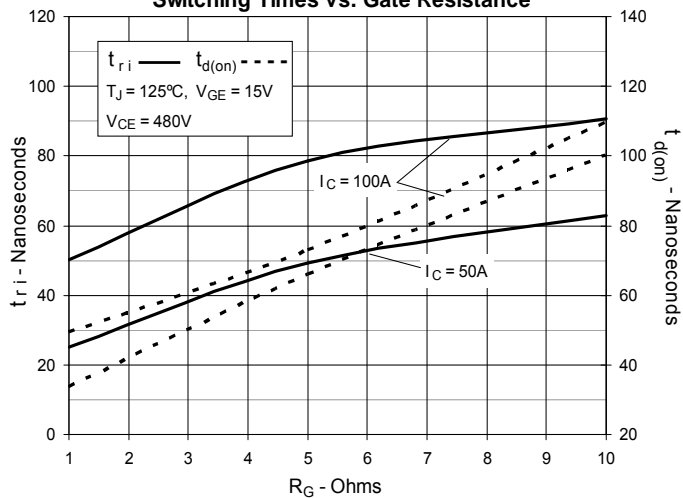


**Fig. 11. Maximum Transient Thermal Impedance**

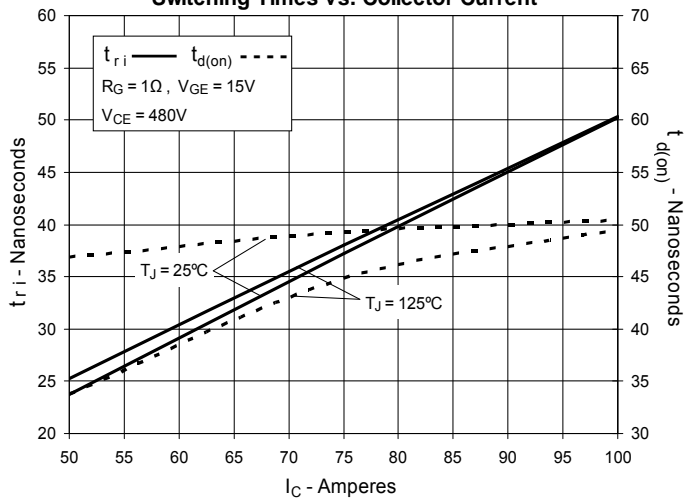


**Fig. 12. Inductive Switching  
Energy Loss vs. Gate Resistance**

**Fig. 13. Inductive Switching  
Energy Loss vs. Collector Current**

**Fig. 14. Inductive Switching  
Energy Loss vs. Junction Temperature**

**Fig. 15. Inductive Turn-off  
Switching Times vs. Gate Resistance**

**Fig. 16. Inductive Turn-off  
Switching Times vs. Collector Current**

**Fig. 17. Inductive Turn-off  
Switching Times vs. Junction Temperature**


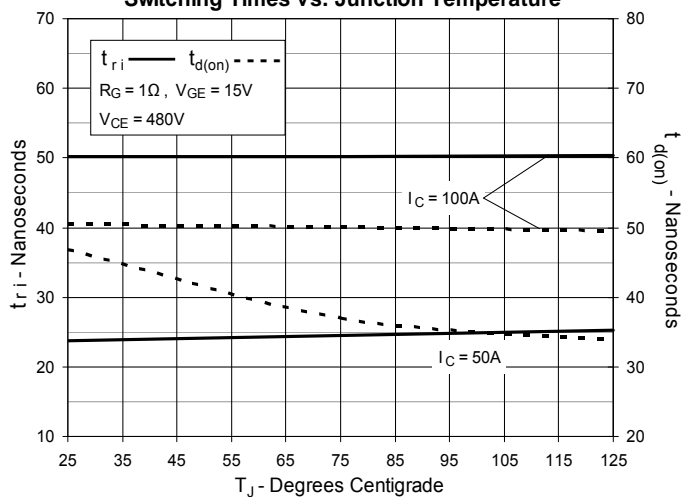
**Fig. 18. Inductive Turn-on**  
Switching Times vs. Gate Resistance



**Fig. 19. Inductive Turn-on**  
Switching Times vs. Collector Current



**Fig. 20. Inductive Turn-on**  
Switching Times vs. Junction Temperature





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