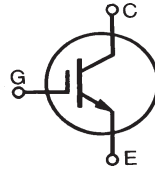


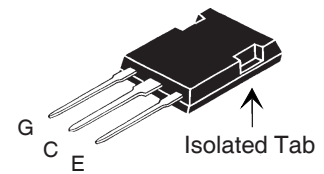
Ultra-low  $V_{sat}$  PT IGBTs for up to 5kHz switching



$V_{CES} = 600V$   
 $I_{C110} = 52A$   
 $V_{CE(sat)} \leq 1.35V$   
 $t_{fi(typ)} = 250ns$

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
$I_{C110}$	$T_C = 110^\circ C$	52	A
$I_{CM}$	$T_C = 25^\circ C$ , 1ms	400	A
<b>SSOA (RBSOA)</b>	$V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 3\Omega$ Clamped inductive load @ $V_{CE} \leq 600V$	$I_{CM} = 150$	A
$P_C$	$T_C = 25^\circ C$	200	W
$T_J$		-55 ... +150	$^\circ C$
$T_{JM}$		150	$^\circ C$
$T_{stg}$		-55 ... +150	$^\circ C$
$F_C$	Mounting Force	20..120/4.5..27	N/lb.
$T_L$	1.6mm (0.063 in.) from case for 10s	300	$^\circ C$
$T_{SOLD}$	Plastic body for 10s	260	$^\circ C$
$V_{ISOL}$	50/60 Hz, RMS	t = 1min 2500	V~
	$I_{ISOL} \leq 1mA$	t = 1s 3000	V~
<b>Weight</b>		5	g

ISOPLUS247™ (IXGR)  
E153432



G = Gate                      E = Emitter  
C = Collector

### Features

- Silocon chip on Direct-Copper Bond (DCB) substrate
- Isolated mounting surface
- 2500V electrical isolation

### Advantages

- High power density
- Low gate drive requirement

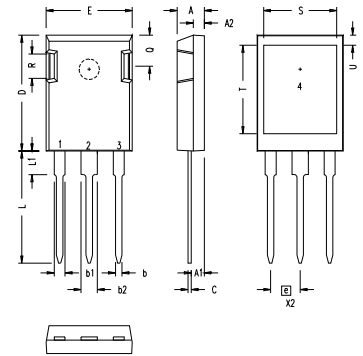
### Applications

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

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$BV_{CES}$	$I_C = 250\mu A$ , $V_{GE} = 0V$	600		V
$V_{GE(th)}$	$I_C = 250\mu A$ , $V_{CE} = V_{GE}$	3.0		V
$I_{CES}$	$V_{CE} = V_{CES}$ $V_{GE} = 0V$ $T_J = 125^\circ C$			75 $\mu A$
				750 $\mu A$
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 20V$			$\pm 100$ nA
$V_{CE(sat)}$	$I_C = 60A$ , $V_{GE} = 15V$ , Note			1.35 V

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$I_C = 60\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$	48	75	S
$C_{ies}$	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		6600	pF
$C_{oes}$			360	pF
$C_{res}$			80	pF
$Q_g$	$I_C = 60\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$		230	nC
$Q_{ge}$			40	nC
$Q_{gc}$			80	nC
$t_{d(on)}$	<b>Inductive Load</b> $I_C = 50\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 480\text{V}, R_G = 3\Omega$		31	ns
$t_{ri}$			34	ns
$E_{on}$			1.4	mJ
$t_{d(off)}$			320	ns
$t_{fi}$			250	ns
$E_{off}$		3.5	mJ	
$t_{d(on)}$	<b>Inductive Load, <math>T_J = 125^\circ\text{C}</math></b> $I_C = 50\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 480\text{V}, R_G = 3\Omega$		29	ns
$t_{ri}$			32	ns
$E_{on}$			2.6	mJ
$t_{d(off)}$			510	nS
$t_{fi}$			375	ns
$E_{off}$		6.5	mJ	
$R_{thJC}$			0.62	$^\circ\text{C/W}$
$R_{thCS}$		0.15		$^\circ\text{C/W}$

### ISOPLUS247 (IXGR) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b1	.075	.084	1.91	2.13
b2	.115	.123	2.92	3.12
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83
S	.520	.540	13.21	13.72
T	.620	.640	15.75	16.26
U	.065	.080	1.65	2.03

- 1 - GATE
- 2 - DRAIN (COLLECTOR)
- 3 - SOURCE (EMITTER)
- 4 - NO CONNECTION

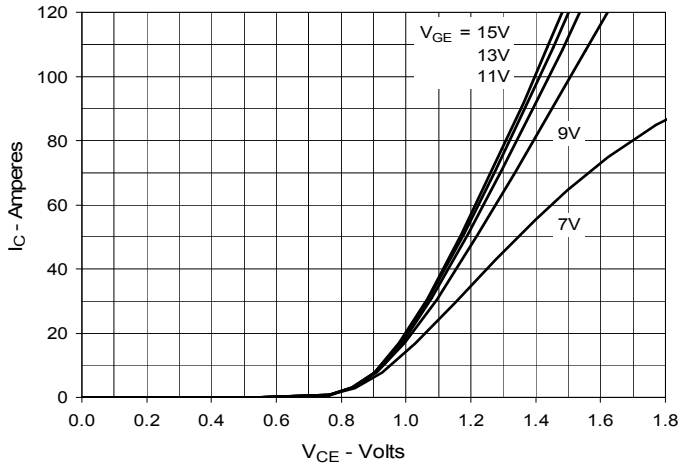
NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO-247AD except screw hole.

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

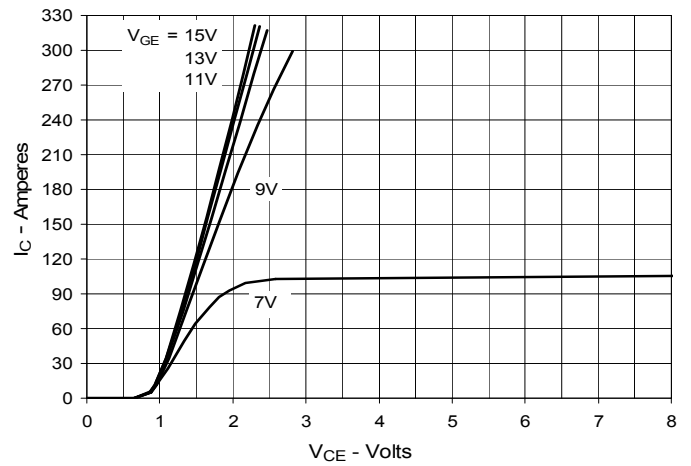
IXYS reserves the right to change limits, test conditions, and dimensions.

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
	4,850,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692	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	

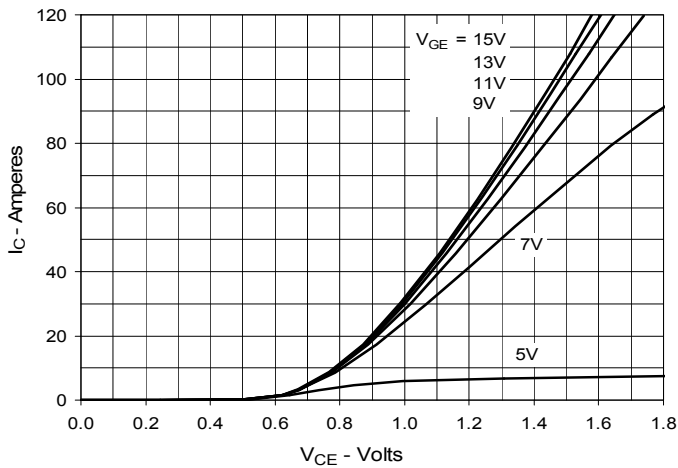
**Fig. 1. Output Characteristics @ 25°C**



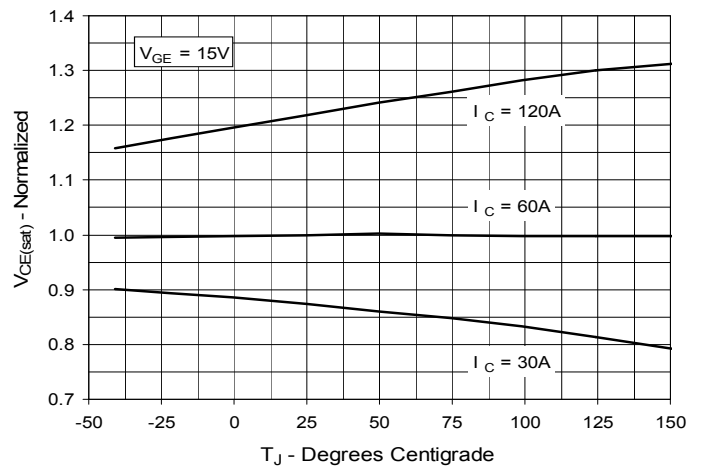
**Fig. 2. Extended Output Characteristics @ 25°C**



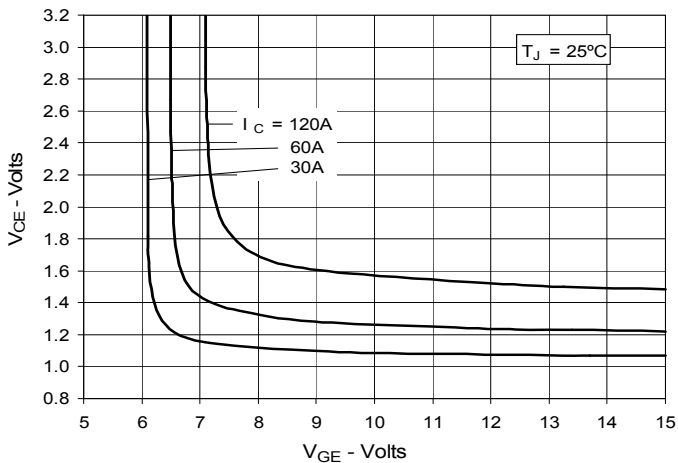
**Fig. 3. Output Characteristics @ 125°C**



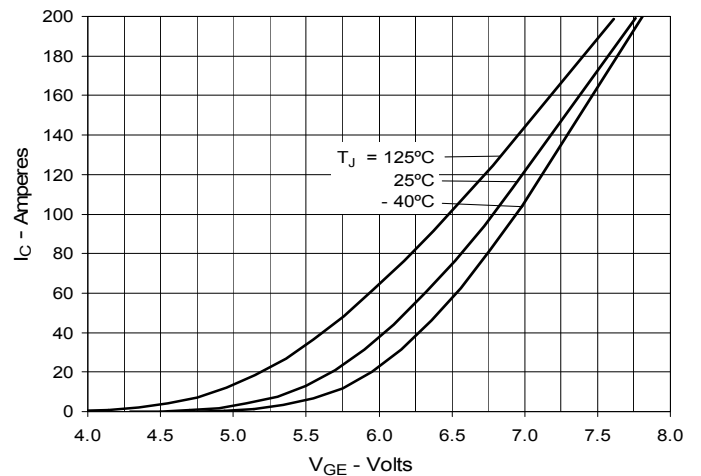
**Fig. 4. Dependence of  $V_{CE(sat)}$  on Junction Temperature**



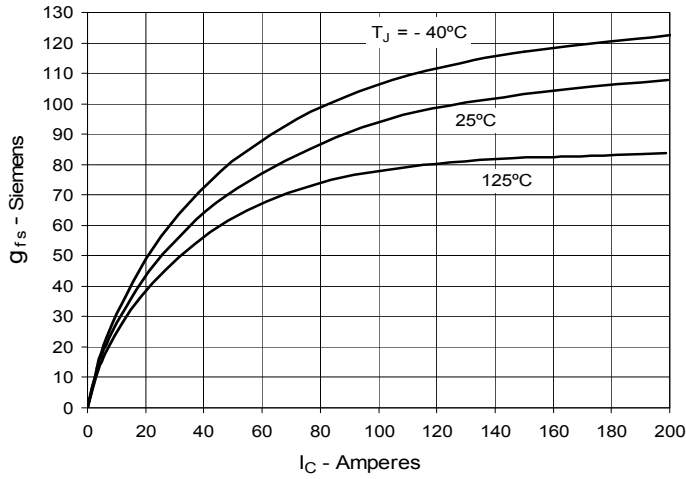
**Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage**



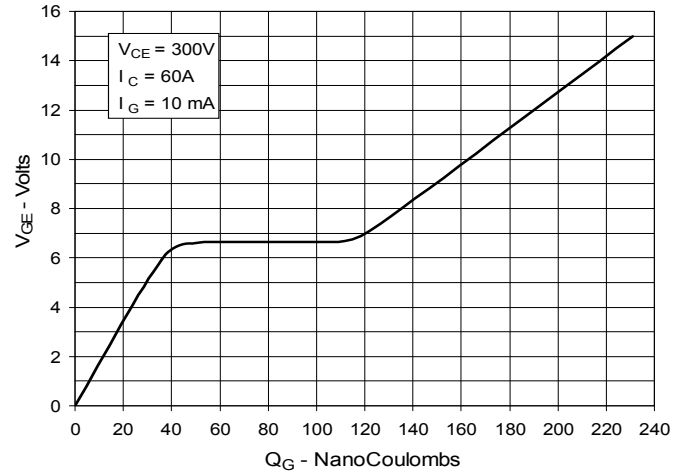
**Fig. 6. Input Admittance**



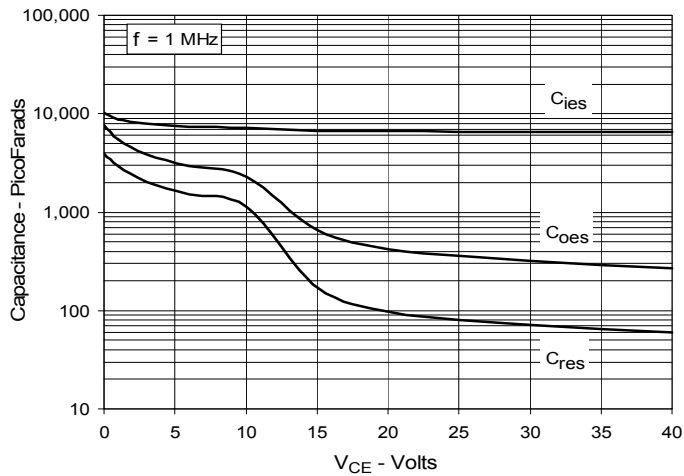
**Fig. 7. Transconductance**



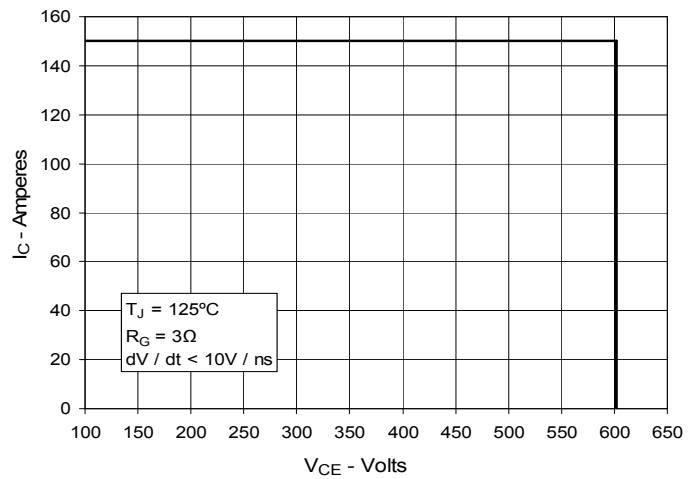
**Fig. 8. Gate Charge**



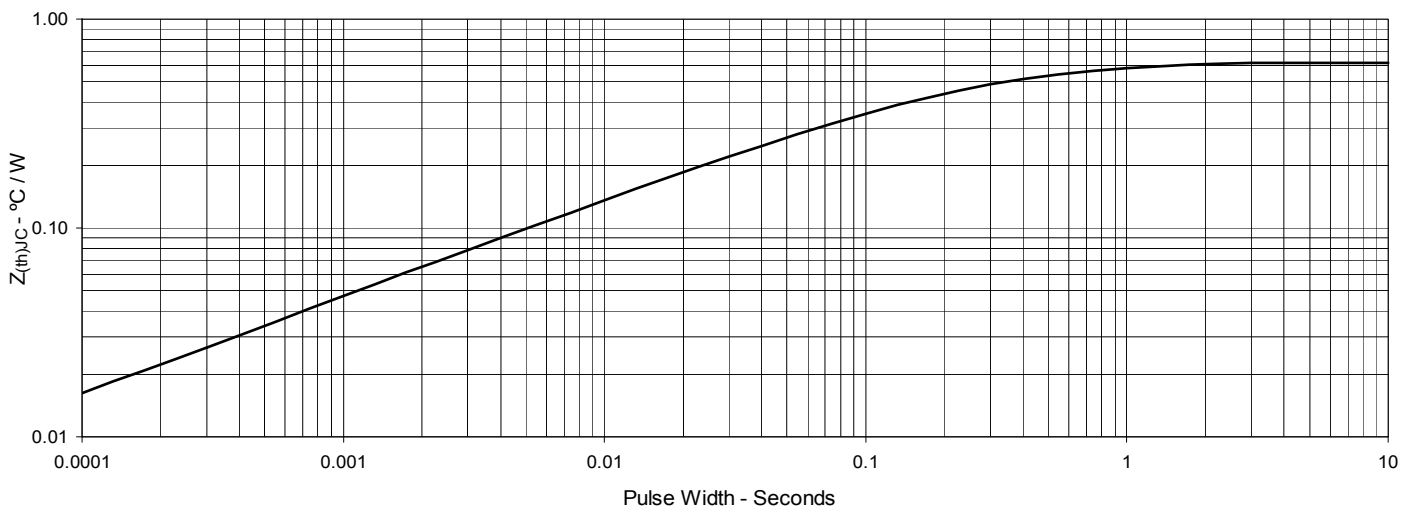
**Fig. 9. Capacitance**



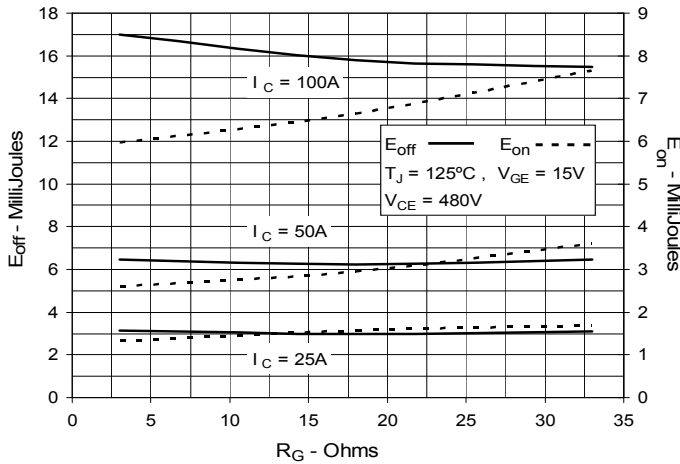
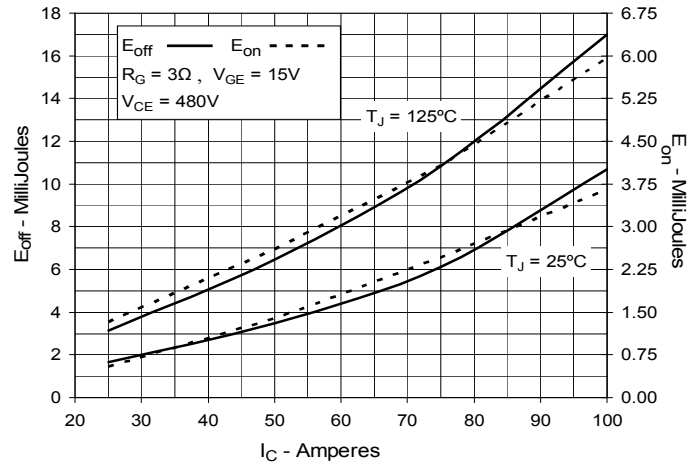
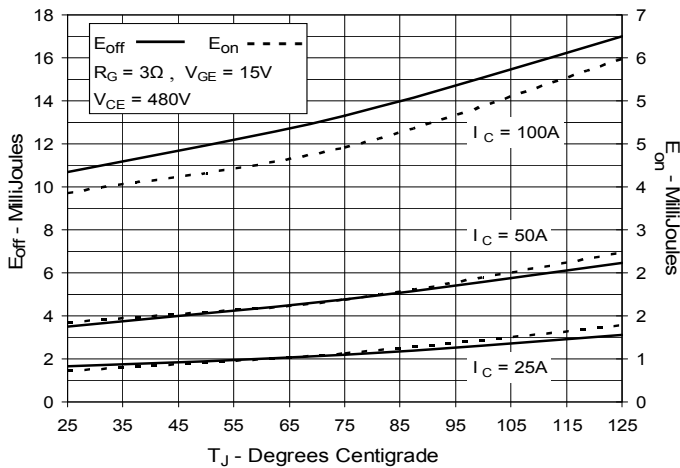
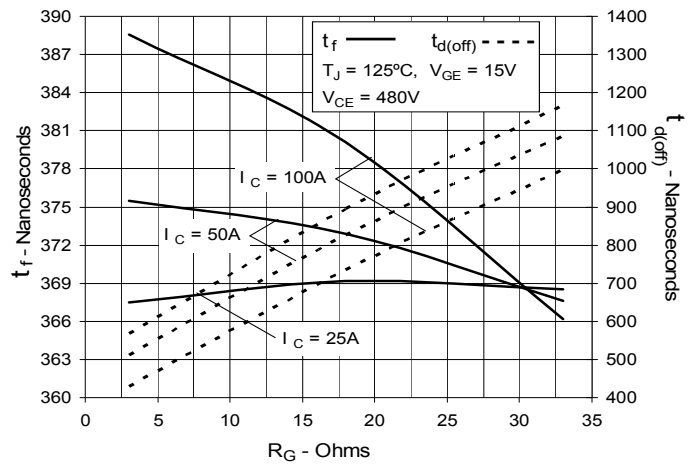
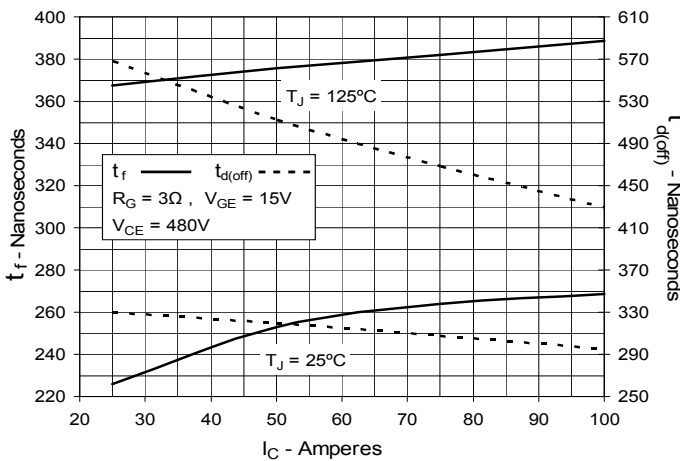
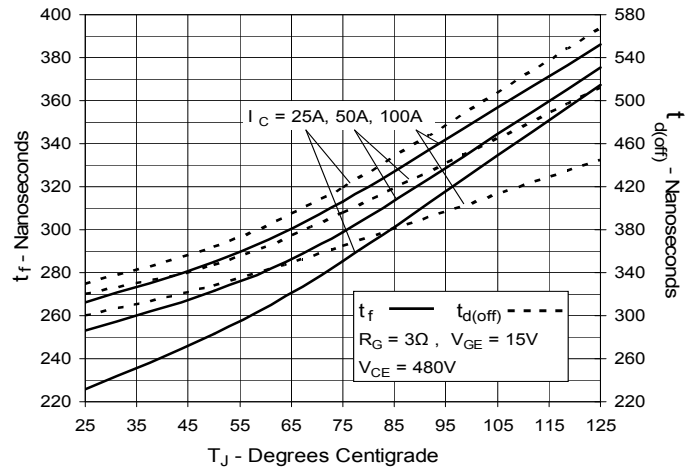
**Fig. 10. Reverse-Bias Safe Operating Area**

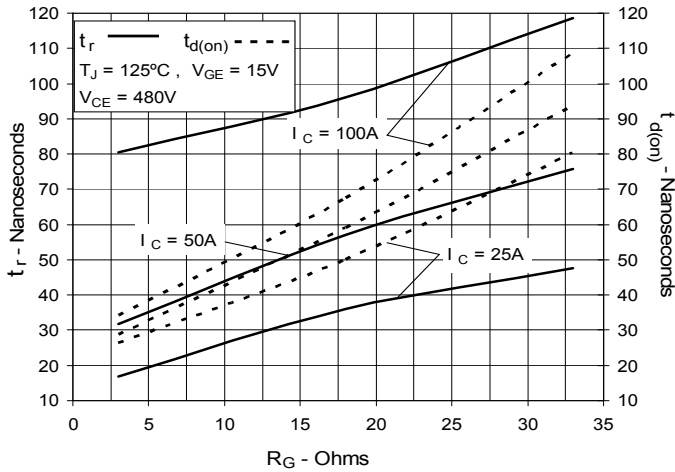
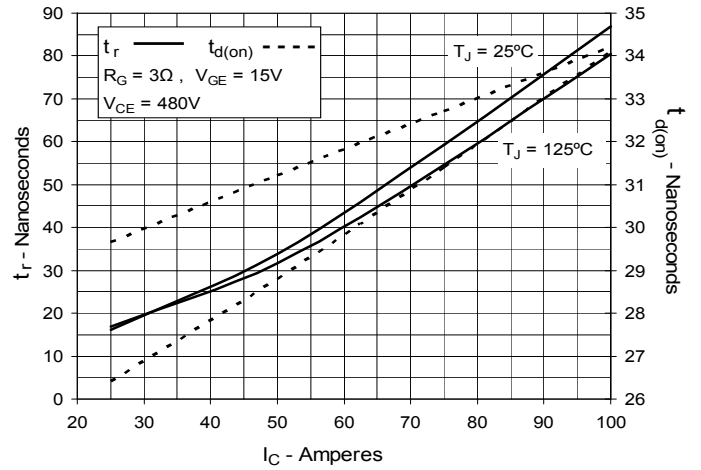


**Fig. 11. Maximum Transient Thermal Impedance**



IXYS reserves the right to change limits, test conditions, and dimensions.

**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**
