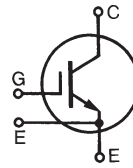


Ultra-Low-V<sub>sat</sub> PT IGBT for  
up to 10kHz Switching



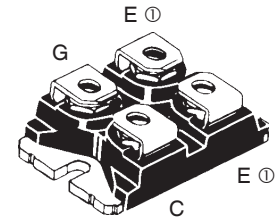
$$V_{CES} = 300V$$

$$I_{C25} = 400A$$

$$V_{CE(sat)} \leq 1.15V$$

Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ C$ to $150^\circ C$	300	V
$V_{CGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GE} = 1M\Omega$	300	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ C$ (Chip Capability)	400	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	1200	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	@ $0.8 \cdot V_{CES}$	V
$P_C$	$T_C = 25^\circ C$	735	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

⓪ Either Emitter Terminal Can Be Used as Main or Kelvin Emitter

#### Features

- Optimized for Low Conduction Losses
- High Current Capability
- International Standard Package
- miniBLOC, with Aluminium Nitride Isolation

#### Advantages

- High Power Density
- Low Gate Drive Requirement

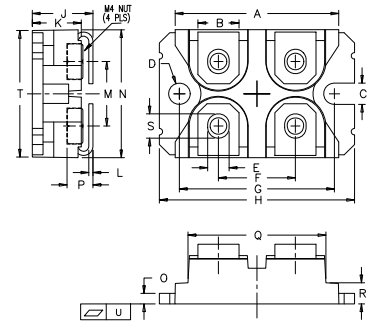
#### Applications

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

Symbol	Test Conditions ( $T_J = 25^\circ C$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{CES}$	$I_C = 1mA$ , $V_{GE} = 0V$	300		V
$V_{GE(th)}$	$I_C = 4mA$ , $V_{CE} = V_{GE}$	3.0		5.0 V
$I_{CES}$	$V_{CE} = V_{CES}$ , $V_{GE} = 0V$ $T_J = 125^\circ C$			50 $\mu A$
				2 mA
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 20V$			$\pm 400$ nA
$V_{CE(sat)}$	$I_C = 100A$ , $V_{GE} = 15V$ , Note 1 $I_C = 400A$			1.15 V
			1.70	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	100	170	S
$C_{ies}$	$V_{CE} = 25\text{V}$ , $V_{GE} = 0\text{V}$ , $f = 1\text{MHz}$		19	nF
$C_{oes}$			1350	pF
$C_{res}$			190	pF
$Q_{g(on)}$	$I_C = 100\text{V}$ , $V_{GE} = 15\text{V}$ , $V_{CE} = 0.5 \cdot V_{CES}$		560	nC
$Q_{ge}$			83	C
$Q_{gc}$			185	nC
$t_{d(on)}$	<b>Resistive Load, <math>T_J = 25^\circ\text{C}</math></b>		45	ns
$t_r$		$I_C = 100\text{A}$ , $V_{GE} = 15\text{V}$	45	ns
$t_{d(off)}$	$V_{CE} = 0.8 \cdot V_{CES}$ , $R_G = 1\Omega$		210	ns
$t_f$			107	ns
$t_{d(on)}$	<b>Resistive Load, <math>T_J = 125^\circ\text{C}</math></b>		47	ns
$t_r$		$I_C = 100\text{A}$ , $V_{GE} = 15\text{V}$	53	ns
$t_{d(off)}$	$V_{CE} = 0.8 \cdot V_{CES}$ , $R_G = 1\Omega$		240	ns
$t_f$			315	ns
$R_{thJC}$			0.17	$^\circ\text{C/W}$
$R_{thCK}$		0.05		$^\circ\text{C/W}$

## SOT-227B miniBLOC (IXGN)



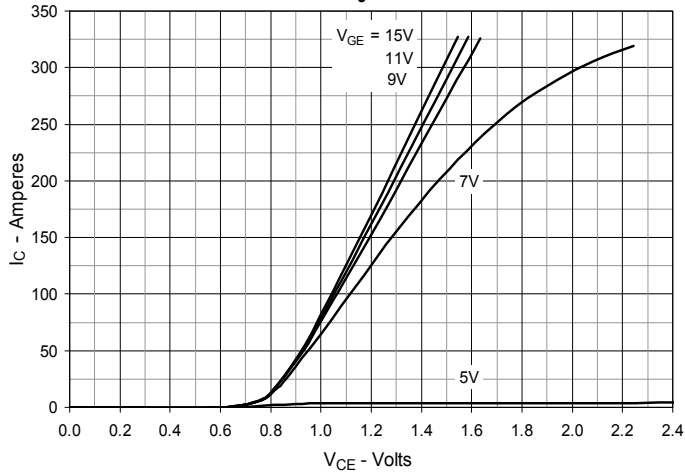
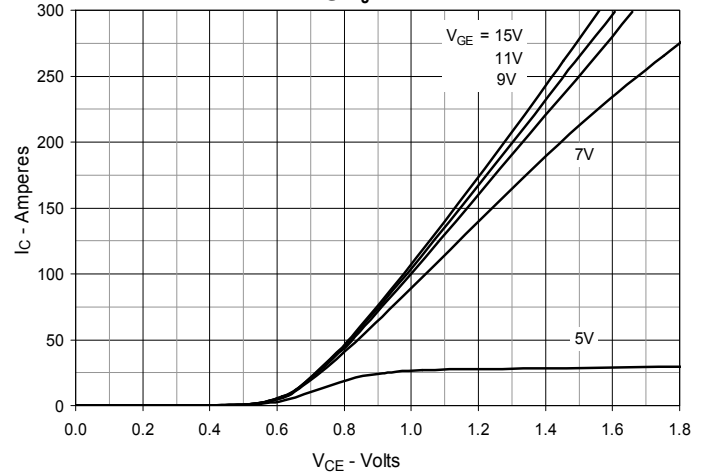
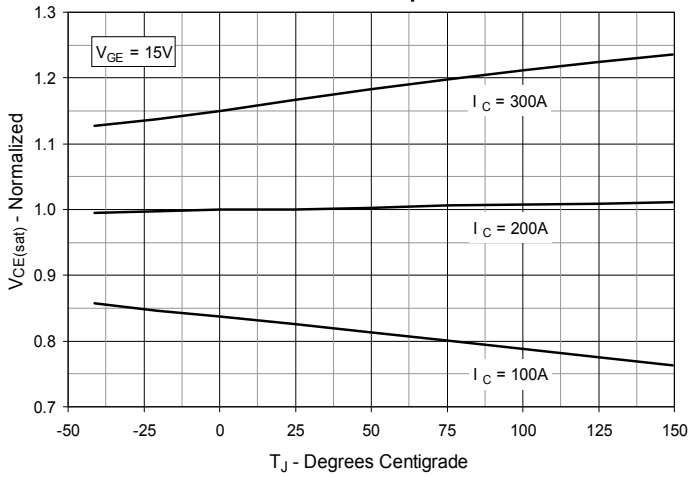
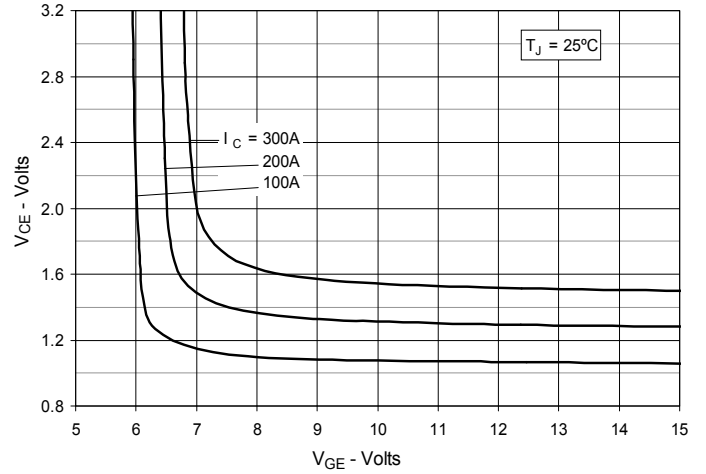
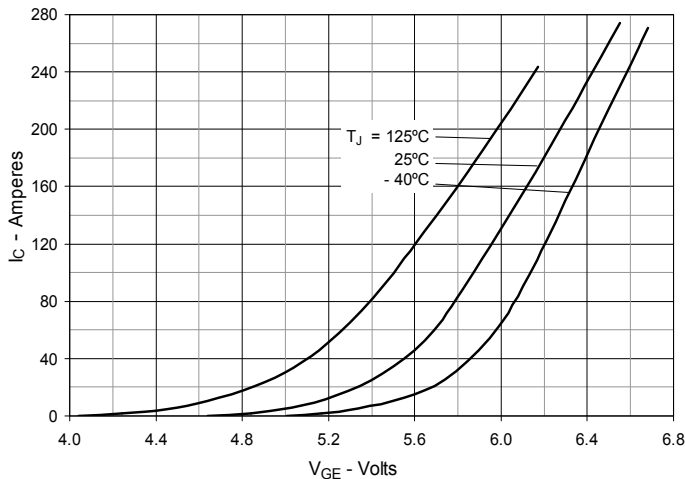
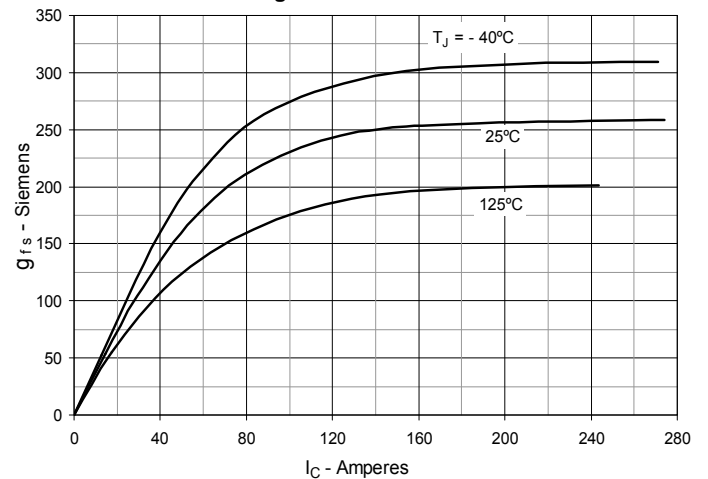
SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.240	1.255	31.50	31.88
B	.307	.323	7.80	8.20
C	.161	.169	4.09	4.29
D	.161	.169	4.09	4.29
E	.161	.169	4.09	4.29
F	.587	.595	14.91	15.11
G	1.186	1.193	30.12	30.30
H	1.496	1.505	38.00	38.23
J	.460	.481	11.68	12.22
K	.351	.378	8.92	9.60
L	.030	.033	0.76	0.84
M	.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,  $d \leq 2\%$ .

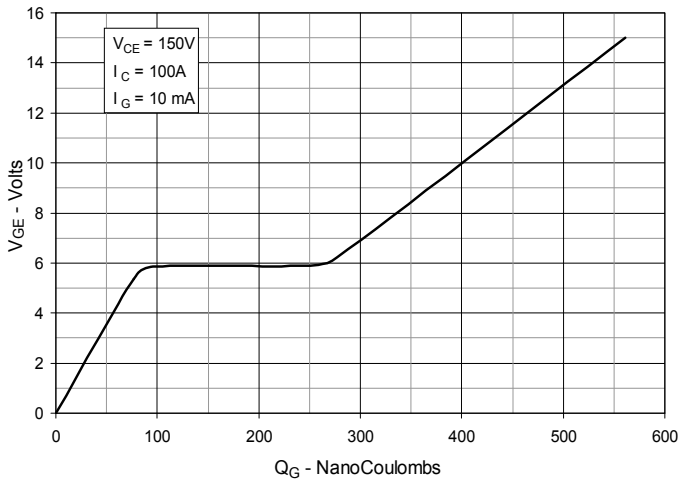
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

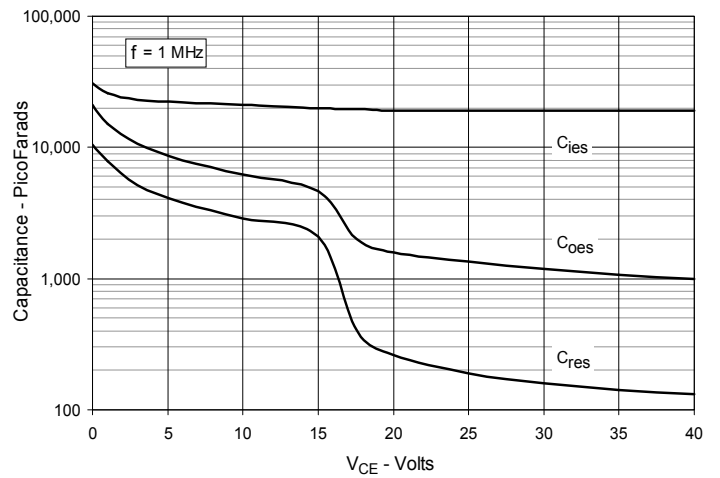
4,835,592	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065 B1	6,683,344	6,727,585	7,005,734 B2	7,157,338B2
4,850,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692	7,063,975 B2	
4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	6,771,478 B2	7,071,537	

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

**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**


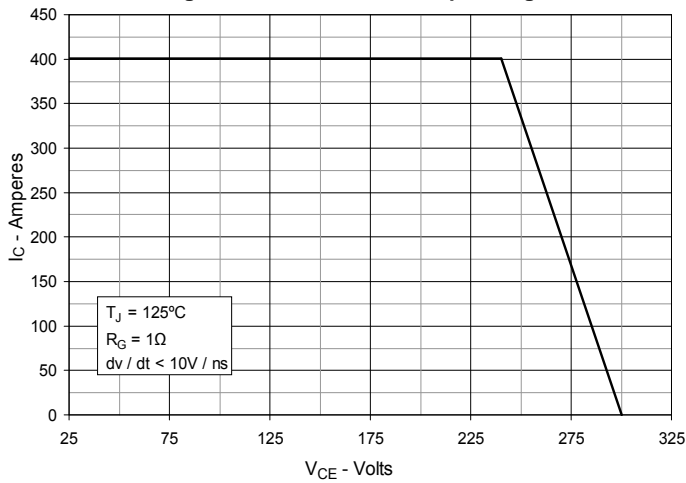
**Fig. 7. Gate Charge**



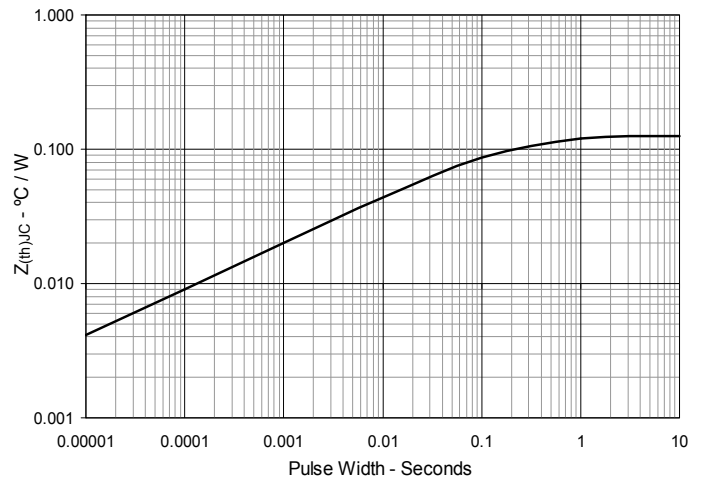
**Fig. 8. Capacitance**

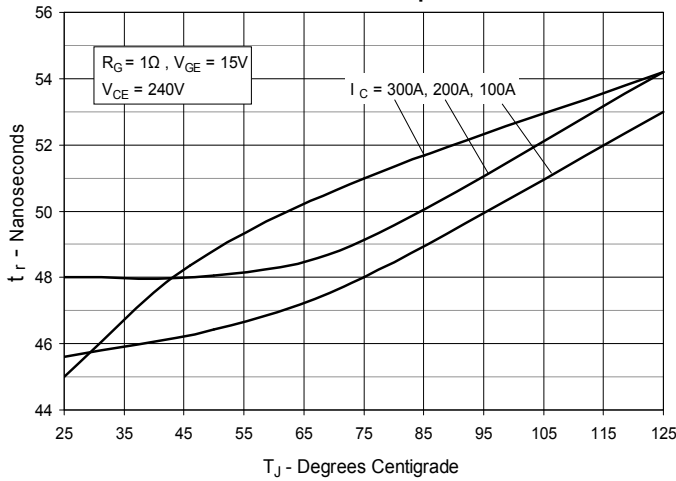
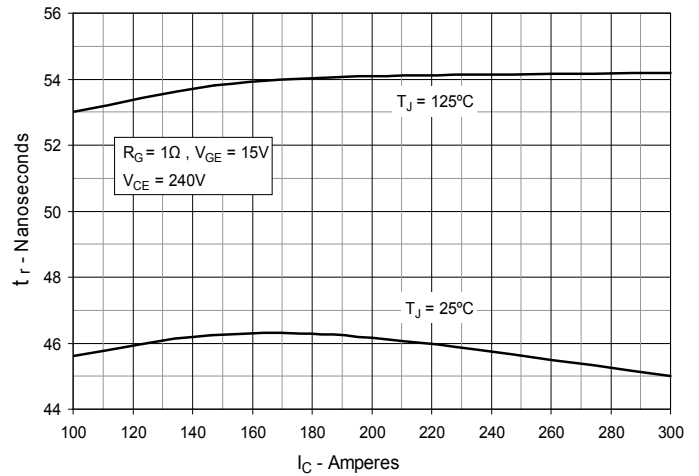
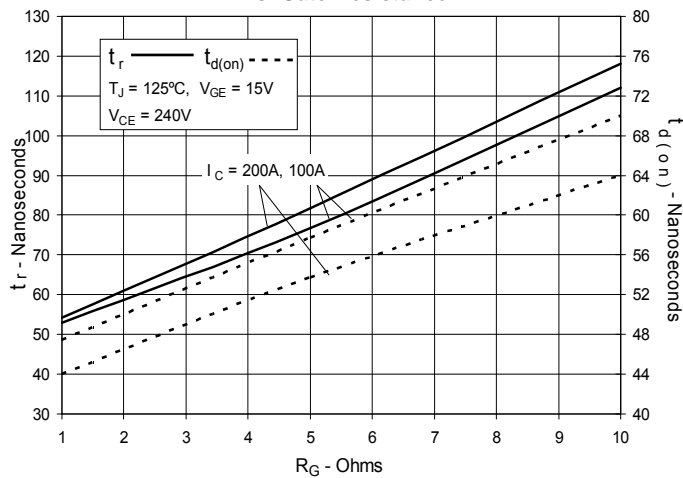
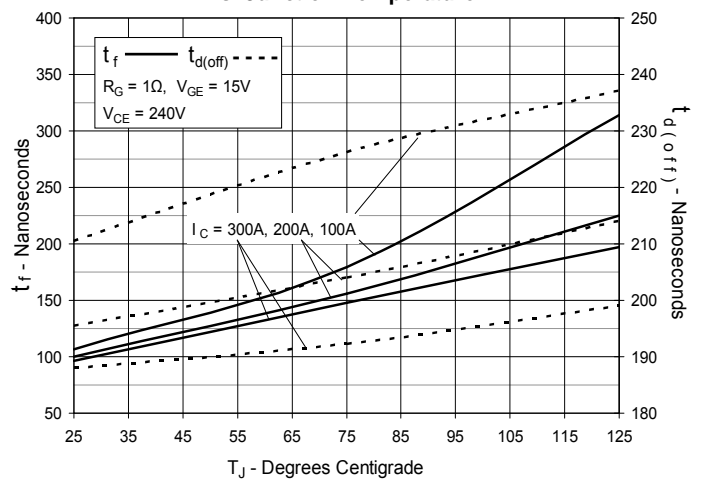
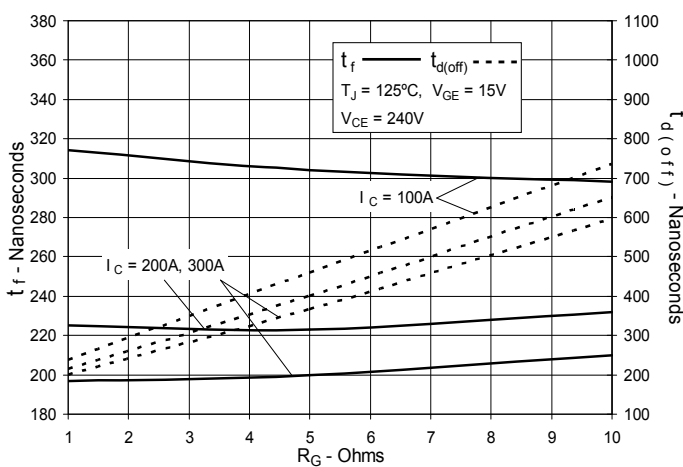


**Fig. 9. Reverse-Bias Safe Operating Area**



**Fig. 10. Maximum Transient Thermal Impedance**



**Fig. 11. Resistive Turn-on Rise Time vs. Junction Temperature**

**Fig. 12. Resistive Turn-on Rise Time vs. Collector Current**

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

**Fig. 14. Resistive Turn-off Switching Times vs. Junction Temperature**

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

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