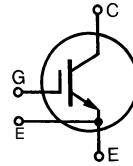


# HiPerFAST™ IGBT

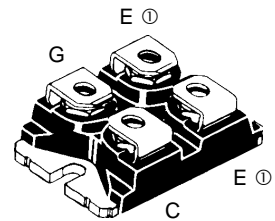
**IXGN 200N60**  
**IXGN 200N60A**



$V_{CES}$	$I_{C25}$	$V_{CE(sat)}$
<b>600 V</b>	<b>200 A</b>	<b>2.5 V</b>
<b>600 V</b>	<b>200 A</b>	<b>2.7 V</b>

Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	600	V
$V_{CGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GE} = 1\text{ M}\Omega$	600	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ\text{C}$	200	A
$I_{C90}$	$T_C = 90^\circ\text{C}$	100	A
$I_{CM}$	$T_C = 25^\circ\text{C}$ , 1 ms	300	A
<b>SSOA</b> <b>(RBSOA)</b>	$V_{GE} = 15\text{ V}$ , $T_{VJ} = 125^\circ\text{C}$ , $R_G = 22\ \Omega$ Clamped inductive load, $L = 30\ \mu\text{H}$	$I_{CM} = 100$ @ $0.8\ V_{CES}$	A
$P_c$	$T_C = 25^\circ\text{C}$	600	W
$T_J$		-55 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		-55 ... +150	$^\circ\text{C}$
$V_{ISOL}$	50/60 Hz	t = 1 min	2500 V~
	$I_{ISOL} \leq 1\text{ mA}$	t = 1 s	3000 V~
$M_d$	Mounting torque	1.5/13	Nm/lb.in.
	Terminal connection torque (M4)	1.5/13	Nm/lb.in.
<b>Weight</b>		30	g

## SOT-227B, miniBLOC



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

## Features

- International standard package miniBLOC (ISOTOP compatible)
- Aluminium nitride isolation
  - high power dissipation
  - Isolation voltage 3000 V~
- Very high current, fast switching IGBT
- Low  $V_{CE(sat)}$ 
  - for minimum on-state conduction losses
- MOS Gate turn-on
  - drive simplicity
- Low collector-to-case capacitance (< 50 pF)
- Low package inductance (< 5 nH)
  - easy to drive and to protect

## Applications

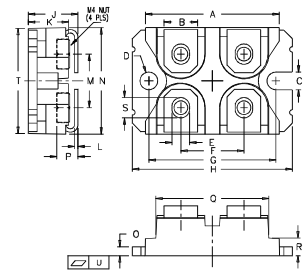
- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switch-mode and resonant-mode power supplies

## Advantages

- Easy to mount with 2 screws
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$BV_{CES}$	$I_C = 250\ \mu\text{A}$ , $V_{GE} = 0\text{ V}$	600		V
$V_{GE(th)}$	$I_C = 10\text{ mA}$ , $V_{CE} = V_{GE}$	2.5		6 V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0\text{ V}$	$T_J = 25^\circ\text{C}$		200 $\mu\text{A}$
		$T_J = 125^\circ\text{C}$		2 mA
$I_{GES}$	$V_{CE} = 0\text{ V}$ , $V_{GE} = \pm 20\text{ V}$			$\pm 400\text{ nA}$
$V_{CE(sat)}$	$I_C = I_{C90}$ , $V_{GE} = 15\text{ V}$	200N60		2.5 V
		200N60A		2.7 V

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$g_{fs}$	$I_C = 60\text{ A}; V_{CE} = 10\text{ V}$ , Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $\leq 2\%$	40	57	S
$C_{ies}$	$V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$		9000	pF
$C_{oes}$			600	pF
$C_{res}$			305	pF
$Q_g$	$I_C = I_{C90}, V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$		465	nC
$Q_{ge}$			52	nC
$Q_{gc}$			228	nC
$t_{d(on)}$	<b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b> $I_C = I_{C90}, V_{GE} = 15\text{ V}, L = 30\ \mu\text{H}$ , $V_{CE} = 0.8 V_{CES}, R_G = R_{off} = 2.4\ \Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$ , higher $T_J$ or increased $R_G$	200N60 200N60A 200N60 200N60A 200N60 200N60A	100	ns
$t_{ri}$			100	ns
$E_{on}$			2.4	mJ
$t_{d(off)}$			800	1100 ns
$t_{fi}$			700	950 ns
$t_{fi}$			350	500 ns
$E_{off}$			200	280 ns
$E_{off}$			14.4	mJ
$E_{off}$	9.6	mJ		
$t_{d(on)}$	<b>Inductive load, <math>T_J = 125^\circ\text{C}</math> (IXGN 200N60A)</b> $I_C = I_{C90}, V_{GE} = 15\text{ V}, L = 30\ \mu\text{H}$ $V_{CE} = 0.8 V_{CES}, R_G = R_{off} = 2.4\ \Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$ , higher $T_J$ or increased $R_G$	200N60A	100	ns
$t_{ri}$			200	ns
$E_{on}$			4.8	mJ
$t_{d(off)}$			780	ns
$t_{fi}$			250	ns
$t_{fi}$			14.4	mJ
$E_{off}$			14.4	mJ
$R_{thJC}$			0.21	K/W
$R_{thCK}$		0.05		K/W

**miniBLOC, SOT-227 B**


M4 screws (4x) supplied

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	38.00	38.23	1.496	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.76	0.84	0.030	0.033
M	12.60	12.85	0.496	0.506
N	25.15	25.42	0.990	1.001
O	1.98	2.13	0.078	0.084
P	4.95	5.97	0.195	0.235
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.174
S	4.72	4.85	0.186	0.191
T	24.59	25.07	0.968	0.987
U	-0.05	0.1	-0.002	0.004

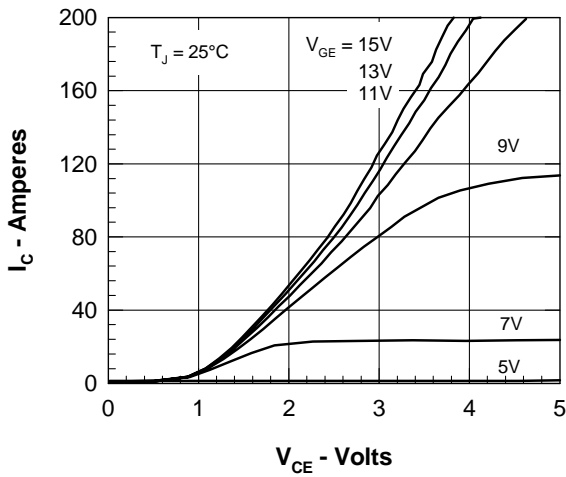


Fig. 1. Saturation Voltage Characteristics

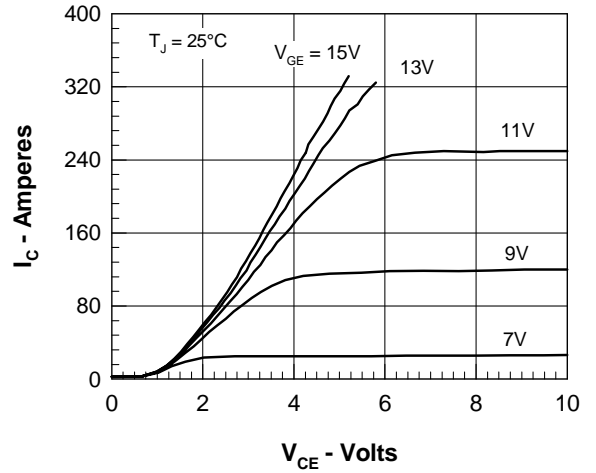


Fig. 2. Extended Output Characteristics

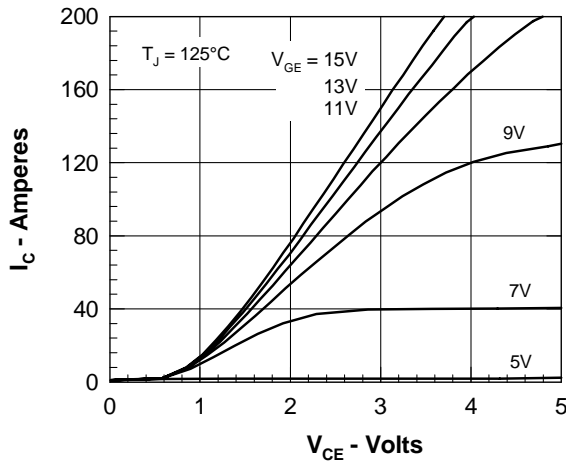


Fig. 3. Saturation Voltage Characteristics

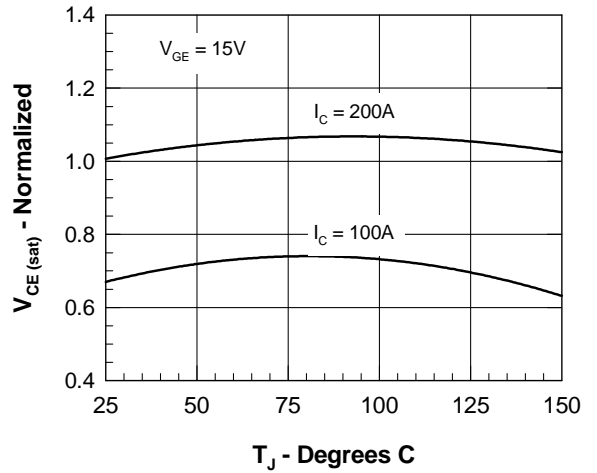


Fig. 4. Temperature Dependence of  $V_{CE(sat)}$

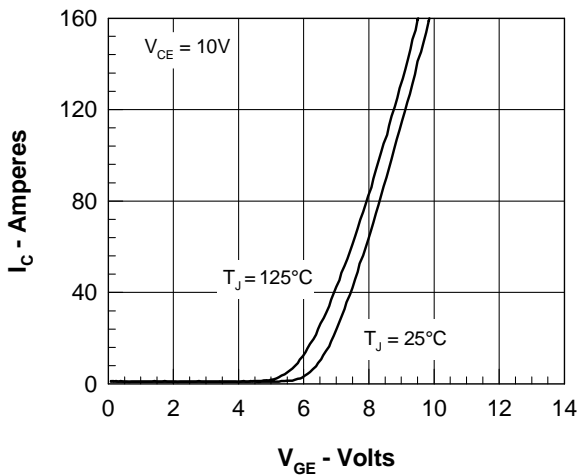


Fig. 5. Turn-off Safe Operating Area

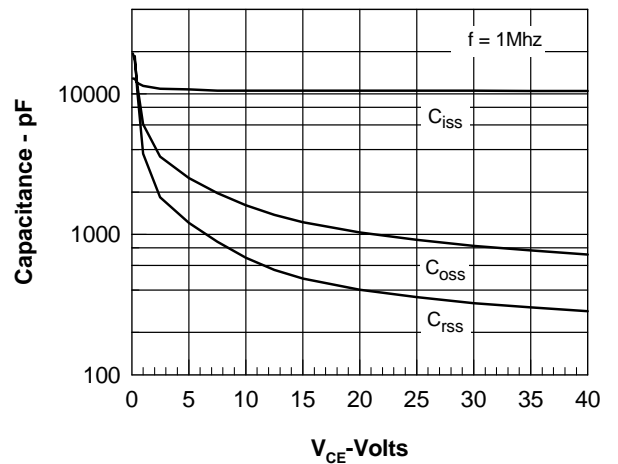


Fig. 6. Temperature Dependence of  $BV_{CES}$  &  $V_{GE(th)}$

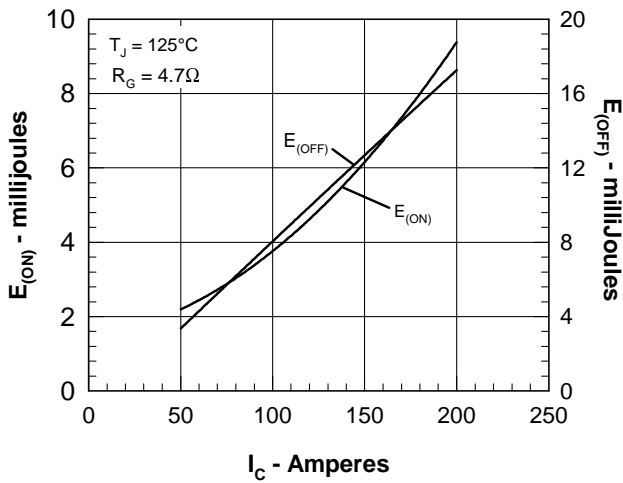


Fig. 7. Dependence of  $t_{fi}$  and  $E_{OFF}$  on  $I_C$ .

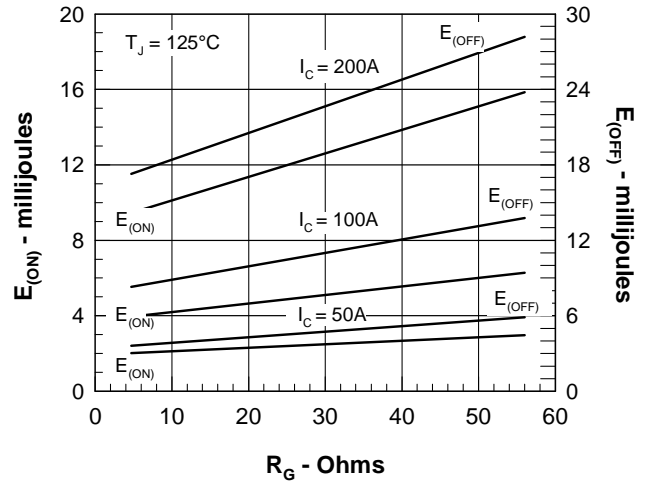


Fig. 8. Dependence of  $t_{fi}$  and  $E_{OFF}$  on  $R_G$ .

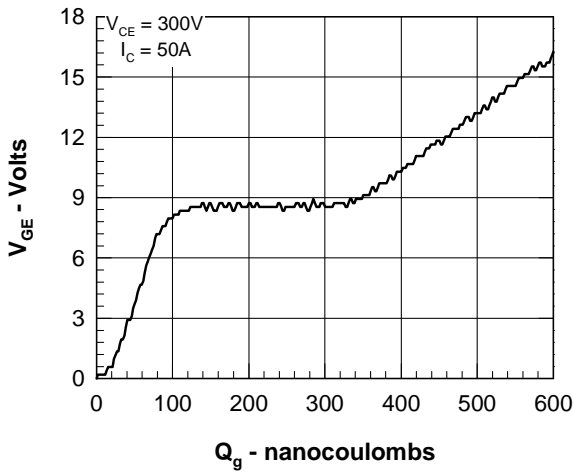


Fig. 9. Gate Charge

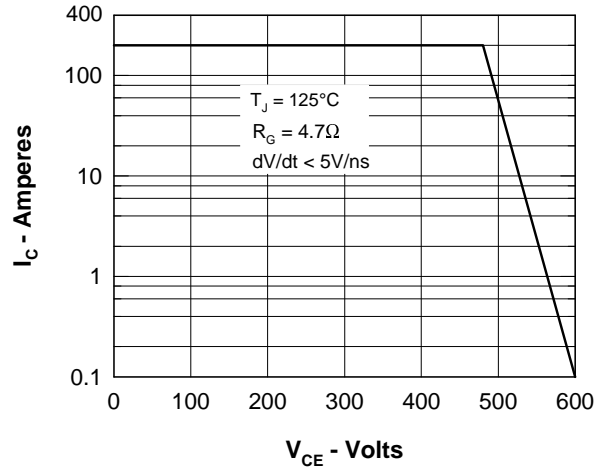


Fig. 10. Junction Capacitance Curves

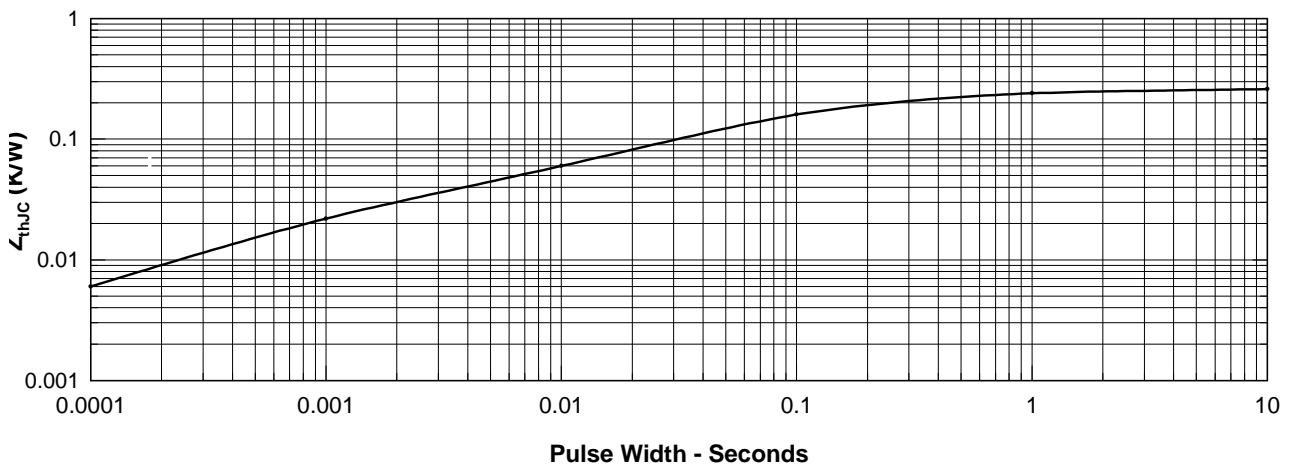


Fig. 11. Transient Thermal Resistance