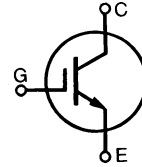


# HiPerFAST™ IGBT Lightspeed™ Series

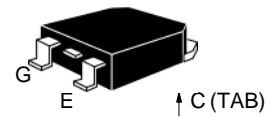
**IXGH 32N60C  
IXGT 32N60C**

**V<sub>CES</sub> = 600 V**  
**I<sub>C25</sub> = 60 A**  
**V<sub>CE(sat)typ</sub> = 2.1 V**  
**t<sub>fi typ</sub> = 55 ns**

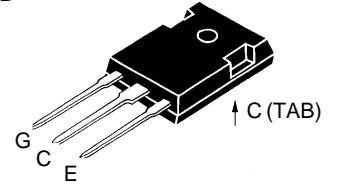


Symbol	Test Conditions	Maximum Ratings	
V <sub>CES</sub>	T <sub>J</sub> = 25°C to 150°C	600	V
V <sub>CGR</sub>	T <sub>J</sub> = 25°C to 150°C; R <sub>GE</sub> = 1 MΩ	600	V
V <sub>GES</sub>	Continuous	±20	V
V <sub>GEM</sub>	Transient	±30	V
I <sub>C25</sub>	T <sub>C</sub> = 25°C	60	A
I <sub>C110</sub>	T <sub>C</sub> = 110°C	32	A
I <sub>CM</sub>	T <sub>C</sub> = 25°C, 1 ms	120	A
<b>SSOA (RBSOA)</b>	V <sub>GE</sub> = 15 V, T <sub>VJ</sub> = 125°C, R <sub>G</sub> = 10 Ω Clamped inductive load, L = 100 μH	I <sub>CM</sub> = 64 @ 0.8 V <sub>CES</sub>	A
P <sub>C</sub>	T <sub>C</sub> = 25°C	200	W
T <sub>J</sub>		-55 ... +150	°C
T <sub>JM</sub>		150	°C
T <sub>stg</sub>		-55 ... +150	°C
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	°C
M <sub>d</sub>	Mounting torque (M3)	1.13/10 Nm/lb.in.	
<b>Weight</b>		TO-247 AD	6 g
		TO-268	4 g

**TO-268  
(IXGT)**



**TO-247 AD  
(IXGH)**



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

### Features

- International standard packages JEDEC TO-247 and surface mountable TO-268
- High current handling capability
- Latest generation HDMOS™ process
- MOS Gate turn-on - drive simplicity

### Applications

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

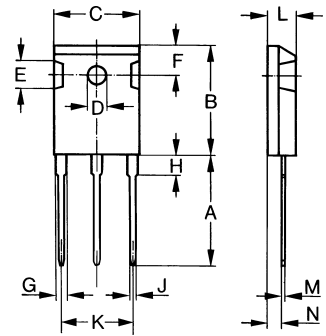
### Advantages

- High power density
- Very fast switching speeds for high frequency applications

Symbol	Test Conditions	Characteristic Values (T <sub>J</sub> = 25°C, unless otherwise specified)		
		min.	typ.	max.
BV <sub>CES</sub>	I <sub>C</sub> = 250 μA, V <sub>GE</sub> = 0 V	600		V
V <sub>GE(th)</sub>	I <sub>C</sub> = 250 μA, V <sub>CE</sub> = V <sub>GE</sub>	2.5		5 V
I <sub>CES</sub>	V <sub>CE</sub> = 0.8 • V <sub>CES</sub> V <sub>GE</sub> = 0 V			200 μA 1 mA
I <sub>GES</sub>	V <sub>CE</sub> = 0 V, V <sub>GE</sub> = ±20 V			±100 nA
V <sub>CE(sat)</sub>	I <sub>C</sub> = I <sub>C110</sub> , V <sub>GE</sub> = 15 V	2.1	2.5	V

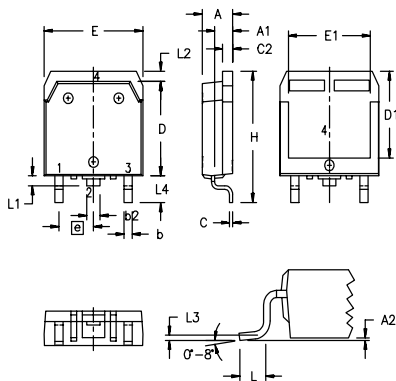
Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$g_{fs}$	$I_C = I_{C110}, V_{CE} = 10\text{ V}$ , Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $\leq 2\%$		25	S
$C_{ies}$	$V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$		2700	pF
$C_{oes}$			190	pF
$C_{res}$			50	pF
$Q_g$	$I_C = I_{C110}, V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$		110	nC
$Q_{ge}$			22	nC
$Q_{gc}$			40	nC
$t_{d(on)}$	<b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b>		25	ns
$t_{ri}$	$I_C = I_{C110}, V_{GE} = 15\text{ V}, L = 100\ \mu\text{H}$ , $V_{CE} = 0.8 V_{CES}, R_G = R_{off} = 4.7\ \Omega$		20	ns
$t_{d(off)}$			85	ns
$t_{fi}$	Remarks: Switching times may increase for $V_{CE}$ (Clamp) $> 0.8 \cdot V_{CES}$ , higher $T_J$ or increased $R_G$		55	ns
$E_{off}$			0.32	mJ
$t_{d(on)}$	<b>Inductive load, <math>T_J = 150^\circ\text{C}</math></b>		25	ns
$t_{ri}$	$I_C = I_{C110}, V_{GE} = 15\text{ V}, L = 100\ \mu\text{H}$ , $V_{CE} = 0.8 V_{CES}, R_G = R_{off} = 4.7\ \Omega$		25	ns
$E_{on}$			0.30	mJ
$t_{d(off)}$	Remarks: Switching times may increase for $V_{CE}$ (Clamp) $> 0.8 \cdot V_{CES}$ , higher $T_J$ or increased $R_G$		110	170 ns
$t_{fi}$			105	160 ns
$E_{off}$		0.85	1.25 mJ	
$R_{thJC}$				0.62 K/W
$R_{thCK}$	(IXGH32N60C)		0.25	K/W

### TO-247 AD (IXGH) Outline



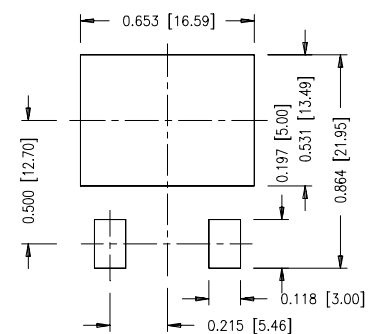
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	19.81	20.32	0.780	0.800
B	20.80	21.46	0.819	0.845
C	15.75	16.26	0.610	0.640
D	3.55	3.65	0.140	0.144
E	4.32	5.49	0.170	0.216
F	5.4	6.2	0.212	0.244
G	1.65	2.13	0.065	0.084
H	-	4.5	-	0.177
J	1.0	1.4	0.040	0.055
K	10.8	11.0	0.426	0.433
L	4.7	5.3	0.185	0.209
M	0.4	0.8	0.016	0.031
N	1.5	2.49	0.087	0.102

### TO-268AA (D<sup>3</sup> PAK)



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

### Min. Recommended Footprint



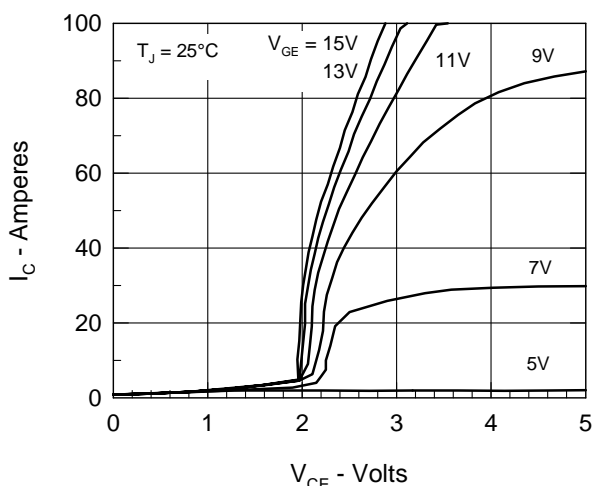


Fig. 1. Output Characteristics

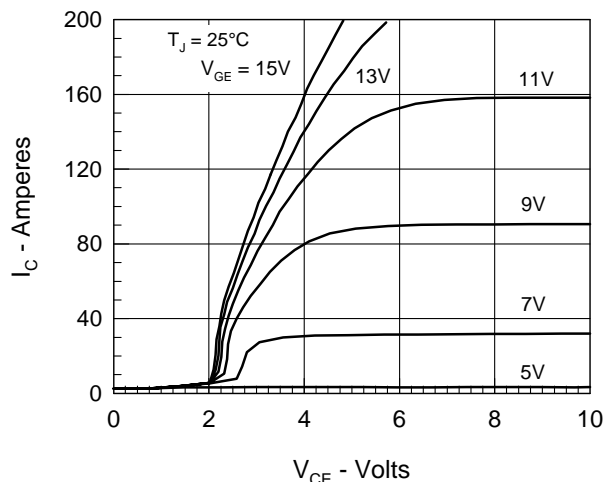


Fig. 2. Extended Output Characteristics

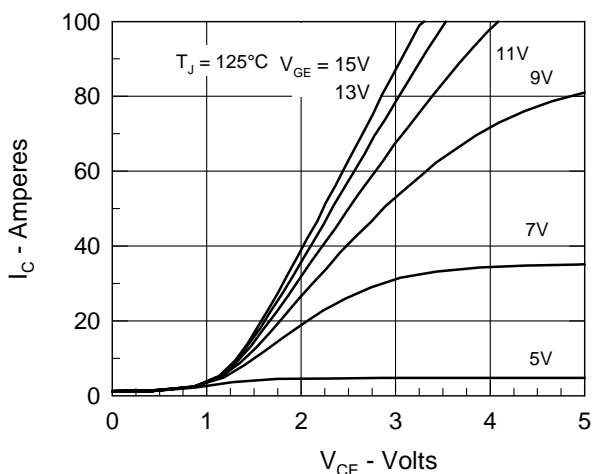


Fig. 3. High Temperature Output Characteristics

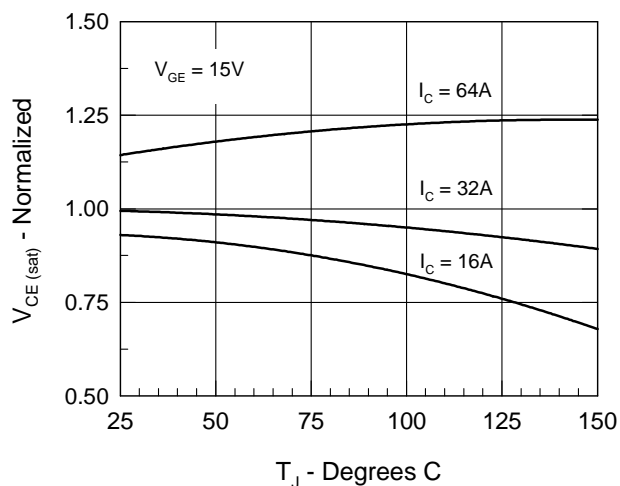
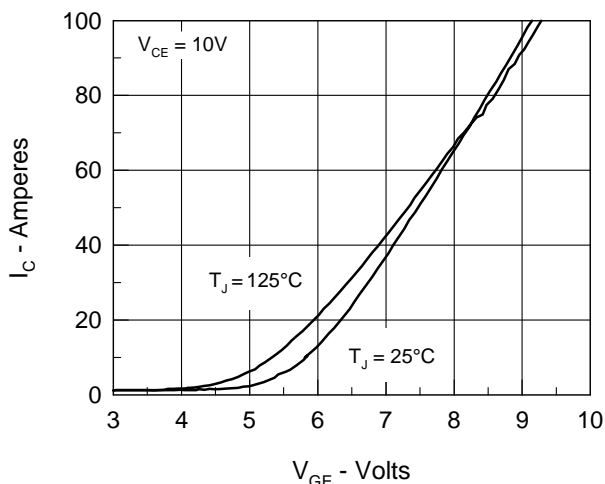

 Fig. 4. Temperature Dependence of  $V_{CE(sat)}$ 


Fig. 5. Admittance Curves

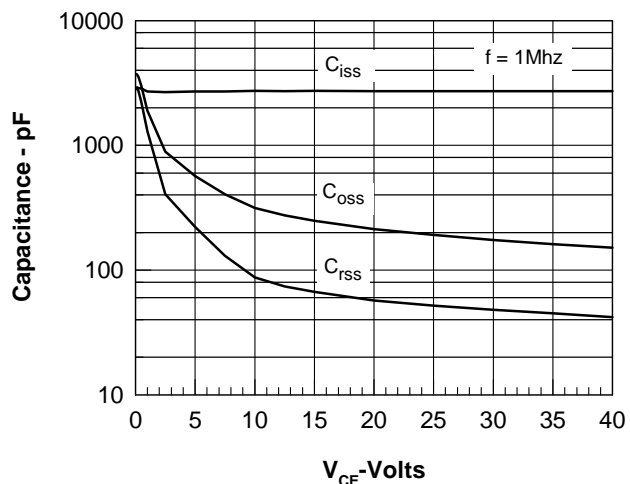


Fig. 6. Capacitance Curves

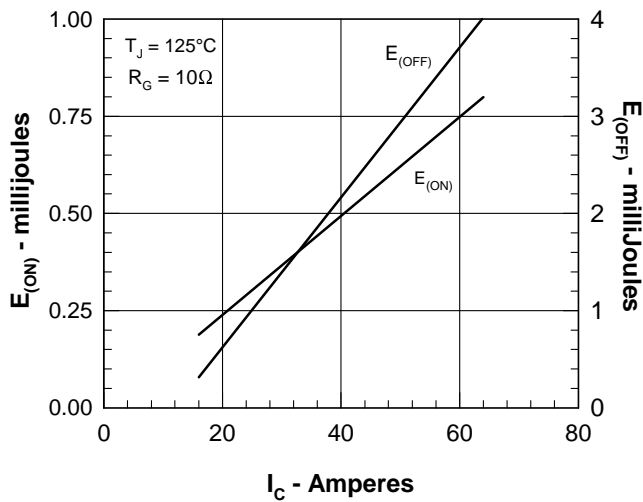


Fig. 7. Dependence of  $E_{ON}$  and  $E_{OFF}$  on  $I_C$ .

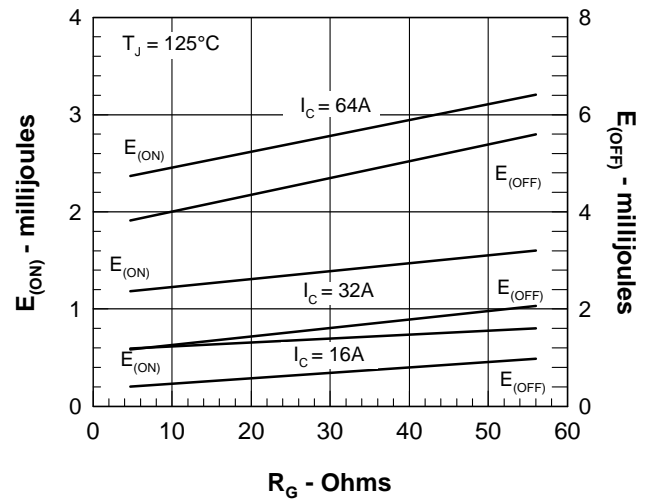


Fig. 8. Dependence of  $E_{ON}$  and  $E_{OFF}$  on  $R_G$ .

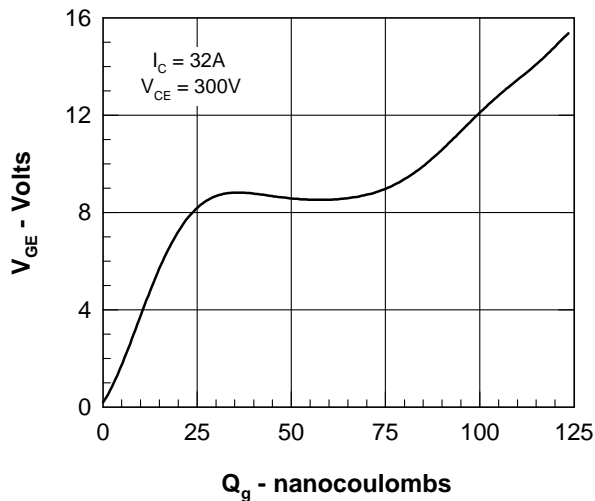


Fig. 9. Gate Charge

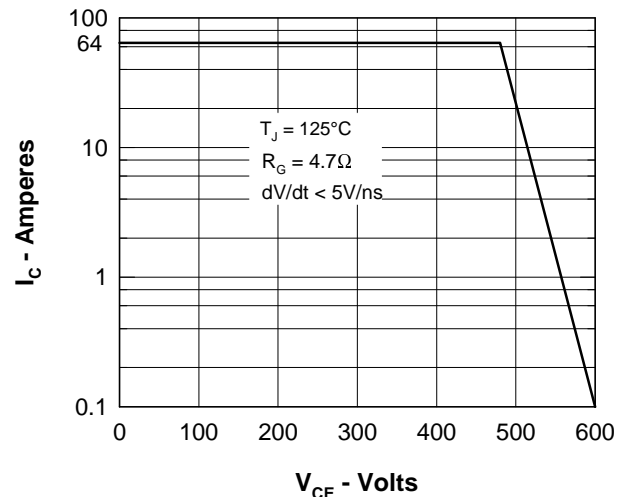


Fig. 10. Turn-off Safe Operating Area

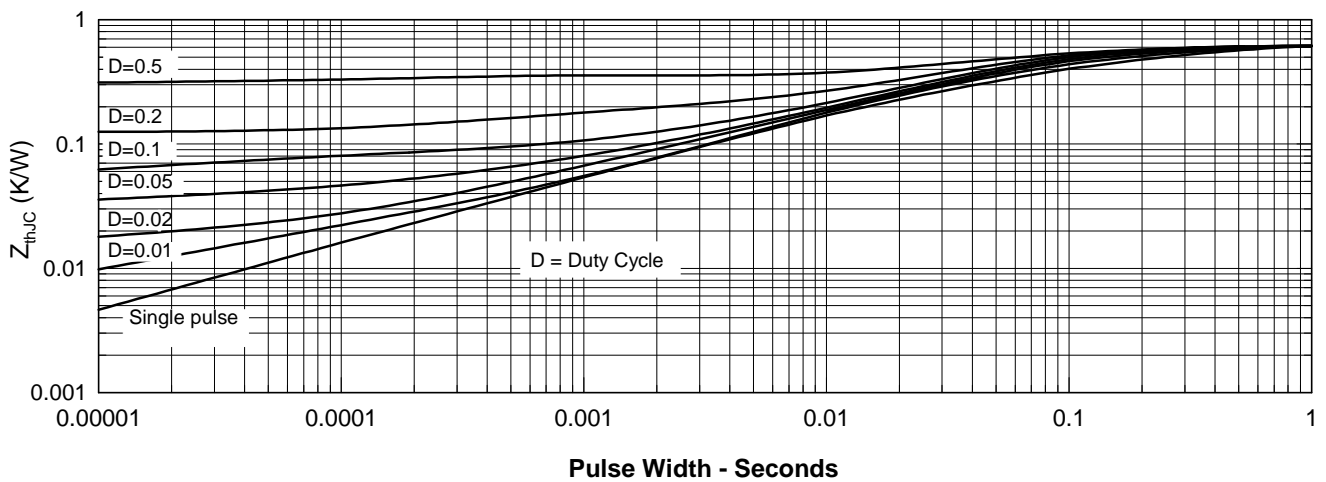


Fig. 11. Transient Thermal Resistance



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