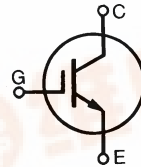




# HiPerFAST™ IGBT Lightspeed™ Series

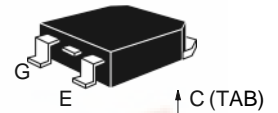
**IXGH 32N60C**  
**IXGT 32N60C**

$V_{CES} = 600\text{ V}$   
 $I_{C25} = 60\text{ A}$   
 $V_{CE(sat)typ} = 2.1\text{ V}$   
 $t_{fi\text{ typ}} = 55\text{ ns}$

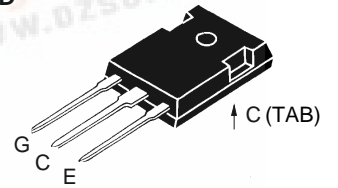


Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	600	V
$V_{CGR}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1\text{ M}\Omega$	600	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ\text{C}$	60	A
$I_{C110}$	$T_C = 110^\circ\text{C}$	32	A
$I_{CM}$	$T_C = 25^\circ\text{C}, 1\text{ ms}$	120	A
<b>SSOA (RBSOA)</b>	$V_{GE} = 15\text{ V}, T_{VJ} = 125^\circ\text{C}, R_G = 10\ \Omega$ Clamped inductive load, $L = 100\ \mu\text{H}$	$I_{CM} = 64$ @ $0.8 V_{CES}$	A
$P_C$	$T_C = 25^\circ\text{C}$	200	W
$T_J$		-55 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		-55 ... +150	$^\circ\text{C}$
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	$^\circ\text{C}$
$M_d$	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

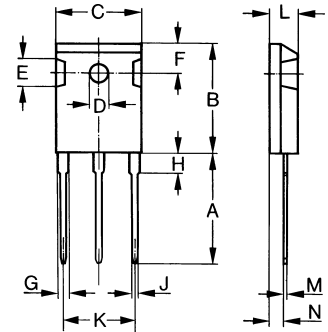
- High power density
- Very fast switching speeds for high frequency applications

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$BV_{CES}$	$I_C = 250\ \mu\text{A}, V_{GE} = 0\text{ V}$	600		V
$V_{GE(th)}$	$I_C = 250\ \mu\text{A}, V_{CE} = V_{GE}$	2.5		V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0\text{ V}$			$T_J = 25^\circ\text{C}$ : 200 $\mu\text{A}$ $T_J = 150^\circ\text{C}$ : 1 mA
$I_{GES}$	$V_{CE} = 0\text{ V}, V_{GE} = \pm 20\text{ V}$			$\pm 100\text{ nA}$
$V_{CE(sat)}$	$I_C = I_{C110}, V_{GE} = 15\text{ V}$	2.1	2.5	V



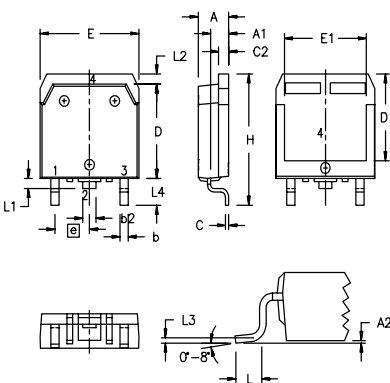
Symbol	Test Conditions	Characteristic Values		
		$(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$		
		min.	typ.	max.
$g_{fs}$	$I_C = I_{C110}, V_{CE} = 10\text{ V},$ Pulse test, $t \leq 300\ \mu\text{s},$ duty cycle $\leq 2\%$		25	S
$C_{ies}$	$V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$		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> $I_C = I_{C110}, V_{GE} = 15\text{ V}, L = 100\ \mu\text{H},$ $V_{CE} = 0.8 V_{CES}, R_G = R_{off} = 4.7\ \Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES},$ higher $T_J$ or increased $R_G$		25	ns
$t_{ri}$			20	ns
$t_{d(off)}$			85	ns
$t_{fi}$			55	ns
$E_{off}$			0.32	mJ
$t_{d(on)}$	<b>Inductive load, <math>T_J = 150^\circ\text{C}</math></b> $I_C = I_{C110}, V_{GE} = 15\text{ V}, L = 100\ \mu\text{H}$ $V_{CE} = 0.8 V_{CES}, R_G = R_{off} = 4.7\ \Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES},$ higher $T_J$ or increased $R_G$		25	ns
$t_{ri}$			25	ns
$E_{on}$			0.30	mJ
$t_{d(off)}$			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



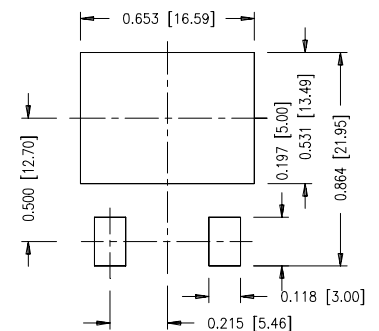
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	19.81	20.32	0.780	0.800
B	20.80	21.46	0.819	0.845
C	15.75	16.26	0.610	0.640
D	3.55	3.65	0.140	0.144
E	4.32	5.49	0.170	0.216
F	5.4	6.2	0.212	0.244
G	1.65	2.13	0.065	0.084
H	-	4.5	-	0.177
J	1.0	1.4	0.040	0.055
K	10.8	11.0	0.426	0.433
L	4.7	5.3	0.185	0.209
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
L <sub>1</sub>	1.20	1.40	.047	.055
L <sub>2</sub>	1.00	1.15	.039	.045
L <sub>3</sub>	0.25 BSC		.010 BSC	
L <sub>4</sub>	3.80	4.10	.150	.161

### Min. Recommended Footprint



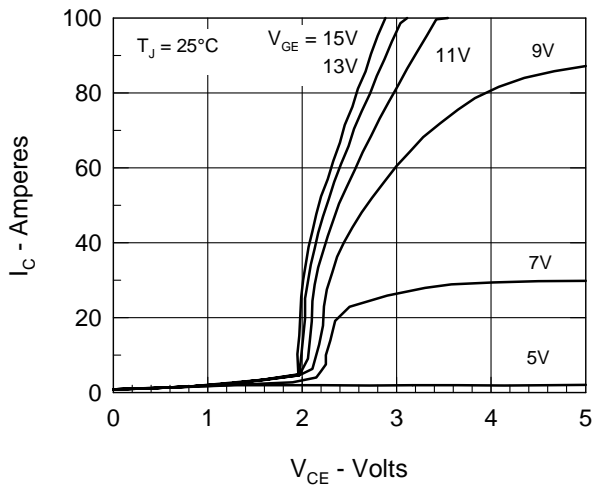


Fig. 1. Output Characteristics

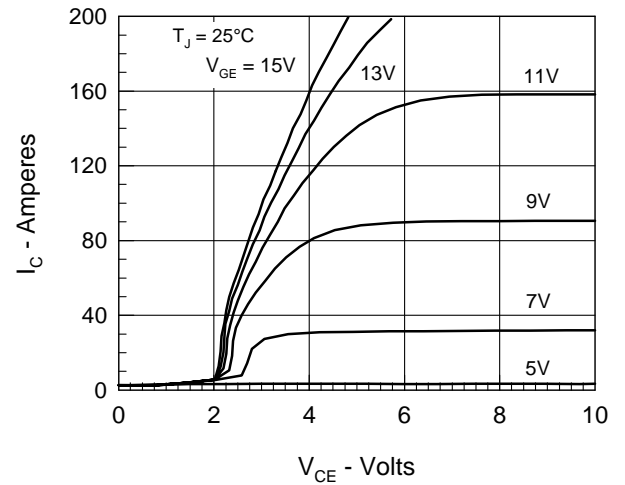


Fig. 2. Extended Output Characteristics

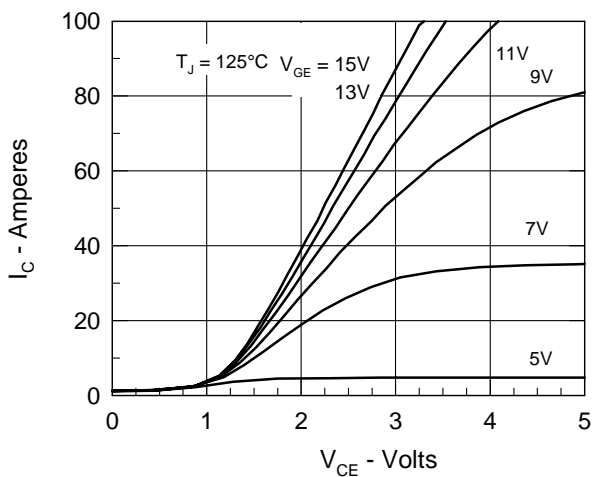


Fig. 3. High Temperature Output Characteristics

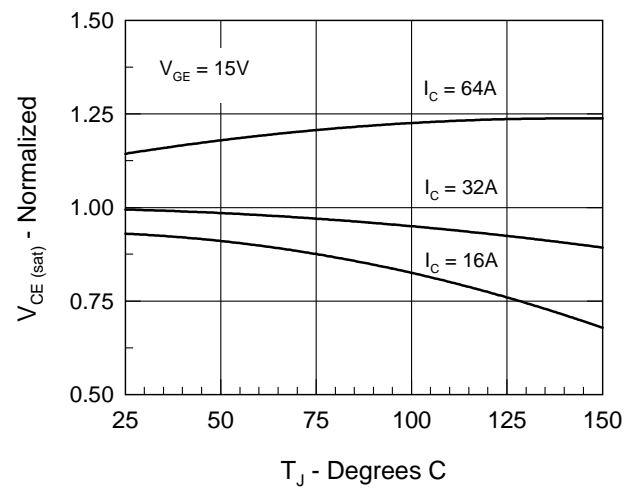
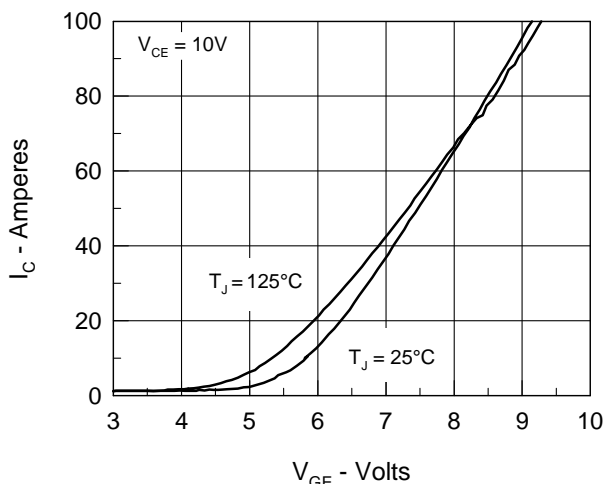

 Fig. 4. Temperature Dependence of  $V_{CE(sat)}$ 


Fig. 5. Admittance Curves

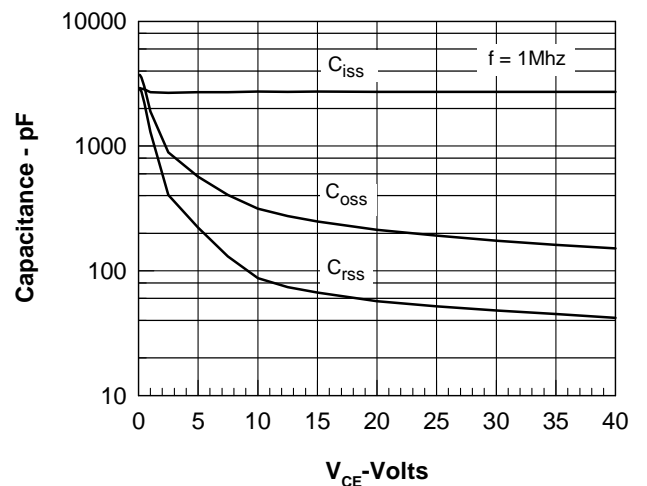


Fig. 6. Capacitance Curves

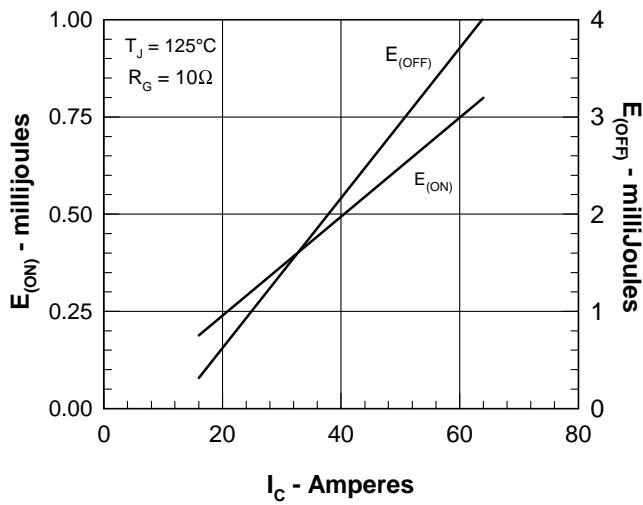


Fig. 7. Dependence of  $E_{ON}$  and  $E_{OFF}$  on  $I_C$ .

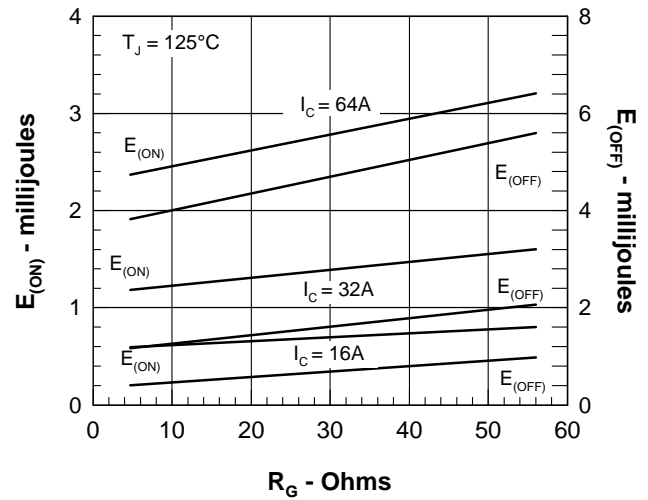


Fig. 8. Dependence of  $E_{ON}$  and  $E_{OFF}$  on  $R_G$ .

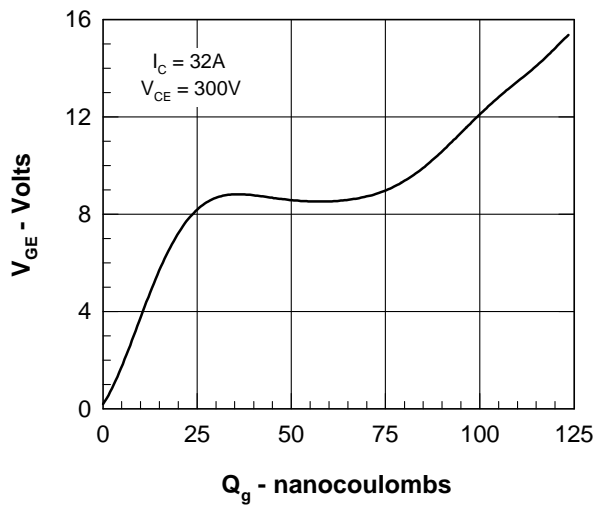


Fig. 9. Gate Charge

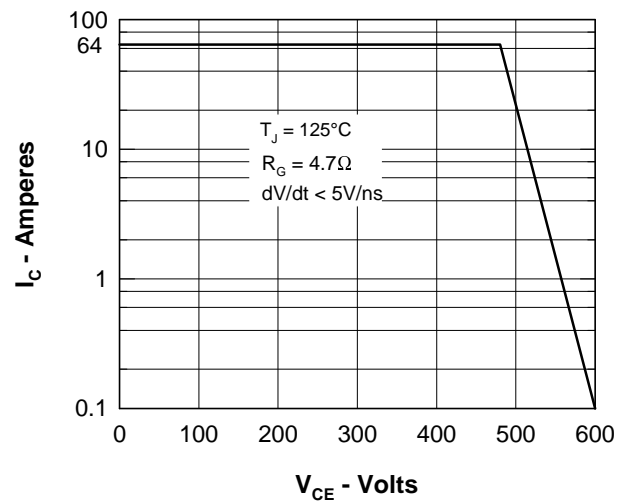


Fig. 10. Turn-off Safe Operating Area

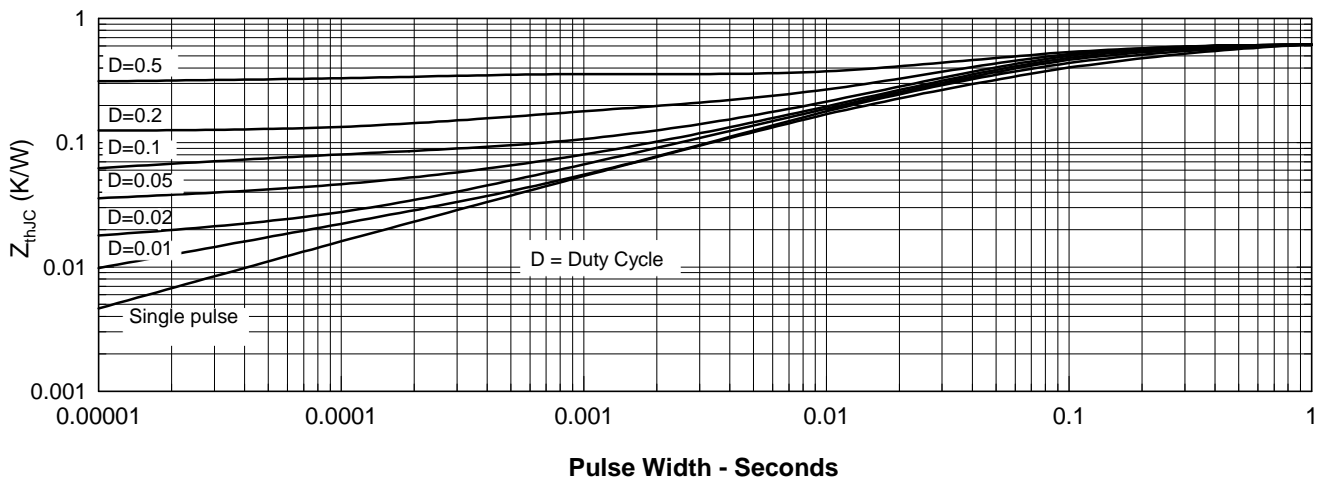


Fig. 11. Transient Thermal Resistance