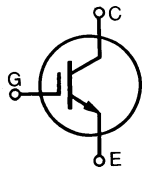
IXYS

HiPerFAST™ IGBT

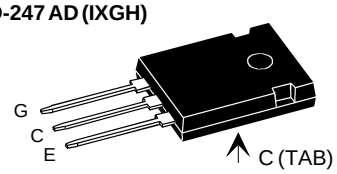
IXGH 50N60B
IXGK 50N60B
IXGT 50N60B

V_{CES} = 600 V
I_{C25} = 75 A
$V_{CE(sat)}$ = 2.5 V
$t_{fi(typ)}$ = 150 ns

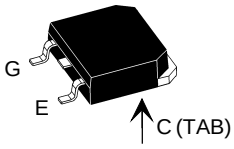


Symbol	Test Conditions		Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C		600	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ		600	V
V_{GES}	Continuous		±20	V
V_{GEM}	Transient		±30	V
I_{C25}	T_C = 25°C		75	A
I_{C90}	T_C = 90°C		50	A
I_{CM}	T_C = 25°C, 1 ms		200	A
SSOA (RBSOA)	V_{GE}= 15 V, T_{VJ} = 125°C, R_G = 10 Ω Clamped inductive load		I_{CM} = 100 @ 0.8 V_{CES}	A
P_C	T_C = 25°C		300	W
T_J			-55 ... +150	°C
T_{JM}			150	°C
T_{stg}			-55 ... +150	°C
M_d	Mounting torque	TO-247AD	1.13/10	Nm/lb.in.
		TO-264	0.9/6	Nm/lb.in.
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s			300	°C
Weight		TO-247	6	g
		TO-264	10	g
		TO-268	4	g

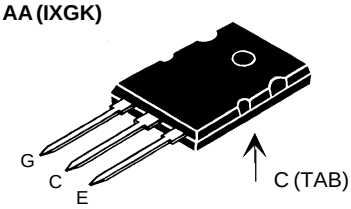
TO-247 AD (IXGH)



TO-268 (D3) (IXGT)



TO-264 AA (IXGK)



G = Gate D = Drain
E = Emitter TAB = Collector

Features
- International standard packages
- High frequency IGBT
- Latest generation HDMOS™ process
- High current handling capability
- MOS Gate turn-on
  - drive simplicity

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 1 screw (insulated mounting screw hole)
- Switching speed for high frequency applications
- High power density

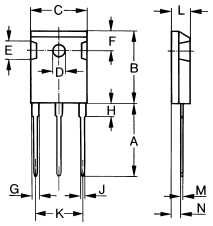
Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) Min.	Typ.	Max.	
BV_{CES}	I_C = 250μA, V_{GE} = 0 V		600			V
$V_{GE(th)}$	I_C = 250 μA, V_{CE} = V_{GE}		2.5		5.0	V
I_{CES}	V_{CE} = 0.8 • V_{CES}	T_J = 25°C			200	μA
	V_{GE} = 0 V	T_J = 125°C			1	mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±100	nA
$V_{CE(sat)}$	I_C = I_{C90}, V_{GE} = 15 V				2.5	V

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

95585E (7/00)

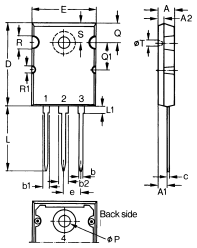
Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	min.	typ.	max.	
g_{fs}	$I_C = I_{C90}$; V_{CE} = 10 V, Pulse test, t ≤ 300 µs, duty cycle ≤ 2 %	25	35		S
C_{iss}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		4000		pF
C_{oss}			340		pF
C_{rss}			100		pF
Q_g	$I_C = I_{C90}$, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}		110	180	nC
Q_{ge}			30	50	nC
Q_{gc}			40	100	nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		50		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15 V		50		ns
$t_{d(off)}$	V_{CE} = 0.8 • V_{CES}, $R_G = R_{off}$ = 2.7 Ω		200	300	ns
t_{fi}	Remarks: Switching times may increase for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or increased R_G		150	270	ns
E_{off}			3.0	6.0	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		50		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15 V		50		ns
E_{on}	V_{CE} = 0.8 • V_{CES}, $R_G = R_{off}$ = 2.7 Ω		2		mJ
$t_{d(off)}$	Remarks: Switching times may increase for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or increased R_G		280		ns
t_{fi}			250		ns
E_{off}			4.2		mJ
R_{thJC}				0.62	K/W
R_{thCK}	TO-247 package		0.25		K/W
	TO-264 package		0.15		K/W

TO-247 AD (IXGH) Outline



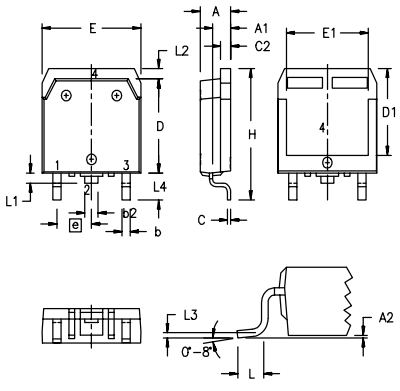
Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	19.81	20.32	0.780	0.800
B	20.80	21.46	0.819	0.845
C	15.75	16.26	0.610	0.640
D	3.55	3.65	0.140	0.144
E	4.32	5.49	0.170	0.216
F	5.4	6.2	0.212	0.244
G	1.65	2.13	0.065	0.084
H	-	4.5	-	0.177
J	1.0	1.4	0.040	0.055
K	10.8	11.0	0.426	0.433
L	4.7	5.3	0.185	0.209
M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

TO-264 AA (IXGK) Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.82	5.13	.190	.202
A1	2.54	2.89	.100	.114
A2	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b1	2.39	2.69	.094	.106
b2	2.90	3.09	.114	.122
c	0.53	0.83	.021	.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	.780	.786
e	5.46 BSC		.215 BSC	
J	0.00	0.25	.000	.010
K	0.00	0.25	.000	.010
L	20.32	20.83	.800	.820
L1	2.29	2.59	.090	.102
P	3.17	3.66	.125	.144
Q	6.07	6.27	.239	.247
Q1	8.38	8.69	.330	.342
R	3.81	4.32	.150	.170
R1	1.78	2.29	.070	.090
S	6.04	6.30	.238	.248
T	1.57	1.83	.062	.072

TO-268AA (IXGT) (D³ PAK)



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.9	5.1	.193	.201
A_1	2.7	2.9	.106	.114
A_2	.02	.25	.001	.010
b	1.15	1.45	.045	.057
b_2	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_1	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

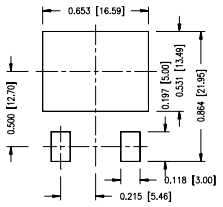


Figure 1. Saturation Voltage Characteristics

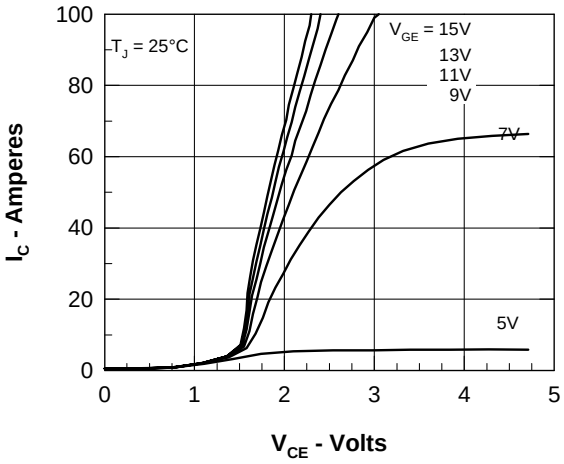


Figure 2. Extended Output Characteristics

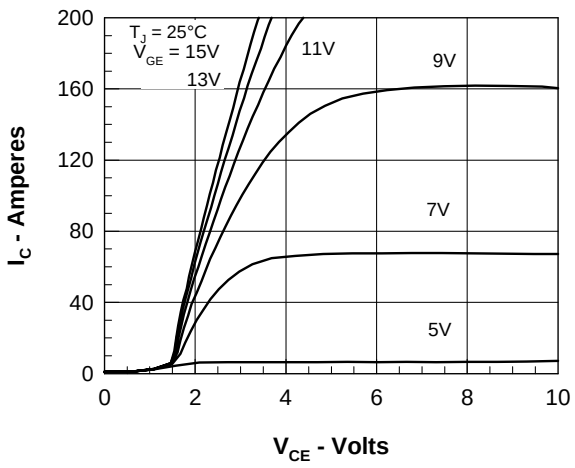


Figure 3. Saturation Voltage Characteristics

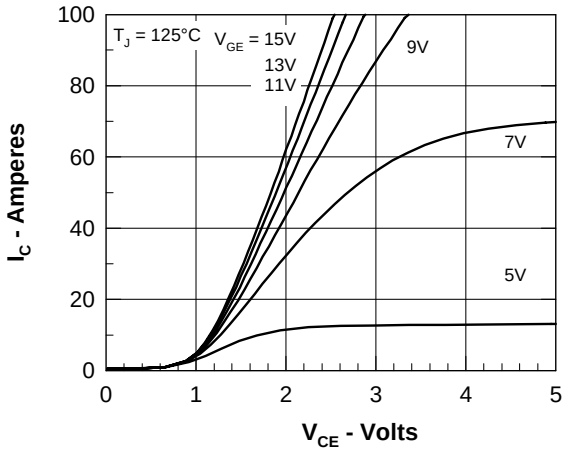


Figure 4. Temperature Dependence of $V_{CE(sat)}$

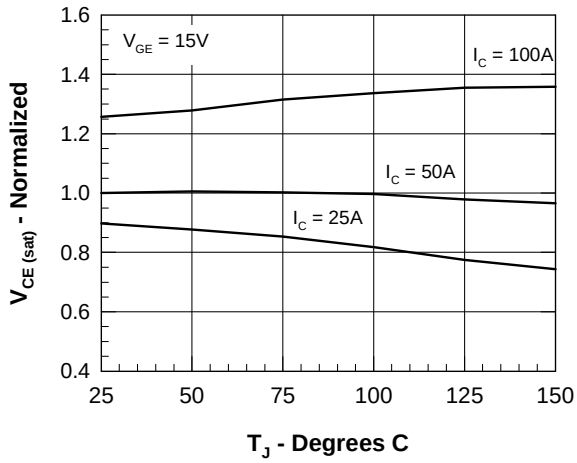


Figure 5. Admittance Curves

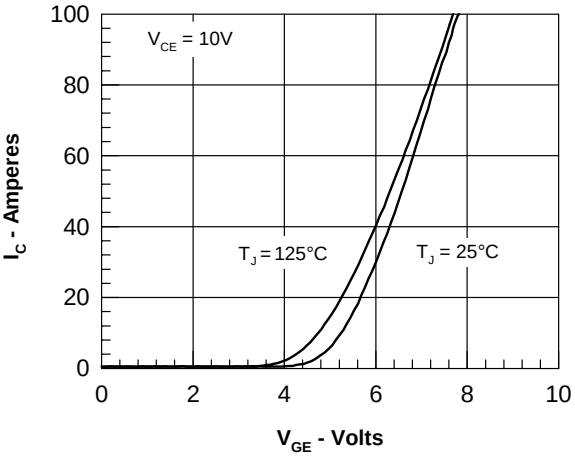


Figure 6. Capacitance Curves

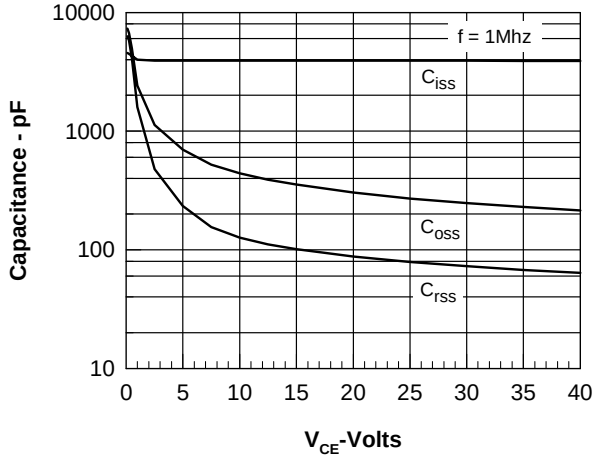


Figure 7. Dependence of E_{ON} and E_{OFF} on I_C.

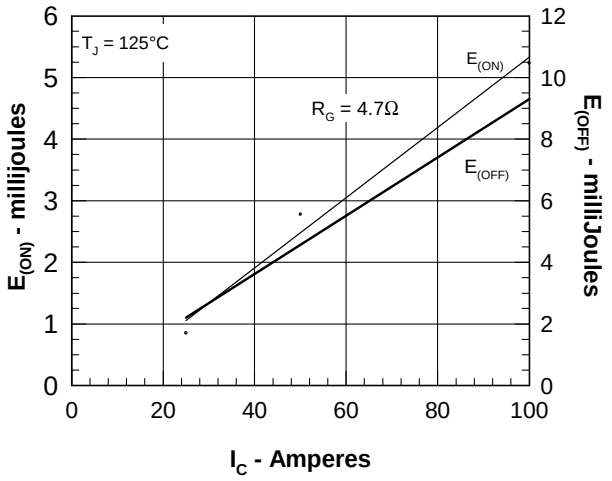


Figure 8. Dependence of E_{ON} and E_{OFF} on R_G.

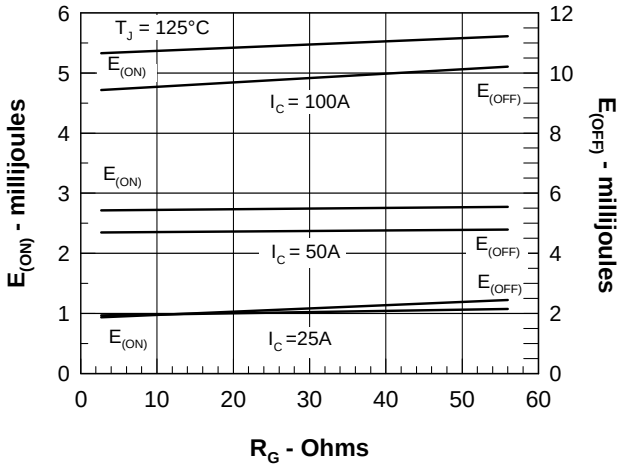


Figure 9. Gate Charge

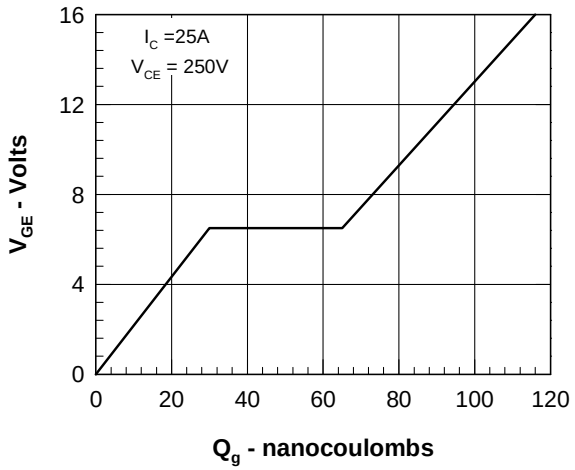


Figure 10. Turn-off Safe Operating Area

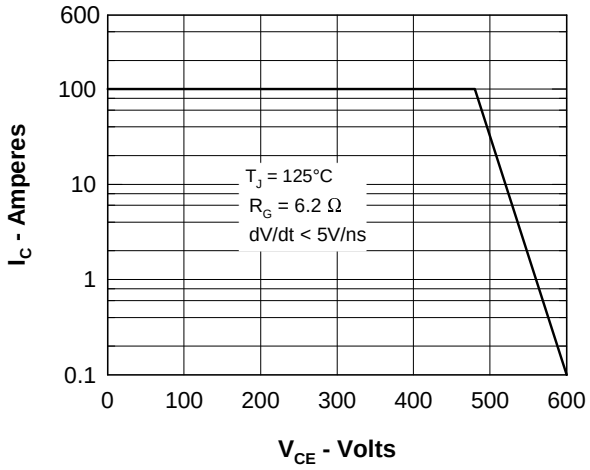


Figure 11. IGBT Transient Thermal Resistance