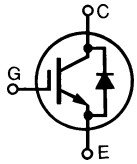
IXYS

HiPerFAST™ IGBT

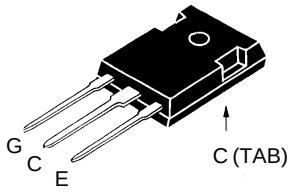
IXGH40N30BD1

V_{CES} = 300 V
I_{C25} = 60 A
$V_{CE(sat)}$ = 2.4 V
t_{fi} = 75 ns



Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	300	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ	300	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	60	A
I_{C90}	T_C = 90°C	40	A
I_{CM}	T_C = 25°C, 1 ms	160	A
SSOA (RBSOA)	V_{GE} = 15 V, T_{VJ} = 125°C, R_G = 10 Ω Clamped inductive load, L = 30 μH	I_{CM} = 80 @ 0.8 V_{CES}	A
P_C	T_C = 25°C	200	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
Maximum Lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	°C
M_d	Mounting torque (M3)	1.13/10	Nm/lb.in.

TO-247 AD



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

Features

- International standard package JEDEC TO-247 AD
- High current IGBT and paralled FRED in one package
- Low leakage current FRED
- Newest generation HDMOS™ process
- MOS Gate turn-on
  - drive simplicity

Applications

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

Advantages

- High power density (two devices in one package)
- Switching speed for high frequency applications
- Easy to mount with 1 screw, (isolated mounting screw hole)

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
BV_{CES}	I_C = 250 μA, V_{GE} = 0 V		300			V
$V_{GE(th)}$	I_C = 250 μA, V_{CE} = V_{GE}		2.5		5	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				2.4	V

IXYS reserves the right to change limits, test conditions, and dimensions. 97508C (6/98)

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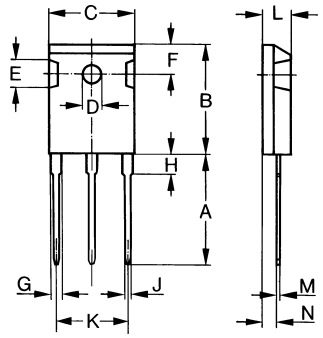
Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
g_{fs}	$I_C = I_{C90}$; V_{CE} = 10 V, Pulse test, t ≤ 300 µs, duty cycle ≤ 2 %	20	28		S
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		2500		pF
C_{oes}			210		pF
C_{res}			60		pF
Q_g	$I_C = I_{C90}$, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}		145	170	nC
Q_{ge}			23	35	nC
Q_{gc}			50	75	nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		25		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15 V, L = 100 µH,		45		ns
$t_{d(off)}$	V_{CE} = 0.8 V_{CES}, $R_G = R_{off}$ = 1.0 Ω		75		ns
t_{fi}	Remarks: Switching times may increase for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or increased R_G		75		ns
E_{off}			0.3		mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		25		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15 V, L = 100 µH		45		ns
E_{on}	V_{CE} = 0.8 V_{CES}, $R_G = R_{off}$ = 1.0 Ω		0.5		mJ
$t_{d(off)}$	Remarks: Switching times may increase for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or increased R_G		90	180	ns
t_{fi}			130	230	ns
E_{off}			0.6	1.4	mJ
R_{thJC}				0.62	K/W
R_{thCK}			0.25		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

Reverse Diode (FRED)

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
V_F	$I_F = I_{C90}$, V_{GE} = 0 V, Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %			1.8	V
I_{RM}	$I_F = I_{C90}$, V_{GE} = 0 V, -di_F/dt = 100 A/µs V_R = 100 V; T_J =100°C		1.5	1.8	A
t_{rr}	I_F = 1 A; -di/dt = 100 A/µs; V_R = 30 V T_J = 25°C		30		ns
R_{thJC}				1	K/W

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IXYS MOSFETS and IGBTs are covered by one or more of the following U.S. patents:
4,835,592 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715
4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025

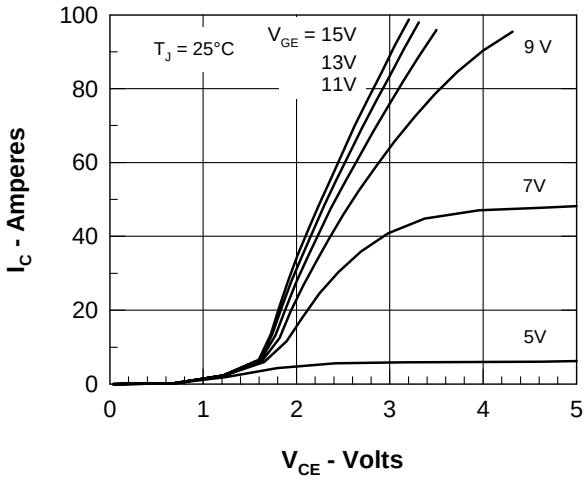

Fig. 1. Output Characteristics

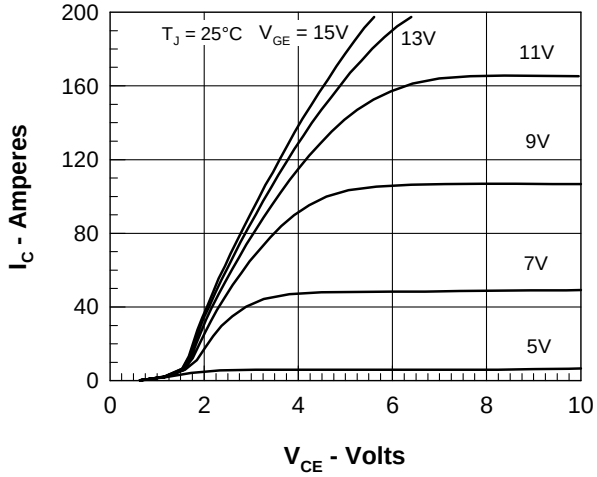

Fig. 2. Extended Output Characteristics

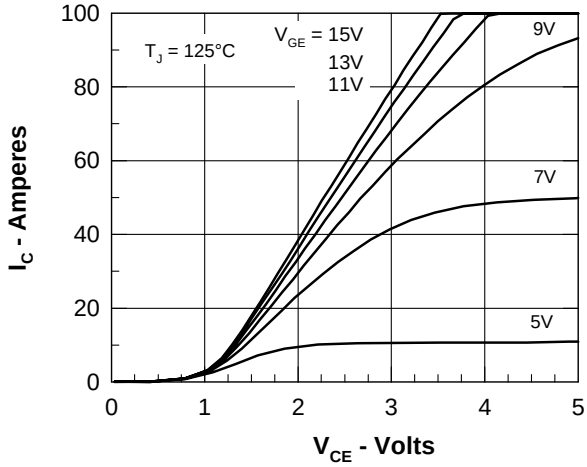

Fig. 3. High Temperature Output Characteristics

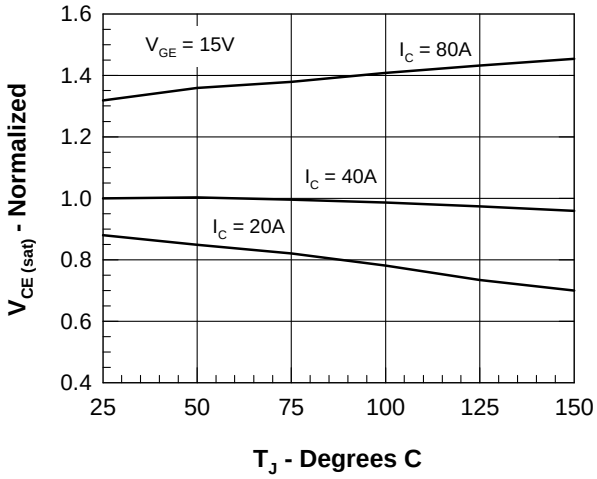

Fig. 4. Temperature Dependence of $V_{CE(sat)}$

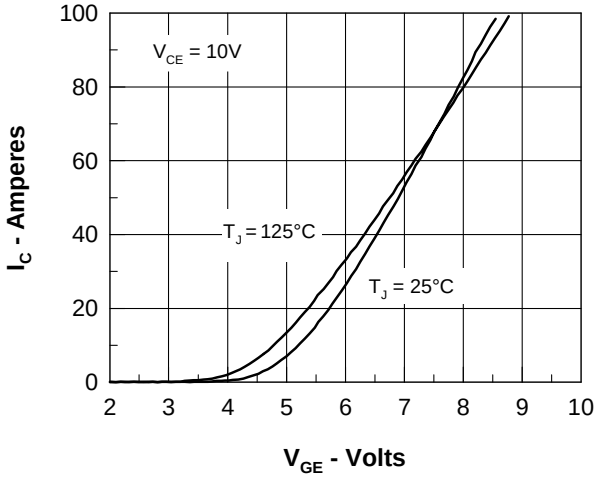

Fig. 5. Admittance Curves

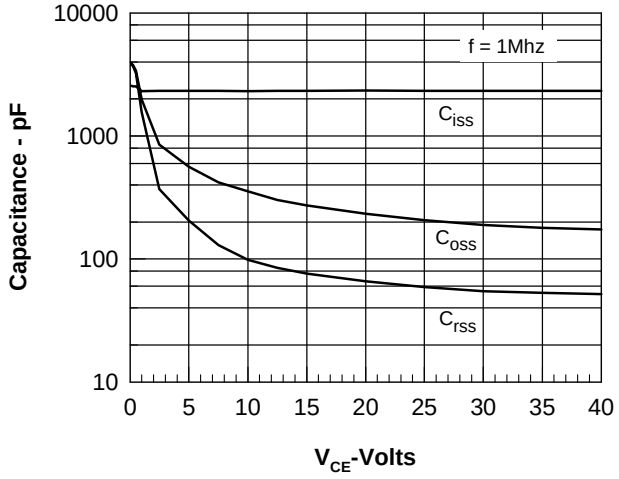

Fig. 6. Capacitance Curves)

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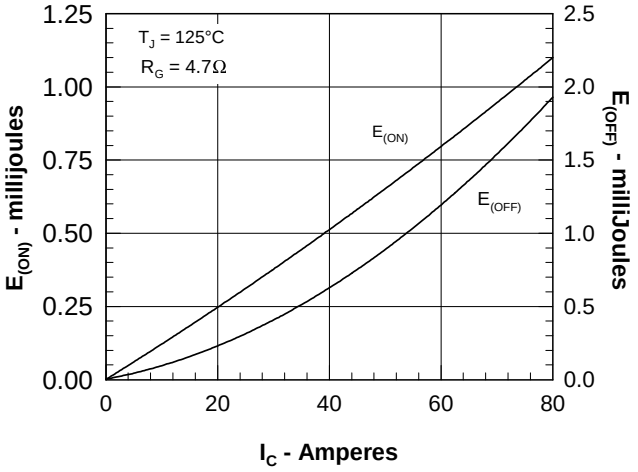

Fig. 7. Dependence of E_{ON} and E_{OFF} on I_C.

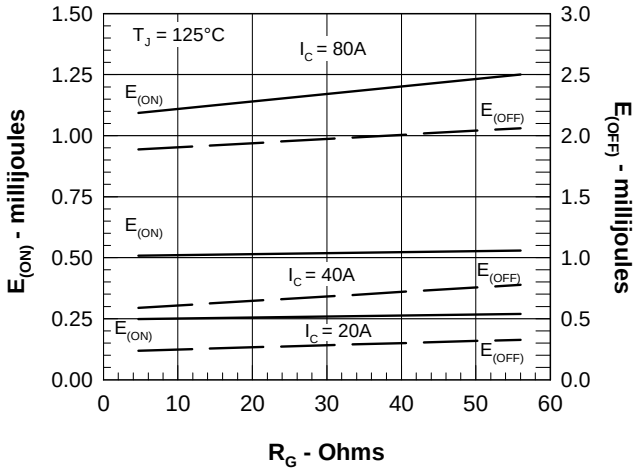

Fig. 8. Dependence of E_{ON} and E_{OFF} on R_G.

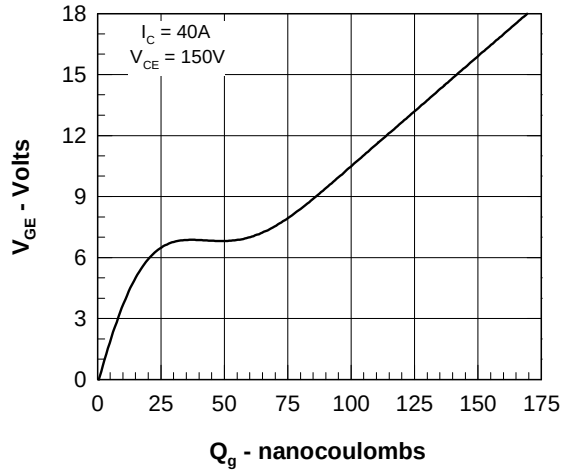

Fig. 9. Gate Charge

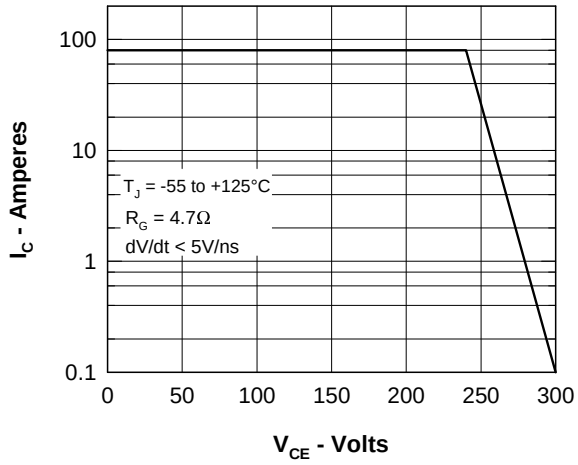

Fig. 10. Turn-off Safe Operating Area

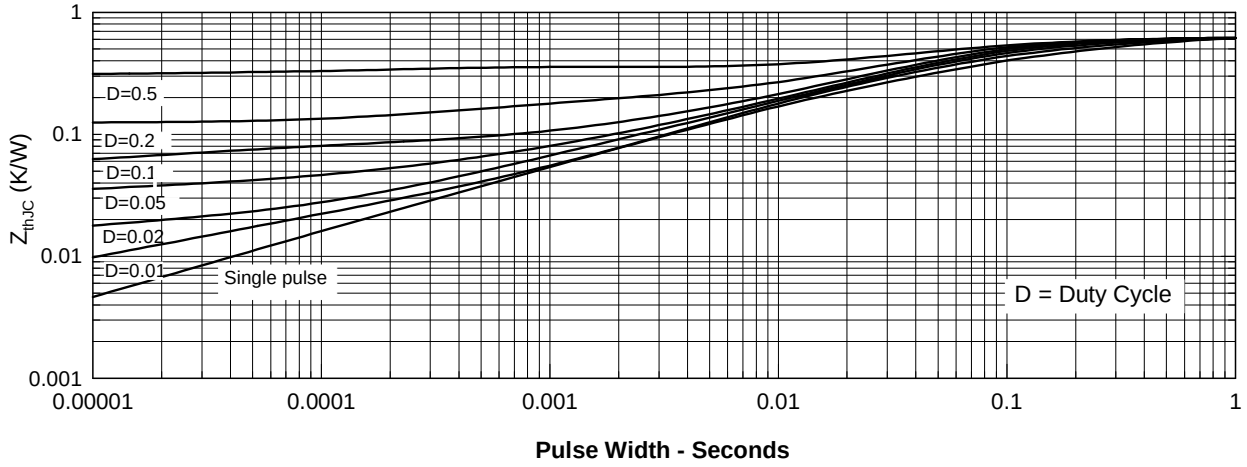

Fig. 11. Transient Thermal Resistance

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