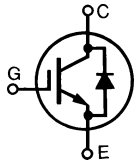
IXYS

HiPerFAST™ IGBT

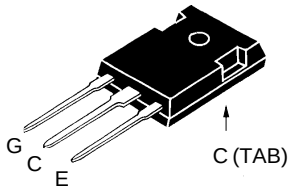
IXGH40N30BD1

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

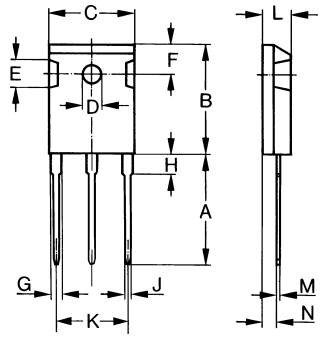
Advantages

- 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

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

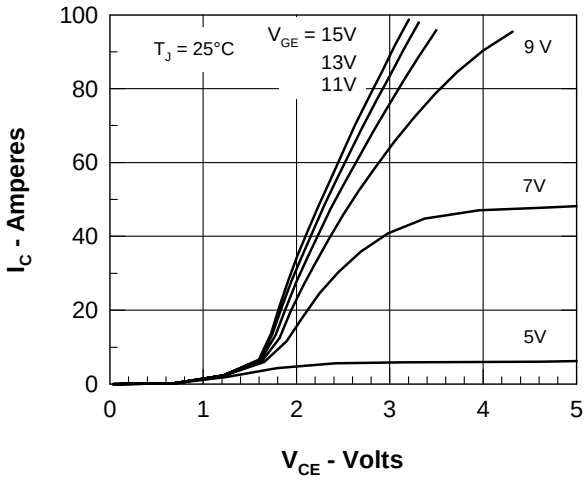


Fig. 1. Output Characteristics

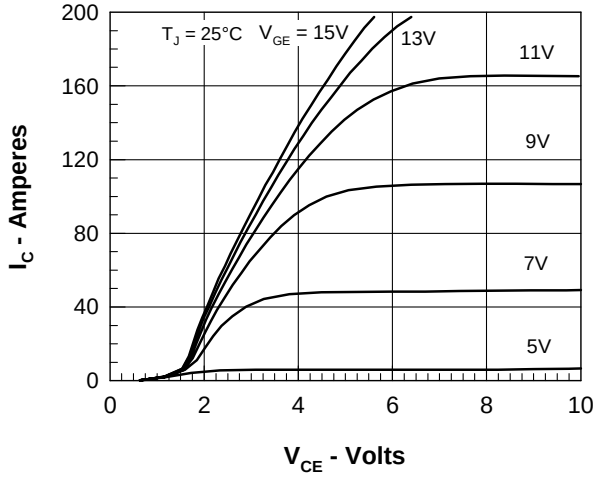


Fig. 2. Extended Output Characteristics

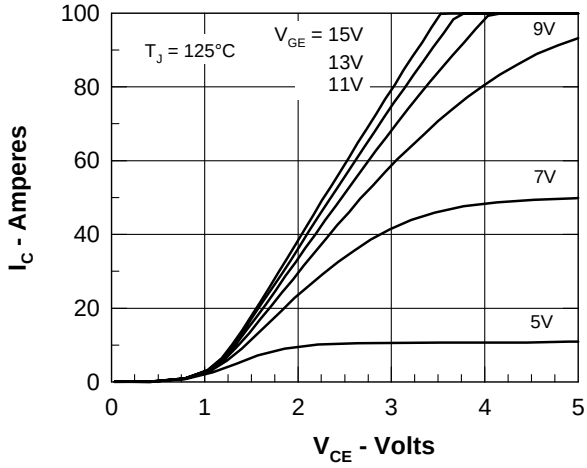


Fig. 3. High Temperature Output Characteristics

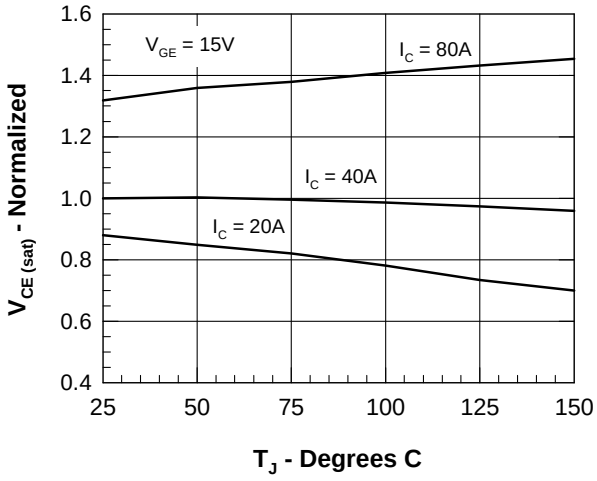


Fig. 4. Temperature Dependence of $V_{CE(sat)}$

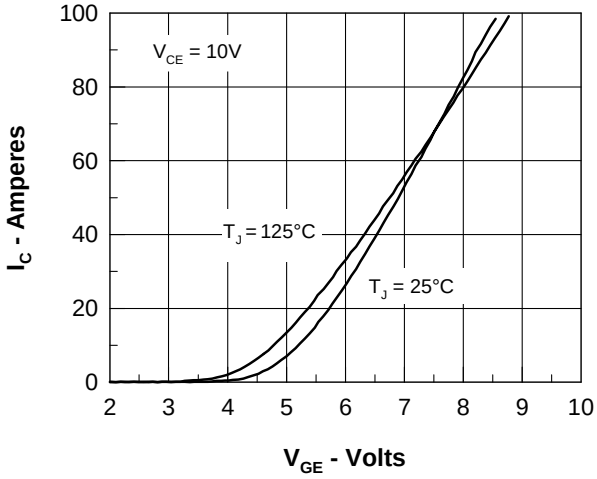


Fig. 5. Admittance Curves

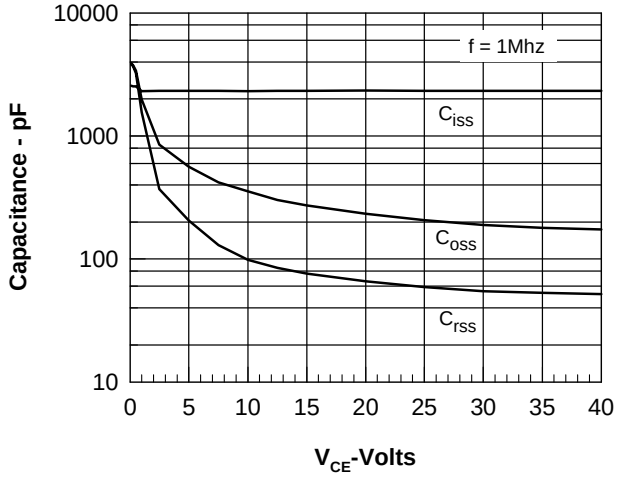


Fig. 6. Capacitance Curves)

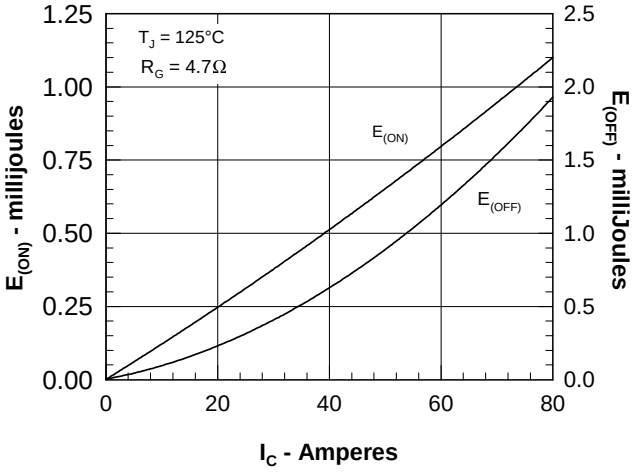


Fig. 7. Dependence of E_{ON} and E_{OFF} on I_C.

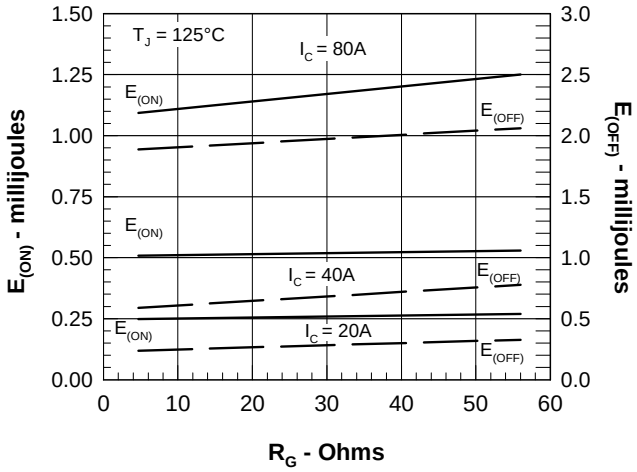


Fig. 8. Dependence of E_{ON} and E_{OFF} on R_G.

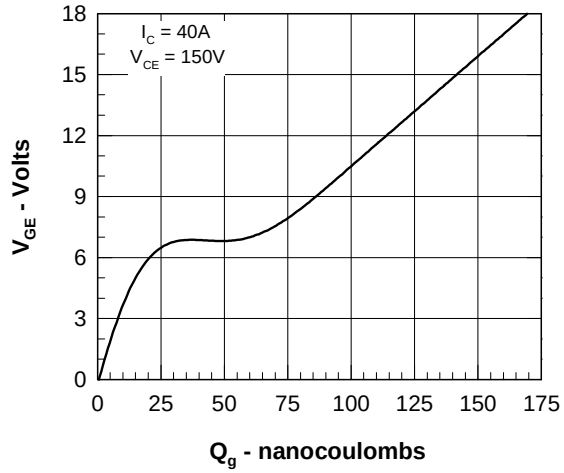


Fig. 9. Gate Charge

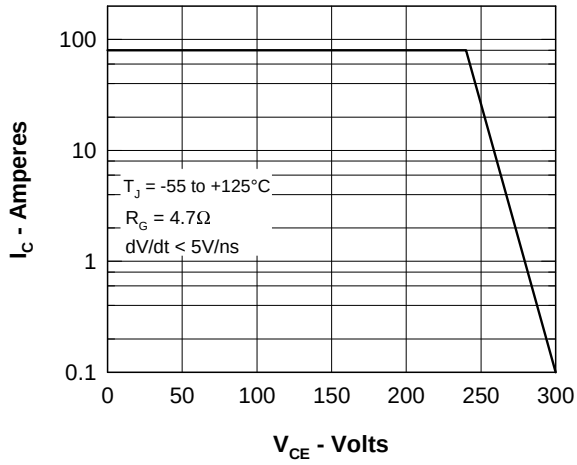


Fig. 10. Turn-off Safe Operating Area

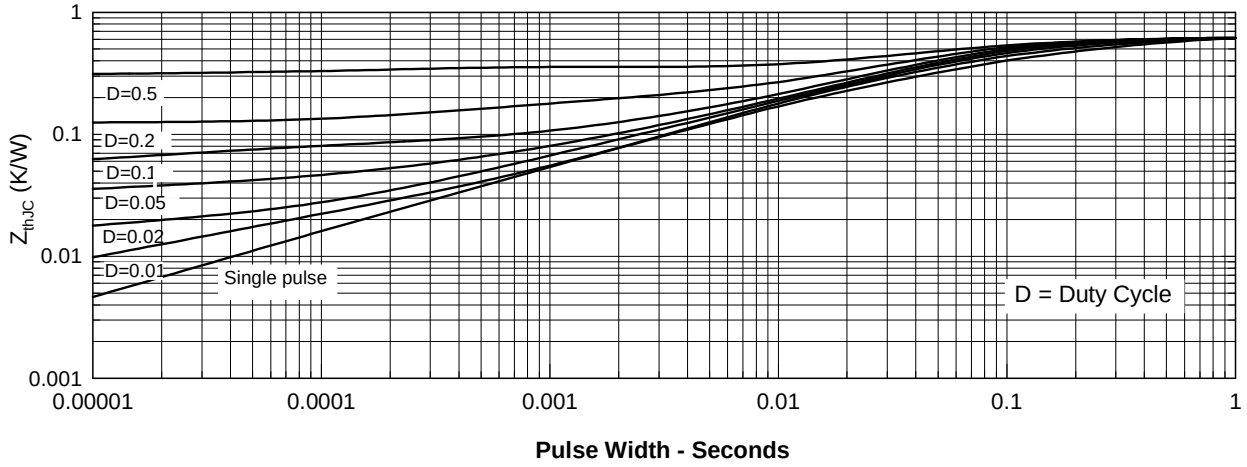


Fig. 11. Transient Thermal Resistance