



**THE DATASHEET OF
IXGH12N60BD1**

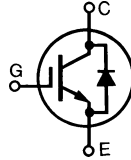


HiPerFAST™ IGBT

IXGH 12N60BD1

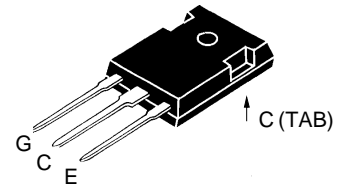
$V_{DSS} = 600 \text{ V}$
 $I_{D25} = 24 \text{ A}$
 $V_{CE(sat)} = 2.1 \text{ V}$
 $t_{fi(typ)} = 120 \text{ ns}$

Preliminary data



Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C}$ to 150°C	600	V
V_{CGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GE} = 1 \text{ M}\Omega$	600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$	24	A
I_{C90}	$T_C = 90^\circ\text{C}$	12	A
I_{CM}	$T_C = 25^\circ\text{C}$, 1 ms	48	A
SSOA (RBSOA)	$V_{GE} = 15 \text{ V}$, $T_{VJ} = 125^\circ\text{C}$, $R_G = 33 \Omega$ Clamped inductive load, $L = 300 \mu\text{H}$	$I_{CM} = 24$ @ $0.8 V_{CES}$	A
P_C	$T_C = 25^\circ\text{C}$	100	W
T_J		-55 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
M_d	Mounting torque with screw M3 Mounting torque with screw M3.5	0.45/4 0.55/5	Nm/lb.in.
Weight		6	g
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	$^\circ\text{C}$

TO-247 AD



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

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
$V_{GE(th)}$	$I_C = 250 \mu\text{A}$, $V_{GE} = V_{GE}$	2.5		5.0 V
I_{CES}	$V_{CE} = 0.8 \cdot V_{CES}$, $T_J = 25^\circ\text{C}$ $V_{GE} = 0 \text{ V}$, $T_J = 125^\circ\text{C}$			200 μA 1.5 mA
I_{GES}	$V_{CE} = 0 \text{ V}$, $V_{GE} = \pm 20 \text{ V}$			$\pm 100 \text{ nA}$
$V_{CE(sat)}$	$I_C = I_{C90}$, $V_{GE} = 15 \text{ V}$			2.1 V

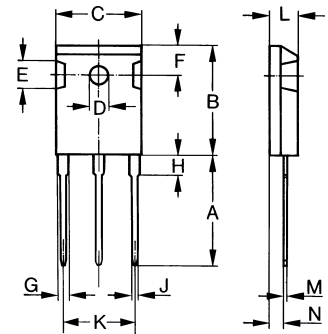
Features

- Moderate frequency IGBT
- New generation HDMOS™ process
- International standard package JEDEC TO-247
- High peak current handling capability and antiparallel diode in one package

Applications

- PFC circuit
- AC motor speed control
- DC servo and robot drives
- Switch-mode and resonant-mode power supplies

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)			
		min.	typ.	max.	
g_{fs}	$I_C = I_{C90}$; $V_{CE} = 10\text{ V}$, Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$	5	11	S	
C_{ies}	} $V_{CE} = 25\text{ V}$, $V_{GE} = 0\text{ V}$, $f = 1\text{ MHz}$		860	pF	
C_{oes}			100	pF	
C_{res}			15	pF	
Q_g	} $I_C = I_{C90}$; $V_{GE} = 15\text{ V}$, $V_{CE} = 0.5 V_{CES}$		32	nC	
Q_{ge}			10	nC	
Q_{gc}			10	nC	
$t_{d(on)}$	} Inductive load, $T_J = 25^\circ\text{C}$ $I_C = I_{C90}$; $V_{GE} = 15\text{ V}$, $L = 300\ \mu\text{H}$ $V_{CE} = 0.8 \cdot V_{CES}$, $R_G = R_{off} = 18\ \Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$, higher T_J or increased R_G		20	ns	
t_{ri}			20	ns	
$t_{d(off)}$			150	250	ns
t_{fi}			120	270	ns
E_{off}			0.5	0.8	mJ
$t_{d(on)}$	} Inductive load, $T_J = 125^\circ\text{C}$ $I_C = I_{C90}$; $V_{GE} = 15\text{ V}$, $L = 300\ \mu\text{H}$ $V_{CE} = 0.8 \cdot V_{CES}$, $R_G = R_{off} = 18\ \Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$, higher T_J or increased R_G		20	ns	
t_{ri}			20	ns	
E_{on}			0.5	mJ	
$t_{d(off)}$			200	ns	
t_{fi}			200	ns	
E_{off}			0.8	mJ	
R_{thJC}	IGBT			1.25 K/W	
R_{thCK}		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

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
V_F	$I_F = 15\text{ A}$; $T_{VJ} = 150^\circ\text{C}$ $T_{VJ} = 25^\circ\text{C}$		1.3	V
				2.5 V
I_{RM}	} $V_R = 100\text{ V}$; $I_F = 25\text{ A}$; $-di_F/dt = 100\text{ A}/\mu\text{s}$ $L \leq 0.05\ \mu\text{H}$; $T_{VJ} = 100^\circ\text{C}$		2	2.5 A
t_{rr}		$I_F = 1\text{ A}$; $-di/dt = 50\text{ A}/\mu\text{s}$; $V_R = 30\text{ V}$; $T_J = 25^\circ\text{C}$		35
R_{thJC}	Diode			1.6 K/W

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