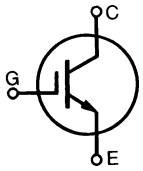
HiPerFAST™ IGBT with Diode Lightspeed™ Series

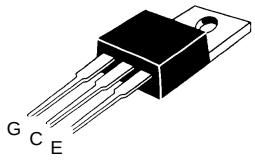
IXGA 7N60CD1
IXGP 7N60CD1

V_{CES} = 600 V
I_{C25} = 14 A
$V_{CE(sat)typ}$ = 2.0 V
t_{fi} = 45 ns

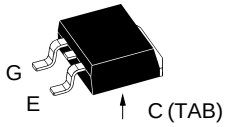


Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	600	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ	600	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	14	A
I_{C90}	T_C = 90°C	7	A
I_{CM}	T_C = 25°C, 1 ms	30	A
SSOA (RBSOA)	V_{GE} = 15 V, T_{VJ} = 125°C, R_G = 22 Ω Clamped inductive load, L = 300 μH	I_{CM} = 14 @ 0.8 V_{CES}	A
P_C	T_C = 25°C	54	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, (TO-220)	M3 M3.5	0.45/4Nm/lb.in. 0.55/5Nm/lb.in.
Weight	TO-220 TO-263	4 2	g g

TO-220AB (IXGP)



TO-263 AA (IXGA)



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

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	600			V
$V_{GE(th)}$	I_C = 250 μA, V_{CE} = V_{GE}	2.5		5.5	V
I_{CES}	V_{CE} = 0.8 • V_{CES} T_J = 25°C V_{GE} = 0 V T_J = 125°C			100 750	μA μA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V			±100	nA
$V_{CE(sat)}$	I_C = I_{C90}, V_{GE} = 15 V		2.0	2.5	V

Features

- International standard packages JEDEC TO-263 surface mountable and JEDEC TO-220 AB
- High frequency IGBT
- High current handling capability
- HiPerFAST™ HDMOS™ process
- MOS Gate turn-on
  - drive simplicity

Applications

- 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
- Suitable for surface mounting
- Very low switching losses for high frequency applications

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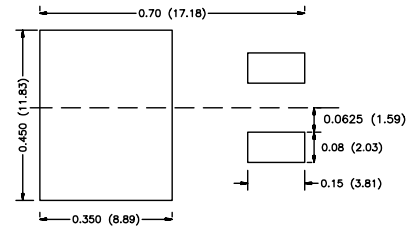
Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
g_{fs}	$I_C = I_{C90}$; V_{CE} = 10 V, Pulse test, t ≤ 300 µs, duty cycle ≤ 2 %	3	7		S
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		500		pF
C_{oes}			50		pF
C_{res}			17		pF
Q_g	$I_C = I_{C90}$, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}		25		nC
Q_{ge}			15		nC
Q_{gc}			10		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		10		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15 V, L = 300 µH		10		ns
$t_{d(off)}$	V_{CE} = 0.8 • V_{CES}, $R_G = R_{off}$ = 18 Ω		65	130	ns
t_{fi}	Remarks: Switching times may increase for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or increased R_G		45	110	ns
E_{off}			0.12	0.25	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		10		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15 V, L = 300 µH		15		ns
E_{on}	V_{CE} = 0.8 • V_{CES}, $R_G = R_{off}$ = 18 Ω		0.15		mJ
$t_{d(off)}$	Remarks: Switching times may increase for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or increased R_G		120		ns
t_{fi}			85		ns
E_{off}			0.22		mJ
R_{thJC}	IGBT			2.3	K/W
R_{thCK}			0.25		K/W

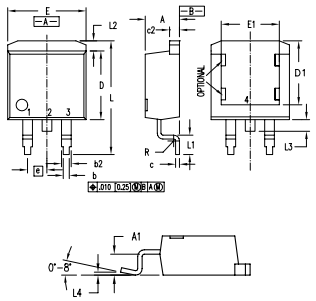
Reverse Diode (FRED)

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
V_F	I_F = 10A; T_{VJ} = 150°C			1.96	V
	T_{VJ} = 25°C			2.95	V
I_{RM}	V_R = 100 V; I_F =25A; -di_F/dt = 100 A/µs L ≤ 0.05 µH; T_{VJ} = 100°C		2	2.5	V
t_{rr}	I_F = 1 A; -di/dt = 50 A/µs; V_R = 30 V T_J = 25°C		35		ns
R_{thJC}	Diode			1.6	K/W

Min. Recommended Footprint

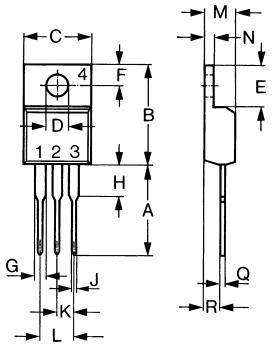


TO-263 AA (IXGA) Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.06	4.83	.160	.190
A1	2.03	2.79	.080	.110
b	0.51	0.99	.020	.039
b2	1.14	1.40	.045	.055
c	0.46	0.74	.018	.029
c2	1.14	1.40	.045	.055
D	8.64	9.65	.340	.380
D1	7.11	8.13	.280	.320
E	9.65	10.29	.380	.405
E1	6.86	8.13	.270	.320
e	2.54	BSC	.100	BSC
L	14.61	15.88	.575	.625
L1	2.29	2.79	.090	.110
L2	1.02	1.40	.040	.055
L3	1.27	1.78	.050	.070
L4	0	0.38	0	.015
R	0.46	0.74	.018	.029

TO-220 AB (IXGP) Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	12.70	13.97	0.500	0.550
B	14.73	16.00	0.580	0.630
C	9.91	10.66	0.390	0.420
D	3.54	4.08	0.139	0.161
E	5.85	6.85	0.230	0.270
F	2.54	3.18	0.100	0.125
G	1.15	1.65	0.045	0.065
H	2.79	5.84	0.110	0.230
J	0.64	1.01	0.025	0.040
K	2.54	BSC	0.100	BSC
M	4.32	4.82	0.170	0.190
N	1.14	1.39	0.045	0.055
Q	0.35	0.56	0.014	0.022
R	2.29	2.79	0.090	0.110