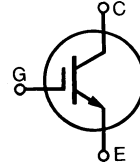


HiPerFAST™ IGBT with Diode Lightspeed™ Series

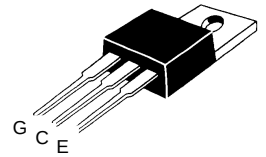
IXGA 7N60CD1
IXGP 7N60CD1

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

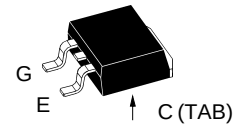


Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	600	V
V_{CGR}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1 \text{ M}\Omega$	600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$	14	A
I_{C90}	$T_C = 90^\circ\text{C}$	7	A
I_{CM}	$T_C = 25^\circ\text{C}, 1 \text{ ms}$	30	A
SSOA (RBSOA)	$V_{GE} = 15 \text{ V}, T_{VJ} = 125^\circ\text{C}, R_G = 22 \Omega$ Clamped inductive load, $L = 300 \mu\text{H}$	$I_{CM} = 14$ @ $0.8 V_{CES}$	A
P_C	$T_C = 25^\circ\text{C}$	54	W
T_J		-55 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	$^\circ\text{C}$
M_d	Mounting torque, (TO-220)	M3 M3.5	0.45/4Nm/lb.in. 0.55/5Nm/lb.in.
Weight	TO-220	4	g
	TO-263	2	g

TO-220AB (IXGP)



TO-263 AA (IXGA)



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

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

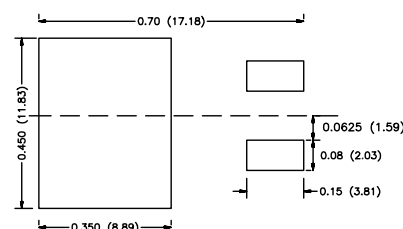
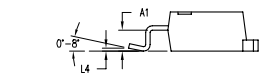
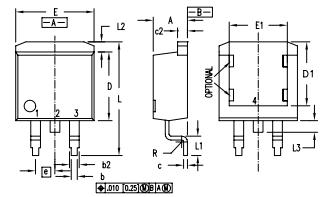
Advantages

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

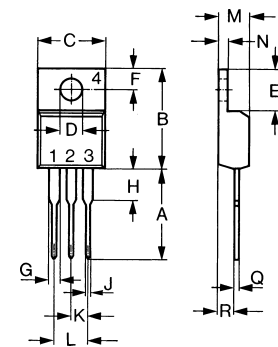
Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
BV_{CES}	$I_C = 250 \mu\text{A}, V_{GE} = 0 \text{ V}$	600		V
$V_{GE(th)}$	$I_C = 250 \mu\text{A}, V_{CE} = V_{GE}$	2.5		5.5 V
I_{CES}	$V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0 \text{ V}$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$			100 μA 750 μA
I_{GES}	$V_{CE} = 0 \text{ V}, V_{GE} = \pm 20 \text{ V}$			$\pm 100 \text{ nA}$
$V_{CE(sat)}$	$I_C = I_{C90}, V_{GE} = 15 \text{ V}$	2.0	2.5	V

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, $t \leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$	3	7	S
C_{ies}	$V_{CE} = 25\text{ V}$, $V_{GE} = 0\text{ V}$, $f = 1\text{ MHz}$		500	pF
C_{oes}			50	pF
C_{res}			17	pF
Q_g	$I_C = I_{C90}; V_{GE} = 15\text{ V}$, $V_{CE} = 0.5 V_{CES}$		25	nC
Q_{ge}			15	nC
Q_{gc}			10	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = I_{C90}; V_{GE} = 15\text{ V}$, $L = 300\text{ }\mu\text{H}$ $V_{CE} = 0.8 \cdot V_{CES}$, $R_G = R_{off} = 18\text{ }\Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$, higher T_J or increased R_G		10	ns
t_{ri}			10	ns
$t_{d(off)}$			65	130 ns
t_{fi}			45	110 ns
E_{off}			0.12	0.25 mJ
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = I_{C90}; V_{GE} = 15\text{ V}$, $L = 300\text{ }\mu\text{H}$ $V_{CE} = 0.8 \cdot V_{CES}$, $R_G = R_{off} = 18\text{ }\Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$, higher T_J or increased R_G		10	ns
t_{ri}			15	ns
E_{on}			0.15	mJ
$t_{d(off)}$			120	ns
t_{fi}			85	ns
E_{off}			0.22	mJ
R_{thJC}	IGBT			2.3 K/W
R_{thCK}			0.25	K/W

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
V_F	$I_F = 10\text{ A}$; $T_{VJ} = 150^\circ\text{C}$ $T_{VJ} = 25^\circ\text{C}$			1.96 V 2.95 V
I_{RM}	$V_R = 100\text{ V}$; $I_F = 25\text{ A}$; $-di_F/dt = 100\text{ A}/\mu\text{s}$ $L \leq 0.05\text{ }\mu\text{H}$; $T_{VJ} = 100^\circ\text{C}$		2	2.5 V
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	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