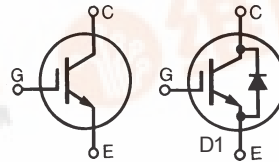


Advance Technical Information

HiPerFAST™ IGBT C2-Class High Speed IGBT

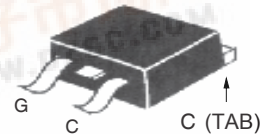
IXGA 16N60C2
IXGP 16N60C2
IXGA 16N60C2D1
IXGP 16N60C2D1

$V_{CES} = 600 \text{ V}$
 $I_{C25} = 40 \text{ A}$
 $V_{CE(sat)} = 3.0 \text{ V}$
 $t_{fi(typ)} = 35 \text{ ns}$

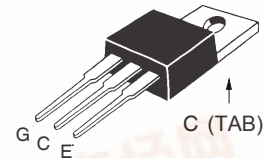


Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	600	V
V_{CGR}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1 \text{ M}\Omega$	600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$	40	A
I_{C110}	$T_C = 110^\circ\text{C}$	16	A
I_{D110}	$T_C = 110^\circ\text{C}$ (IXG_16N60C2D1 diode)	11	A
I_{CM}	$T_C = 25^\circ\text{C}, 1 \text{ ms}$	100	A
SSOA (RBSOA)	$V_{GE} = 15 \text{ V}, T_J = 125^\circ\text{C}, R_G = 22 \Omega$ Clamped inductive load	$I_{CM} = 32$ @ $0.8 V_{CES}$	A
P_C	$T_C = 25^\circ\text{C}$	150	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 (M3.5 screw)	0.55/5 Nm/lb.in.	
	Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s	300	$^\circ\text{C}$
	Maximum tab temperature soldering SMD devices for 10s	260	$^\circ\text{C}$
Weight	TO-220	4	g
	TO-263	2	g

TO-263 (IXGA)



TO-220 (IXGP)



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

Features

- Very high frequency IGBT
- High current handling capability
- MOS Gate turn-on - drive simplicity

Applications

- PFC circuits
- 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
- Very fast switching speeds for high frequency applications

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
$V_{GE(th)}$	$I_C = 250 \mu\text{A}, V_{CE} = V_{GE}$	2.5		5.0 V
I_{CES}	$V_{CE} = V_{CES}$ $V_{GE} = 0 \text{ V}$			25 μA 50 μA
I_{GES}	$V_{CE} = 0 \text{ V}, V_{GE} = \pm 20 \text{ V}$			$\pm 100 \text{ nA}$
$V_{CE(sat)}$	$I_C = 12 \text{ A}, V_{GE} = 15 \text{ V}$ Note 2		2.1	3.0 V V

IXGP 16N60C2 IXGA 16N60C2D1
IXGA 16N60C2 IXGA 16N60C2D1

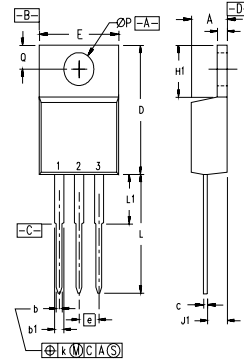
Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
g_{fs}	$I_C = 12\text{A}$; $V_{CE} = 10\text{V}$, Note 2.	8	12	S
C_{ies}	$V_{CE} = 25\text{V}$; $V_{GE} = 0\text{V}$; $f = 1\text{MHz}$		720	pF
C_{oes}	16N60C2 16N60C2D1		55	pF
			65	pF
C_{res}			19	pF
Q_g	$I_C = 20\text{A}$; $V_{GE} = 15\text{V}$; $V_{CE} = 0.5 V_{CES}$		32	nC
Q_{ge}			6	nC
Q_{gc}			10	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$		25	ns
t_{ri}	$I_C = 12\text{A}$; $V_{GE} = 15\text{V}$		15	ns
$t_{d(off)}$	$V_{CE} = 400\text{V}$; $R_G = R_{off} = 22\ \Omega$		60	120 ns
t_{fi}	Note 1.		35	ns
E_{off}			60	100 μJ
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$		25	ns
t_{ri}	$I_C = 12\text{A}$; $V_{GE} = 15\text{V}$		18	ns
E_{on}	$V_{CE} = 400\text{V}$; $R_G = R_{off} = 22\ \Omega$		0.38	mJ
$t_{d(off)}$	Note 1		120	ns
t_{fi}			70	ns
E_{off}			150	μJ
R_{thJC} R_{thCK}	(IXGP)		0.5	0.83 K/W K/W

Reverse Diode (FRED)

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
V_F	$I_F = 10\text{A}$; $V_{GE} = 0\text{V}$ $T_J = 125^\circ\text{C}$			2.66 V 1.66
I_{RM}	$I_F = 12\text{A}$; $-di_F/dt = 100\text{A}/\mu\text{s}$; $V_R = 100\text{V}$		2.5	A
t_{rr}	$V_{GE} = 0\text{V}$; $T_J = 125^\circ\text{C}$		110	ns
t_{rr}	$I_F = 1\text{A}$; $-di_F/dt = 100\text{A}/\mu\text{s}$; $V_R = 30\text{V}$; $V_{GE} = 0\text{V}$		30	ns
R_{thJC}				2.5 K/W

- Notes: 1. Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$, higher T_J , or increased R_G .
2. Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$

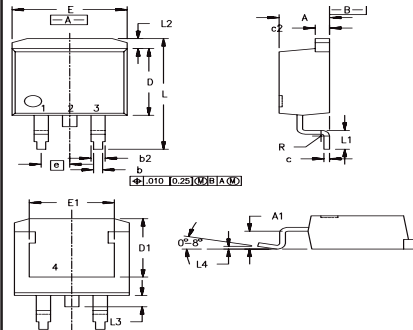
TO-220 Outline



Pins: 1 - Gate 2 - Collector
3 - Emitter 4 - Collector

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.170	.190	4.32	4.83
b	.025	.040	0.64	1.02
b1	.045	.065	1.15	1.65
c	.014	.022	0.35	0.56
D	.580	.630	14.73	16.00
E	.390	.420	9.91	10.66
e	.100 BSC		2.54 BSC	
F	.045	.055	1.14	1.40
H1	.230	.270	5.85	6.85
J1	.090	.110	2.29	2.79
k	0	.015	0	0.38
L	.500	.550	12.70	13.97
L1	.110	.230	2.79	5.84
ØP	.139	.161	3.53	4.08
Q	.100	.125	2.54	3.18

TO-263 Outline



Dim.	Millimeter		Inches	
	Min.	Max.	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	.065
c	0.46	0.74	.018	.029
c2	1.14	1.40	.045	.065
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	.065
L3	1.27	1.78	.050	.070
L4	0	0.38	0	.015