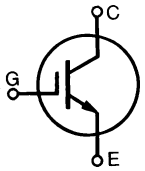
IXYS

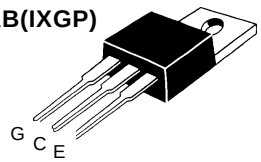
Preliminary data

Low $V_{CE(sat)}$ IGBT
High speed IGBT

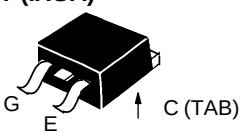
	V_{CES}	I_{C25}	$V_{CE(sat)}$
IXGA/IXGP/IXGH10N60	600 V	20 A	2.5 V
IXGA/IXGP/IXGH10N60A	600 V	20 A	3.0 V



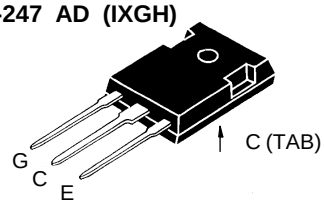
TO-220AB(IXGP)



TO-263 AA (IXGA)



TO-247 AD (IXGH)



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

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	20	A
I_{C90}	T_C = 90°C	10	A
I_{CM}	T_C = 25°C, 1 ms	40	A
SSOA (RBSOA)	V_{GE}= 15 V, T_{VJ} = 125°C, R_G = 150 Ω Clamped inductive load, L = 300 µH	I_{CM} = 20 @ 0.8 V_{CES}	A
P_C	T_C = 25°C	100	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
Maximum Lead and Tab temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	°C
M_d	Mounting torque, TO-247 AD	1.13/10	Nm/lb.in.
Weight	TO-263 AA TO-247 AD	2 6	g g

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	V
I_{CES}	V_{CE} = 0.8 • V_{CES} V_{GE} = 0 V	T_J = 25°C T_J = 125°C			200 1	µA mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±100	nA
$V_{CE(sat)}$	I_C = I_{C90}, V_{GE} = 15 V	10N60 10N60A			2.5 3.0	V V

Features

- International standard packages JEDEC TO-263 AA surface mountable and JEDEC TO-247 AD
- 2nd generation HDMOS™ process Low $V_{CE(sat)}$
  - for low on-state conduction losses
- High current handling capability
- MOS Gate turn-on
  - drive simplicity

Applications

- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switch-mode and resonant-mode power supplies

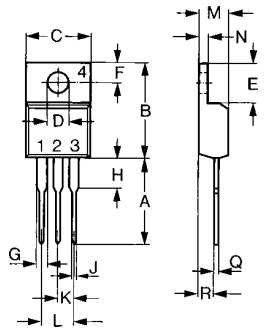
Advantages

- Space savings, TO-263 AA
- Facilitates automated assembly
- Reduces assembly time and cost
- Easy to mount with 1 screw, TO-247 (isolated mounting screw hole)
- High power density

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 %		4	8		S
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz			750		pF
C_{oes}				100		pF
C_{res}				30		pF
Q_g	$I_C = I_{C90}$, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}			50	70	nC
Q_{ge}				15	25	nC
Q_{gc}				25	45	nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**			100		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15 V, L = 100 µH			200		ns
E_{on}	V_{CE} = 0.8 V_{CES}, $R_G = R_{off}$ = 150 Ω			0.4		mJ
$t_{d(off)}$	Remarks: Switching times may increase for V_{CE}			600		ns
t_{fi}	(Clamp) > 0.8 • V_{CES},	10N60A		300		ns
E_{off}	higher T_J or increased R_G	10N60A		0.6		mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**			100		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15 V,			200		ns
E_{on}	L = 100 µH			1		mJ
$t_{d(off)}$	V_{CE} = 0.8 V_{CES}, $R_G = R_{off}$ = 150 Ω			900	1500	ns
t_{fi}		10N60		570	2000	ns
	Remarks: Switching times may increase for V_{CE}	10N60A		360	600	ns
E_{off}	(Clamp) > 0.8 • V_{CES}, higher T_J or increased R_G	10N60		2.0		mJ
		10N60A		1.2		mJ
R_{thJC}					1.25	K/W
R_{thCK}				0.25		K/W

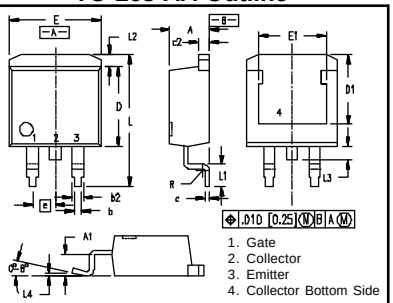
IXGA/P/IXGH 10N60 / 10N60A characteristic curves are located in the IXGH 10N60U1 and IXGH 10N60AU1 data sheet.

TO-220 AB Outline



Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	12.70	14.93	0.500	0.580
B	14.23	16.50	0.560	0.650
C	9.66	10.66	0.380	0.420
D	3.54	4.08	0.139	0.161
E	5.85	6.85	0.230	0.270
F	2.29	2.79	0.090	0.110
G	1.15	1.77	0.045	0.070
H	2.79	6.35	0.110	0.250
J	0.64	0.89	0.025	0.035
K	2.54	BSC	0.100	BSC
M	4.32	4.82	0.170	0.190
N	0.64	1.39	0.025	0.055
Q	0.51	0.76	0.020	0.030
R	2.04	2.49	0.080	0.115

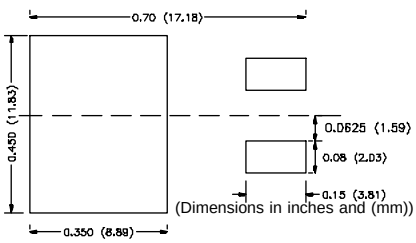
TO-263 AA Outline



1. Gate
2. Collector
3. Emitter
4. Collector Bottom Side

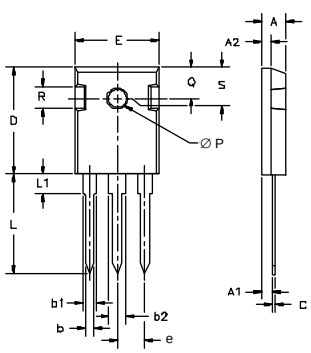
Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	4.06	4.83	.160	.190
A1	2.03	2.79	.080	.110
b	0.51	0.99	.020	.039
b2	1.14	1.40	.045	.055
c	0.46	0.74	.018	.029
c2	1.14	1.40	.045	.055
D	8.64	9.65	.340	.380
D1	7.11	8.13	.280	.320
E	9.65	10.29	.380	.405
E1	6.86	8.13	.270	.320
e	2.54	BSC	.100	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

Min. Recommended Footprint



(Dimensions in inches and (mm))

TO-247 AD Outline



Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
∅P	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15	BSC	242	BSC