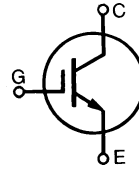


Low $V_{CE(sat)}$ IGBT High speed IGBT

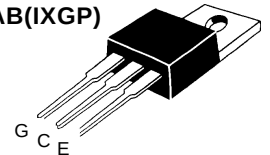
IXGA/IXGP/IXGH10N60
IXGA/IXGP/IXGH10N60A

V_{CES}	I_{C25}	$V_{CE(sat)}$
600 V	20 A	2.5 V
600 V	20 A	3.0 V

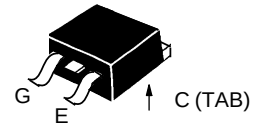


Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C}$ to 150°C	600	V
V_{CGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GE} = 1\text{ M}\Omega$	600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$	20	A
I_{C90}	$T_C = 90^\circ\text{C}$	10	A
I_{CM}	$T_C = 25^\circ\text{C}$, 1 ms	40	A
SSOA (RBSOA)	$V_{GE} = 15\text{ V}$, $T_{VJ} = 125^\circ\text{C}$, $R_G = 150\ \Omega$ Clamped inductive load, $L = 300\ \mu\text{H}$	$I_{CM} = 20$ @ $0.8\ V_{CES}$	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	$^\circ\text{C}$
Maximum Lead and Tab temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	$^\circ\text{C}$
M_d	Mounting torque, TO-247 AD	1.13/10	Nm/lb.in.
Weight	TO-263 AA	2	g
	TO-247 AD	6	g

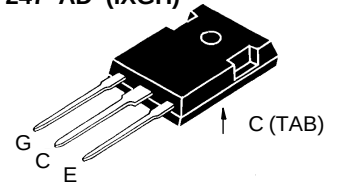
TO-220AB (IXGP)



TO-263 AA (IXGA)



TO-247 AD (IXGH)



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

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

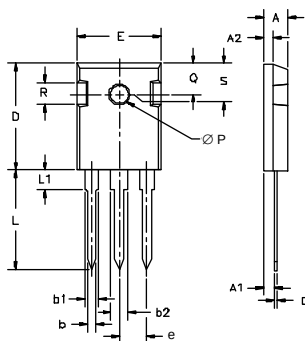
- Space savings, TO-263 AA
- Facilitates automated assembly
- Reduces assembly time and cost
- Easy to mount with 1 screw, TO-247 (isolated mounting screw hole)
- High power density

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, 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		V
I_{CES}	$V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0\text{ V}$			$200\ \mu\text{A}$ 1 mA
I_{GES}	$V_{CE} = 0\text{ V}$, $V_{GE} = \pm 20\text{ V}$			$\pm 100\text{ nA}$
$V_{CE(sat)}$	$I_C = I_{C90}$, $V_{GE} = 15\text{ V}$			2.5 V 3.0 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 $\leq 2\%$	4	8	S
C_{ies}	$V_{CE} = 25\text{ V}$, $V_{GE} = 0\text{ V}$, $f = 1\text{ MHz}$		750	pF
C_{oes}			100	pF
C_{res}			30	pF
Q_g	$I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $V_{CE} = 0.5\text{ V}_{CES}$		50	nC
Q_{ge}			15	nC
Q_{gc}			25	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $L = 100\text{ }\mu\text{H}$ $V_{CE} = 0.8\text{ V}_{CES}$ $R_G = R_{off} = 150\text{ }\Omega$ Remarks: Switching times may increase for V_{CE} (Clamp) $> 0.8 \cdot V_{CE}$ higher T_J or increased R_G		100	ns
t_{ri}			200	ns
E_{on}			0.4	mJ
$t_{d(off)}$			600	ns
t_{fi}		10N60A	300	ns
E_{off}		10N60A	0.6	mJ
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $L = 100\text{ }\mu\text{H}$ $V_{CE} = 0.8\text{ V}_{CES}$ $R_G = R_{off} = 150\text{ }\Omega$ Remarks: Switching times may increase for V_{CE} (Clamp) $> 0.8 \cdot V_{CE}$ higher T_J or increased R_G		100	ns
t_{ri}			200	ns
E_{on}			1	mJ
$t_{d(off)}$		10N60	900	1500 ns
t_{fi}		10N60A	570	2000 ns
E_{off}		10N60A	360	600 ns
R_{thJC}				1.25 K/W
R_{thCK}			0.25	K/W

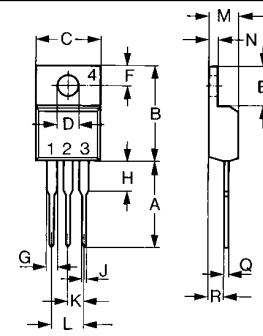
IXGA/P/IXGH 10N60 / 10N60A characteristic curves are located in the IXGH 10N60U1 and IXGH 10N60AU1 data sheet.

TO-247 AD Outline



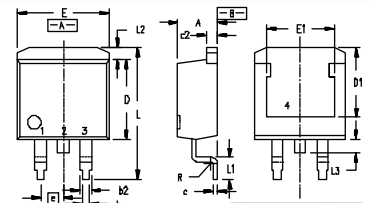
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A ₁	2.2	2.54	.087	.102
A ₂	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b ₁	1.65	2.13	.065	.084
b ₂	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L ₁		4.50		.177
ØP	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

TO-220 AB Outline



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	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

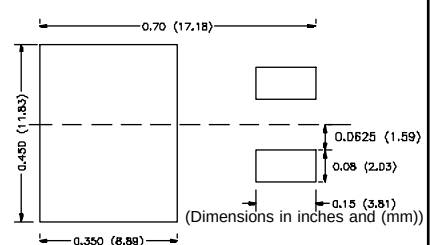
TO-263 AA Outline



- Gate
- Collector
- Emitter
- Collector Bottom Side

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.06	4.83	.160	.190
A ₁	2.03	2.79	.080	.110
b	0.51	0.99	.020	.039
b ₂	1.14	1.40	.045	.055
c	0.46	0.74	.018	.029
c ₂	1.14	1.40	.045	.055
D	8.64	9.65	.340	.380
D ₁	7.11	8.13	.280	.320
E	9.65	10.29	.380	.405
E ₁	6.86	8.13	.270	.320
e	2.54	BSC	.100	BSC
L	14.61	15.88	.575	.625
L ₁	2.29	2.79	.090	.110
L ₂	1.02	1.40	.040	.055
L ₃	1.27	1.78	.050	.070
L ₄	0	0.38	0	.015
R	0.46	0.74	.018	.029

Min. Recommended Footprint



IXYS reserves the right to change limits, test conditions, and dimensions.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715
4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025