

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

IXSH/IXSM 30N60
IXSH/IXSM 30N60A

V_{CES}	I_{C25}	$V_{CE(sat)}$
600 V	50 A	2.5 V
600 V	50 A	3.0 V

Short Circuit SOA Capability



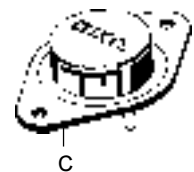
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Symbol	Test Conditions	Maximum Ratings
V_{CES}	$T_J = 25^\circ\text{C}$ to 150°C	600 V
V_{CGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GE} = 1\text{ M}\Omega$	600 V
V_{GES}	Continuous	± 20 V
V_{GEM}	Transient	± 30 V
I_{C25}	$T_C = 25^\circ\text{C}$	50 A
I_{C90}	$T_C = 90^\circ\text{C}$	30 A
I_{CM}	$T_C = 25^\circ\text{C}$, 1 ms	100 A
SSOA (RBSOA)	$V_{GE} = 15\text{ V}$, $T_J = 125^\circ\text{C}$, $R_G = 4.7\ \Omega$ Clamped inductive load, $L = 100\ \mu\text{H}$	$I_{CM} = 60$ @ $0.8 V_{CES}$
t_{SC} (SCSOA)	$V_{GE} = 15\text{ V}$, $V_{CE} = 360\text{ V}$, $T_J = 125^\circ\text{C}$ $R_G = 33\ \Omega$, non repetitive	10 μs
P_C	$T_C = 25^\circ\text{C}$	200 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	1.13/10 Nm/lb.in.
Weight		TO-204 = 18 g, TO-247 = 6 g
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300 $^\circ\text{C}$

TO-247 AD (IXSH)



TO-204 AE (IXSM)



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

Features

- International standard packages
- Guaranteed Short Circuit SOA capability
- Low $V_{CE(sat)}$
- for low on-state conduction losses
- High current handling capability
- MOS Gate turn-on
- drive simplicity
- Fast Fall Time for switching speeds up to 20 kHz

Applications

- AC motor speed control
- Uninterruptible power supplies (UPS)
- Welding

Advantages

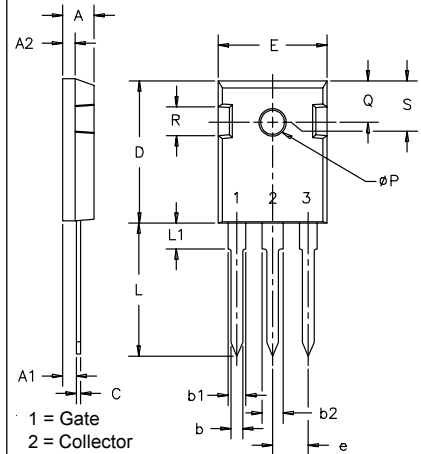
- Easy to mount with 1 screw (TO-247) (isolated mounting screw hole)
- High power density

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
$V_{GE(th)}$	$I_C = 2.5\text{ mA}$, $V_{CE} = V_{GE}$	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 1 mA
I_{GES}	$V_{CE} = 0\text{ V}$, $V_{GE} = \pm 20\text{ V}$			± 100 nA
$V_{CE(sat)}$	$I_C = I_{C90}$, $V_{GE} = 15\text{ V}$ 30N60 30N60A			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, $t_{CE} \leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$	7	13	S
$I_{C(on)}$	$V_{GE} = 15\text{ V}$, $V_{CE} = 10\text{ V}$		100	A
C_{ies}	$V_{CE} = 25\text{ V}$, $V_{GE} = 0\text{ V}$, $f = 1\text{ MHz}$		2760	pF
C_{oes}			240	pF
C_{res}			51	pF
Q_g	$I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $V_{CE} = 0.5\text{ V}_{CES}$		110	nC
Q_{ge}			34	nC
Q_{gc}			47	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $L = 100\ \mu\text{H}$ $V_{CE} = 0.8\text{ V}_{CES}$, $R_G = 4.7\ \Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$, higher T_J or increased R_G		60	ns
t_{ri}			130	ns
$t_{d(off)}$			400	ns
t_{fi}		30N60 30N60A	400 200	ns ns
E_{off}		30N60 30N60A	5.0 2.5	mJ mJ
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $L = 100\ \mu\text{H}$ $V_{CE} = 0.8\text{ V}_{CES}$, $R_G = 4.7\ \Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$, higher T_J or increased R_G		60	ns
t_{ri}			130	ns
E_{on}			1.0	mJ
$t_{d(off)}$		30N60 30N60A	540 340	1000 525 ns
t_{fi}		30N60 30N60A	600 340	1500 700 ns
E_{off}	30N60 30N60A	12 6	mJ mJ	
R_{thJC}				0.63 KW
R_{thCK}			0.25	KW

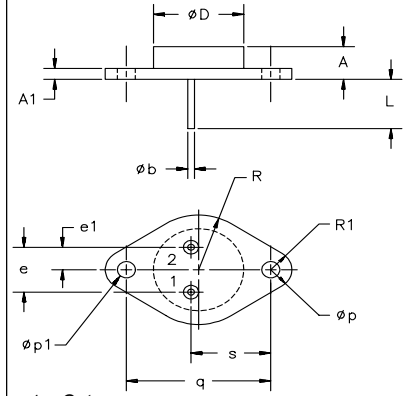
IXSH 30N60 and IXSH 30N60A characteristic curves are located on the IXSH 30N60U1 and IXSH 30N60AU1 data sheets.

TO-247 AD Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.209	4.7	5.3
A1	.087	.102	2.2	2.54
A2	.059	.098	2.2	2.6
b	.040	.055	1.0	1.4
b1	.065	.084	1.65	2.13
b2	.113	.123	2.87	3.12
C	.016	.031	.4	.8
D	.819	.845	20.80	21.46
E	.610	.640	15.75	16.26
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1	.177		4.50	
ϕP	.140	.144	3.55	3.65
Q	.212	.244	5.4	6.2
R	.170	.216	4.32	5.49
S	.242 BSC		6.15 BSC	

TO-204AE Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.250	.450	6.4	11.4
A1	.060	.135	1.53	3.42
ϕb	.057	.063	1.45	1.60
ϕD	.875		22.22	
e	.420	.440	10.67	11.17
e1	.205	.225	5.21	5.71
L	.440	.480	11.18	12.19
ϕp	.151	.165	3.84	4.19
$\phi p1$.151	.165	3.84	4.19
q	1.187 BSC		30.15 BSC	
R	.495	.525	12.58	13.33
R1	.131	.188	3.33	4.77
s	.655	.675	16.64	17.14

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