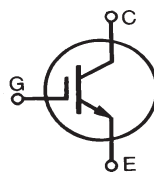


HiPerFAST™ IGBT

Short Circuit SOA Capability

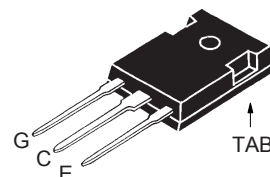
IXSH24N60
IXSH24N60A

V_{CES}	I_{C90}	$V_{CE(sat)}$
600V	24A	2.2V
600V	24A	2.7V



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}	$T_C = 25^\circ\text{C}$	48	A
I_{C90}	$T_C = 90^\circ\text{C}$	24	A
I_{CM}	$T_C = 25^\circ\text{C}$, 1ms	96	A
SSOA	$V_{GE} = 15\text{V}$, $T_J = 125^\circ\text{C}$, $R_G = 10\Omega$	$I_{CM} = 48$	A
(RBSOA)	Clamped inductive load	@ $0.8 \cdot V_{CES}$	V
t_{SC}	$V_{GE} = 15\text{V}$, $V_{CE} = 360\text{V}$, $T_J = 125^\circ\text{C}$	10	μs
(SCSOA)	$R_G = 82\Omega$, non repetitive		
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	1.13 / 10	Nm/lb.in.
T_L	Maximum lead temperature for soldering	300	$^\circ\text{C}$
T_{SOLD}	1.6mm (0.062 in.) from case for 10s	260	$^\circ\text{C}$
Weight		6	g

TO-247 (IXSH)



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

Features

- International standard package JEDEC TO-247AD
- High frequency IGBT with guaranteed Short Circuit SOA Capability
- 2nd generation HDMOS™ process
- Low $V_{CE(sat)}$ - for low on-state conduction losses
- 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
- Welding

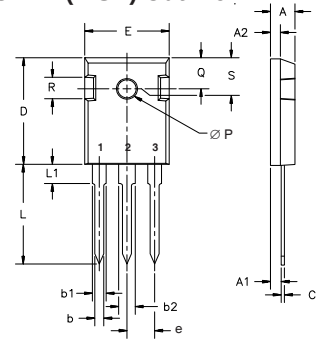
Advantages

- Easy to mount with 1 screw (isolated mounting screw hole)
- Switching speed for high frequency applications
- High power density

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu\text{A}$, $V_{CE} = V_{GE}$	600		V
$V_{GE(th)}$	$I_C = 1.5\text{mA}$, $V_{CE} = V_{GE}$	4.0		7.0 V
I_{CES}	$V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0\text{V}$ $T_J = 125^\circ\text{C}$			200 μA 1 mA
I_{GES}	$V_{CE} = 0\text{V}$, $V_{GE} = \pm 20\text{V}$			± 100 nA
$V_{CE(sat)}$	$I_C = 24\text{A}$, $V_{GE} = 15\text{V}$, Note 1	IXSH24N60 IXSH24N60A		2.2 V 2.7 V

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$I_C = 24\text{A}$, $V_{CE} = 10\text{V}$, Note 1	9	23	S
$I_{C(ON)}$	$V_{GE} = 15\text{V}$, $V_{CE} = 10\text{V}$		65	A
C_{ies}	$V_{CE} = 25\text{V}$, $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$		1800	pF
C_{oes}			160	pF
C_{res}			45	pF
Q_g	$I_C = 24\text{A}$, $V_{GE} = 15\text{V}$, $V_{CE} = 0.5 \cdot V_{CES}$		75	nC
Q_{ge}			20	nC
Q_{gc}			35	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 24\text{A}$, $V_{GE} = 15\text{V}$ $V_{CE} = 480\text{V}$, $R_G = 10\Omega$		100	ns
t_{ri}			200	ns
$t_{d(off)}$			450	ns
t_{fi}		IXSH24N60	500	ns
E_{off}		IXSH24N60A	275	ns
		IXSH24N60A	2.0	mJ
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = 24\text{A}$, $V_{GE} = 15\text{V}$ $V_{CE} = 480\text{V}$, $R_G = 10\Omega$		100	ns
t_{ri}			200	ns
E_{on}			1.2	mJ
$t_{d(off)}$			475	ns
		IXSH24N60	600	ns
		IXSH24N60A	450	ns
t_{fi}		IXSH24N60	4.0	mJ
E_{off}		IXSH24N60A	3.0	mJ
R_{thJC}				0.83 $^\circ\text{C/W}$
R_{thCK}			0.21	$^\circ\text{C/W}$

TO-247 (IXSH) Outline



Terminals: 1 - Gate 2 - Drain
3 - Source Tab - Drain

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
L1		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	

Notes: 1. Pulse test, $t \leq 300\mu\text{s}$; duty cycle, $d \leq 2\%$.

ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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IXYS MOSFETs and IGBTs are covered 4,835,592 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585 7,005,734 B2 7,157,338B2
by one or more of the following U.S. patents: 4,850,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692 7,063,975 B2
4,881,106 5,034,796 5,187,117 5,486,715 6,306,728 B1 6,583,505 6,710,463 6,771,478 B2 7,071,537