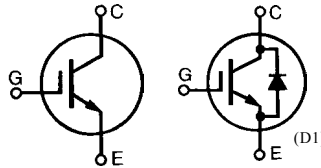


High Speed IGBT

Short Circuit SOA Capability

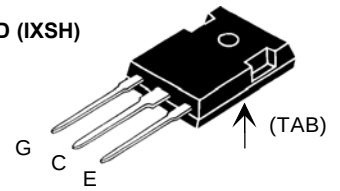
IXSH 24N60B
IXST 24N60B
IXSH 24N60BD1
IXST 24N60BD1

$V_{CES} = 600 \text{ V}$
 $I_{C25} = 48 \text{ A}$
 $V_{CE(sat)} = 2.5 \text{ V}$
 $t_{fi \text{ typ}} = 170 \text{ ns}$

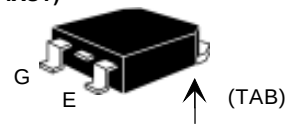


Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	600	V
V_{CGR}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1 \text{ M}\Omega$	600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$	48	A
I_{C90}	$T_C = 90^\circ\text{C}$	24	A
I_{CM}	$T_C = 25^\circ\text{C}, 1 \text{ ms}$	96	A
SSOA (RBSOA)	$V_{GE} = 15 \text{ V}, T_J = 125^\circ\text{C}, R_G = 33 \Omega$ Clamped inductive load, $V_{CC} = 0.8 V_{CES}$	$I_{CM} = 48$ @ $0.8 V_{CES}$	A
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	$T_C = 25^\circ\text{C}$	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.	
Weight		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-268 (D3) (IXST)



G = Gate
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 50 kHz

Applications

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

Advantages

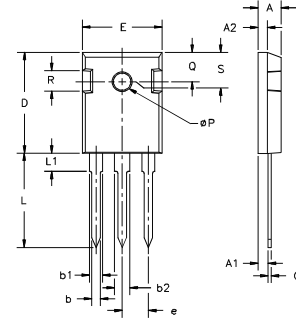
- Easy to mount with 1 screw (TO-247) (isolated mounting screw hole)
- High power density

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
$V_{GE(th)}$	$I_C = 1.5 \text{ mA}, V_{CE} = V_{GE}$	3.5		6.5 V
I_{CES}	$V_{CE} = 0.8 \cdot V_{CES}$ $T_J = 25^\circ\text{C}$	24N60B		25 μA
		24N60BD1		200 μA
	$V_{GE} = 0 \text{ V}$ $T_J = 125^\circ\text{C}$	24N60B		1 mA
		24N60BD1		2 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

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 %	9	13	S
C_{ies}	V _{CE} = 25 V, V _{GE} = 0 V, f = 1 MHz	24N60B 24N60BD1	1450	pF
C_{oes}			130	pF
C_{res}			160	pF
Q_G	I _C = I _{C90} , V _{GE} = 15 V, V _{CE} = 0.5 V _{CES}		41	nC
Q_{GE}			18	nC
Q_{GC}			18	nC
t_{d(on)}	Inductive load, T _J = 25°C I _C = I _{C90} , V _{GE} = 15 V, L = 100 μH V _{CE} = 0.8 V _{CES} , R _G = 33 Ω		50	ns
t_{ri}			50	ns
t_{d(off)}			150	250 ns
t_{fi}			170	300 ns
E_{off}			1.3	2.6 mJ
t_{d(on)}	Inductive load, T _J = 125°C I _C = I _{C90} , V _{GE} = 15 V, V _{CE} = 0.8 V _{CES} , R _G = 33 Ω		55	ns
t_{ri}			75	ns
E_{on}			1.2	mJ
t_{d(off)}			190	ns
t_{fi}			280	ns
E_{off}			2.4	mJ
R_{thJC}				0.83 K/W
R_{thCK}			0.25	K/W

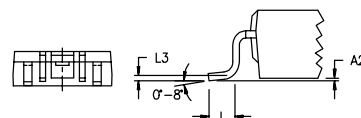
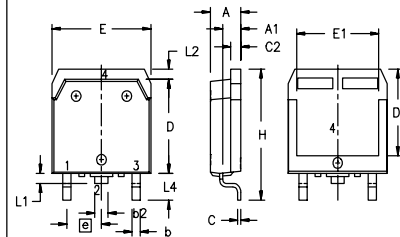
Reverse Diode (FRED)		Characteristic Values (T _J = 25°C, unless otherwise specified)		
Symbol	Test Conditions	min.	typ.	max.
V_F	I _F = I _{C90} , V _{GE} = 0 V, T _J = 150°C Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 % T _J = 25°C			1.6 V 2.5 V
I_{RM}	I _F = I _{C90} , V _{GE} = 0 V, -di _F /dt = 100 A/μs V _R = 100 V T _J = 100°C I _F = 1 A; -di/dt = 100 A/μs; V _R = 30 V T _J = 25°C		6	A
t_{rr}			100	ns
t_{rr}			25	ns
R_{thJC}				0.9 K/W

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-268 Outline



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.9	5.1	.193	.201
A ₁	2.7	2.9	.106	.114
A ₂	.02	.25	.001	.010
b	1.15	1.45	.045	.057
b ₂	1.9	2.1	.075	.083
C	.4	.65	.016	.026
D	13.80	14.00	.543	.551
E	15.85	16.05	.624	.632
E ₁	13.3	13.6	.524	.535
e	5.45 BSC		.215 BSC	
H	18.70	19.10	.736	.752
L	2.40	2.70	.094	.106
L ₁	1.20	1.40	.047	.055
L ₂	1.00	1.15	.039	.045
L ₃	0.25 BSC		.010 BSC	
L ₄	3.80	4.10	.150	.161

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