

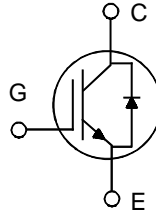
# IGBT with Diode IXSH25N120AU1

"S" Series - Improved SCSOA Capability

$$I_{C25} = 50 \text{ A}$$

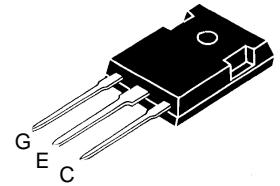
$$V_{CES} = 1200 \text{ V}$$

$$V_{CE(sat)} = 4.0 \text{ V}$$



Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	1200	V
$V_{CGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GE} = 1 \text{ M}\Omega$	1200	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ\text{C}$	50	A
$I_{C90}$	$T_C = 90^\circ\text{C}$	25	A
$I_{CM}$	$T_C = 25^\circ\text{C}$ , 1 ms	80	A
<b>SSOA</b> <b>(RBSOA)</b>	$V_{GE} = 15 \text{ V}$ , $T_J = 125^\circ\text{C}$ , $R_G = 33 \Omega$ Clamped inductive load, $L = 100 \mu\text{H}$	$I_{CM} = 50$ @ $0.8 V_{CES}$	A
$t_{sc}$	$T_J = 125^\circ\text{C}$ , $V_{CE} = 720 \text{ V}$ ; $V_{GE} = 15 \text{ V}$ , $R_G = 33 \Omega$	10	$\mu\text{s}$
$P_C$	$T_C = 25^\circ\text{C}$	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	1.15/10	Nm/lb-in.
<b>Weight</b>		6	g
<b>Max. Lead Temperature for Soldering</b> (1.6mm from case for 10s)		300	$^\circ\text{C}$

TO-247 AD



## Features

- High frequency IGBT with guaranteed short circuit SOA capability.
- IGBT with anti-parallel diode in one package
- 2<sup>nd</sup> generation HDMOS<sup>TM</sup> process  
Low  $V_{CE(sat)}$   
- for minimum on-state conduction losses
- MOS Gate turn-on  
- drive simplicity

## Applications

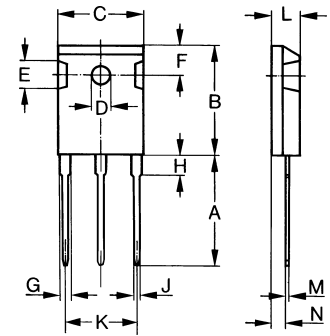
- AC motor speed control
- DC servo and robot drives
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies
- DC choppers

## Advantages

- Saves space (two devices in one package)
- Easy to mount (isolated mounting hole)
- Reduces assembly time and cost
- Operates cooler
- Easier to assemble

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ unless otherwise specified)		
		Min.	Typ.	Max.
$BV_{CES}$	$I_C = 4 \text{ mA}$ , $V_{GE} = 0 \text{ V}$	1200		V
$V_{GE(th)}$	$I_C = 2.5 \text{ mA}$ , $V_{CE} = V_{GE}$	4		8 V
$I_{CES}$	$V_{CE} = 0.8 V_{CES}$ , $V_{GE} = 0 \text{ V}$ Note 2			$T_J = 25^\circ\text{C}$ : 500 $\mu\text{A}$ $T_J = 125^\circ\text{C}$ : 8 mA
$I_{GES}$	$V_{CE} = 0 \text{ V}$ , $V_{GE} = \pm 20 \text{ V}$			$\pm 100 \text{ nA}$
$V_{CE(sat)}$	$I_C = I_{C90}$ , $V_{GE} = 15 \text{ V}$			4.0 V

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$I_C = I_{C90}, V_{CE} = 10\text{ V}$ , Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $\leq 2\%$	10	17	S
$I_{C(on)}$	$V_{GE} = 15\text{ V}, V_{CE} = 10\text{ V}$		140	A
$C_{ies}$	$V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$		2850	pF
$C_{oes}$			210	pF
$C_{res}$			50	pF
$Q_g$	$I_C = I_{C90}, V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$		120	nC
$Q_{ge}$			30	nC
$Q_{gc}$			50	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$		100	ns
$t_{ri}$	$I_C = I_{C90}, V_{GE} = 15\text{ V}, L = 100\ \mu\text{H}$		200	ns
$t_{d(off)}$	$R_G = 18\ \Omega, V_{CLAMP} = 0.8 V_{CES}$		450	ns
$t_{fi}$	Note 1		650	ns
$t_c$			800	ns
$E_{off}$			9.6	mJ
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$		100	ns
$t_{ri}$	$I_C = I_{C90}, V_{GE} = 15\text{ V}, L = 100\ \mu\text{H}$		200	ns
$E_{(on)}$	$R_G = 18\ \Omega$		1.8	mJ
$t_{d(off)}$	$V_{CLAMP} = 0.8 V_{CES}$		450	ns
$t_{fi}$	Note 1		900	ns
$t_c$			1200	ns
$E_{off}$			17	mJ
$R_{thJC}$				0.63 K/W
$R_{thCK}$		0.25		K/W

**TO-247 AD (IXSH) Outline**


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	19.81	20.32	0.780	0.800
B	20.80	21.46	0.819	0.845
C	15.75	16.26	0.610	0.640
D	3.55	3.65	0.140	0.144
E	4.32	5.49	0.170	0.216
F	5.4	6.2	0.212	0.244
G	1.65	2.13	0.065	0.084
H	-	4.5	-	0.177
J	1.0	1.4	0.040	0.055
K	10.8	11.0	0.426	0.433
L	4.7	5.3	0.185	0.209
M	0.4	0.8	0.016	0.031
N	1.5	2.49	0.087	0.102

**Reverse Diode (FRED)**

**Characteristic Values**  
( $T_J = 25^\circ\text{C}$  unless otherwise specified)

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$V_F$	$I_F = I_{C90}, V_{GE} = 0\text{ V}$ Pulse test, $t < 300\ \mu\text{s}$ , duty cycle $< 2\%$			2.5 V
	$T_J = 125^\circ\text{C}$			2.2 V
$t_{rr}$	$I_F = 1\text{ A}; di/dt = -100\ \mu\text{s}; V_R = 30\text{ V};$	$T_J = 25^\circ\text{C}$	40	60 ns
$I_{RM}$	$I_F = I_{C90}, V_{GE} = 0\text{ V}, -di_F/dt = 240\ \text{A}/\mu\text{s}$		16	A
$t_{rr}$	$T_J = 100^\circ\text{C}, V_R = 540\text{ V}$		300	ns
$R_{thJC}$				1.0 K/W

**Notes:**

- 1) Switching times may increase for  $V_{CE}$  (Clamp)  $> 0.8 V_{CES}$ , higher  $T_J$  or  $R_g$  values.
- 2) Device must be heatsunk for high temperature measurements to avoid thermal runaway.