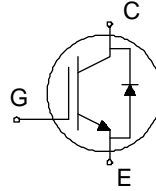


## IGBT with Diode

"S" Series - Improved SCSOA Capability



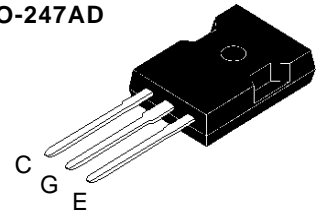
$$I_{C25} = 30 \text{ A}$$

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

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

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
$I_{C25}$	$T_C = 25^\circ\text{C}$	30	A
$I_{C90}$	$T_C = 90^\circ\text{C}$	15	A
$I_{CM}$	$T_C = 25^\circ\text{C}, 1 \text{ ms}$	60	A
<b>SSOA (RBSOA)</b>	$V_{GE} = 15 \text{ V}, T_J = 125^\circ\text{C}, R_G = 82 \Omega$ Clamped inductive load, $L = 100 \mu\text{H}$	$I_{CM} = 30$ @ $0.8 V_{CES}$	A
$t_{sc}$	$T_J = 125^\circ\text{C}, V_{CE} = 720 \text{ V}; V_{GE} = 15 \text{ V}, R_G = 82 \Omega$	5	$\mu\text{s}$
$P_C$	$T_C = 25^\circ\text{C}$	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	1.15/10	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-247AD



### Features

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

### Applications

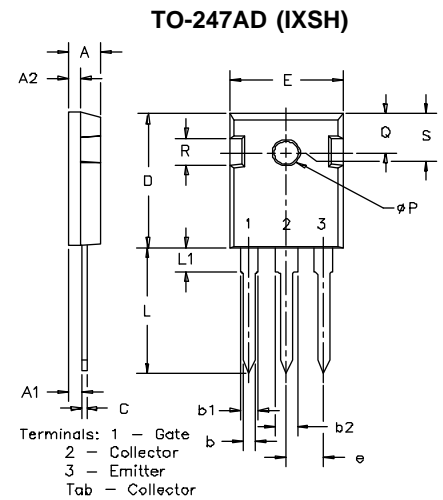
- AC motor speed control
- DC servo and robot drives
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies
- DC choppers

### 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 ( $T_J = 25^\circ\text{C}$ unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{CES}$	$I_C = 4.0 \text{ mA}, V_{GE} = 0 \text{ V}$	1200		V
$V_{GE(th)}$	$I_C = 1.5 \text{ mA}, V_{CE} = V_{GE}$	4		8 V
$I_{CES}$	$V_{CE} = 0.8 V_{CES}, V_{GE} = 0 \text{ V}$ Note 2			$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ 500 $\mu\text{A}$ 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 $\leq 2\%$	6	7	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
$Q_g$	$I_C = I_{C90}, V_{GE} = 15\text{ V}$ , $V_{CE} = 0.5 V_{CES}$		75	nC
$Q_{ge}$			20	nC
$Q_{gc}$			35	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
$t_{d(off)}$	$R_G = 82\ \Omega$ , $V_{CLAMP} = 0.8 V_{CES}$		450	ns
$t_{fi}$	Note 1		600	ns
$t_c$			750	ns
$E_{off}$			5.4	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
$E_{(on)}$	$R_G = 82\ \Omega$		TBD	mJ
$t_{d(off)}$	$V_{CLAMP} = 0.8 V_{CES}$			ns
$t_{fi}$	Note 1		900	ns
$t_c$			1200	ns
$E_{off}$			14.5	mJ
$R_{thJC}$				0.83 K/W
$R_{thCK}$			0.25	K/W



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
phi P	.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	

### Reverse Diode (FRED)

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

	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 $< 2\%$ $T_J = 125^\circ\text{C}$			2.3 V 2.1
$t_{rr}$	$I_F = 1\text{ A}$ ; $di/dt = -100\text{ A}/\mu\text{s}$ ; $V_R = 30\text{ V}$ ; $T_J = 25^\circ\text{C}$		40	60 ns
$I_{RM}$	$I_F = I_{C90}, V_{GE} = 0\text{ V}$ , $-di_F/dt = 240\text{ A}/\mu\text{s}$		16	18 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 leakage current measurements to avoid thermal runaway.

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