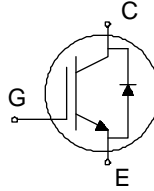


IGBT with Diode

"S" Series - Improved SCSOA Capability



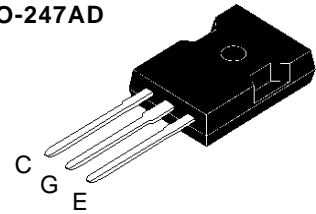
$$I_{C25} = 30 \text{ A}$$

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

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

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C}$ to 150°C	1200	V
V_{CGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GE} = 1 \text{ M}\Omega$	1200	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 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 ms	60	A
SSOA (RBSOA)	$V_{GE} = 15 \text{ V}$, $T_J = 125^\circ\text{C}$, $R_G = 82 \Omega$ 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	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	1.15/10	Nm/lb-in.
Weight		6	g
Max. Lead Temperature for Soldering (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
- 2nd generation HDMOS™ process
Low $V_{CE(sat)}$
- for minimum on-state conduction losses
- MOS Gate turn-on
- drive simplicity

Applications

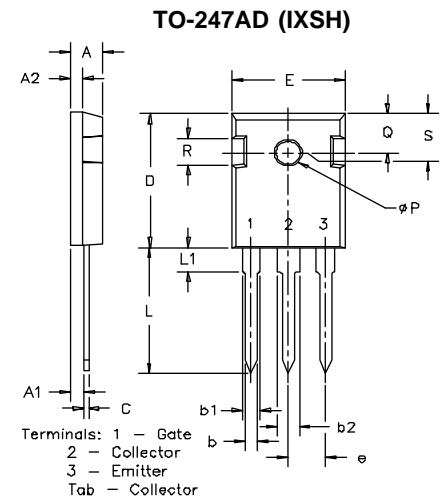
- AC motor speed control
- DC servo and robot drives
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies
- DC choppers

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 μA 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.