

IGBT with Diode

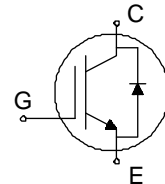
"S" Series - Improved SCSOA Capability

$$I_{C25} = 20 \text{ A}$$

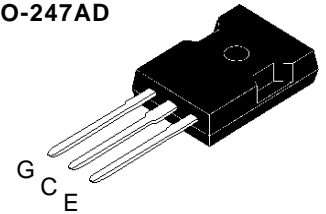
$$V_{CES} = 1200 \text{ V}$$

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

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}	$T_C = 25^\circ\text{C}$	20	A
I_{C90}	$T_C = 90^\circ\text{C}$	10	A
I_{CM}	$T_C = 25^\circ\text{C}$, 1 ms	40	A
SSOA	$V_{GE} = 15 \text{ V}$, $T_J = 125^\circ\text{C}$, $R_G = 150 \Omega$	$I_{CM} = 20$	A
(RBSOA)	Clamped inductive load, $L = 300 \mu\text{H}$	@ $0.8 V_{CES}$	
t_{sc}	$T_J = 125^\circ\text{C}$, $V_{CE} = 720 \text{ V}$; $V_{GE} = 15 \text{ V}$, $R_G = 150 \Omega$	5	μs
P_C	$T_C = 25^\circ\text{C}$	100	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 voltage 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

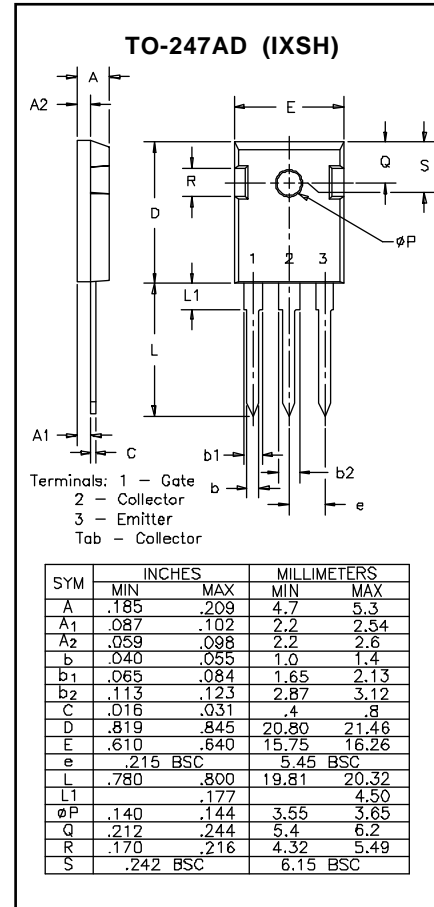
- AC motor speed control
- DC servo and robot drives
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies
- DC choppers

Advantages

- Saves space (two devices in one package)
- Easy to mount (isolated mounting hole)
- Reduces assembly time and cost
- Runs cooler than equivalent 6-pack IGBTs
- Easier to package to meet UL requirements

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$ unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 3.25 \text{ mA}$, $V_{GE} = 0 \text{ V}$	1200		V
$V_{GE(th)}$	$I_C = 750 \mu\text{A}$, $V_{CE} = V_{GE}$	4		8 V
I_{CES}	$V_{CE} = 0.8 V_{CES}$, $V_{GE} = 0 \text{ V}$ Note 2			400 μA 5 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	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 %	4		S
I_{C(on)}	V _{GE} = 15V, V _{CE} = 10 V		37	A
C_{ies}	V _{CE} = 25 V, V _{GE} = 0 V, f = 1 MHz		800	pF
C_{oes}			53	pF
C_{res}			15	pF
Q_g	I _C = I _{C90'} , V _{GE} = 15 V, V _{CE} = 0.5 V _{CES}		40	nC
Q_{ge}			12	nC
Q_{gc}			20	nC
t_{d(on)}	Inductive load, T _J = 25°C		100	ns
t_{ri}	I _C = I _{C90'} , V _{GE} = 15 V, L = 300μH		200	ns
t_{d(off)}	R _G = 120 Ω, V _{CLAMP} = 0.8 V _{CES}		250	ns
t_{fi}	Note 1		620	ns
t_c			750	ns
E_{off}			2.5	mJ
t_{d(on)}	Inductive load, T _J = 125°C		100	ns
t_{ri}	I _C = I _{C90'} , V _{GE} = 15 V, L = 300μH		200	ns
E_(on)	R _G = 120 Ω		TBD	mJ
t_{d(off)}	V _{CLAMP} = 0.8 V _{CES}		300	ns
t_{fi}	Note 1		1100	ns
t_c			1200	ns
E_{off}			4.0	mJ
R_{thJC}				1.25 K/W
R_{thCK}			0.25	K/W



Symbol	Test Conditions	Characteristic Values		
		(T _J = 25°C unless otherwise specified)		
		Min.	Typ.	Max.
V_F	I _F = I _{C90'} , V _{GE} = 0V Pulse test, t < 300 μs, duty cycle < 2% T _J = 125°C			2.6 V 2.3
t_{rr}	I _F = 1A; di/dt = -50A/μs; V _R = 30V; T _J = 25°C		50	70 ns
I_{RM}	I _F = I _{C90'} , V _{GE} = 0V, -di _F /dt = 100 A/μs		6.5	7.2 A
t_{rr}	T _J = 100°C, V _R = 540V		300	ns
R_{thJC}				2.0 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.