IXYS

ADVANCE TECHNICAL DATA SHEET* Data Sheet No. 3400A March 1989

MOSIGBT with Anti-Parallel Rectifier

PART NUMBER

IXGH10N50U1

$I_{C(cont)}$ ..... 20 A
$V_{(BR)CES}$ ..... 500 V
$V_{CE(sat)}$ ..... 3.0 V

FEATURES:

- High Voltage MOSIGBT and Anti-Parallel Rectifier in One Package
- Low $V_{CE(SAT)}$ for Low On-State Conduction Losses
- Fast Fall Times for Switching Speeds up to 30 KHz
- MOS Gate Turn-On Drive Simplicity
- Very Fast Rectifier for Increased Efficiency

APPLICATIONS:

- Motor Control
- Uninterruptible Power Supplies (UPS)
- SMPS

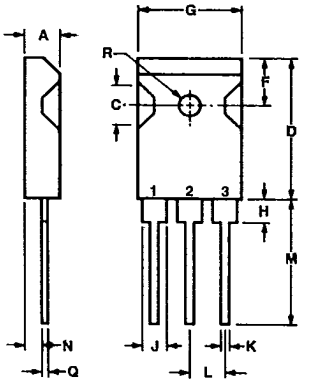
MAXIMUM RATINGS

Parameter		Sym.		Unit
Collector-Emitter Voltage (1)		V_{CES}	500	V_{dc}
Collector-Gate Voltage (R_{GE}=1.0MΩ) (1)		V_{CGR}	500	V_{dc}
Gate-Emitter Voltage Continuous		V_{GE}	±20	V_{dc}
Gate-Emitter Voltage Transient		V_{GEM}	±30	V
Collector Current, Continuous	(T_C = 25 °C)	I_{C25}	20	A_{dc}
	(T_C = 90 °C)	I_{C90}	10	A_{dc}
Collector Current, Pulsed (3)		I_{CM}	40	A
Diode Forward Current	(T_C = 25 °C)	I_{F25}	20	A
	(T_C = 90 °C)	I_{F90}	10	A
Diode Forward Current, Pulsed (3)		I_{FM}	40	A
Total Power Dissipation		P_C	100	W
Power Dissipation Derating (T_C > 25 °C)			.83	W/°C
Operating and Storage Temperature		T_J & T_{stg}	-55 to +150	°C
Thermal Resistance		R_{thJC} IGBT	1.2	°C/W
		R_{thJC} Diode	2.0	°C/W
Thermal Resistance		R_{thCS}	.25 (typ)	°C/W
Max. Lead Temp. for Soldering (10sec)		T_L	300	°C
Mounting Torque		M_M	10	in-lb
Terminal Torque		M_T	N/A	in-lb

*The data supplied herein reflects the Design Technical Objective Specification. The subject products are in Product Development. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

PACKAGE

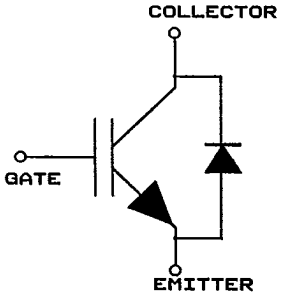
TO-247



PIN 1. GATE
2. COLLECTOR
3. EMITTER

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.70	5.30	.185	.209
C	4.32	5.49	.170	.216
D	20.80	21.46	.819	.845
F	5.4	6.2	.212	.244
G	15.75	16.26	.610	.640
H	—	4.50	—	.177
J	1.65	2.13	.065	.084
K	1.00	1.40	.040	.055
L	5.45 BSC.		.215 BSC.	
M	19.81	20.32	.780	.800
N	1.50	2.49	.087	.102
Q	0.40	0.80	.016	.031
R	3.55	3.65	.140	.144

CIRCUIT DIAGRAM



ELECTRICAL CHARACTERISTICS (T_C = 25 °C unless otherwise specified)

IXGH10N50U1

CHARACTERISTIC	TEST CONDITION		SYMBOL	MIN	TYP	MAX	UNIT
Collector-Emitter Breakdown Voltage	I_C = 500 µA, V_{CE} = 0 V		$V_{(BR)CES}$	500	—	—	V
Gate-Emitter Threshold Voltage	I_C = 500 µA, V_{CE} = V_{GE}		$V_{GE(th)}$	2.5	—	5.0	V
Gate-Emitter Leakage Current	V_{GE} = ±20 V, V_{CE} = 0V		I_{GES}	—	—	500	nA
Collector Leakage Current	V_{CE} = $V_{(BR)CES}$, V_{GE} = 0 V		I_{CES}	—	—	1	mA
	V_{CE} = .8 x $V_{(BR)CES}$, V_{GE} = 0 V, T_J = 125 °C		I_{CES}	—	—	10	mA
Collector-Emitter Saturation Voltage	I_C = I_{C90}, V_{GE} = 15 V	T_J = 25 °C	$V_{CE(sat)}$	—	—	3.0	V
		T_J = 125 °C	$V_{CE(sat)}$	—	—	3.5	V
Forward Transconductance (2)	I_C = I_{C90} x 0.5, V_{CE} = 20 V		g_{fs}	4.0	—	—	S
Input Capacitance	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		C_{ies}	—	—	1200	pF
Output Capacitance			C_{oes}	—	—	200	pF
Reverse Transfer Capacitance			C_{res}	—	—	30	pF
Total Gate Charge	V_{GE} = 10 V, I_C = I_{C90}, V_{CE} = $V_{(BR)CES}$ x 0.8		Q_g	—	—	—	nC
Gate-Emitter Charge			Q_{ge}	—	—	—	nC
Gate-Collector ("Miller") Charge			Q_{gc}	—	—	—	nC

SWITCHING CHARACTERISTICS (T_C = 25 °C unless otherwise specified)

Resistive Load					
Turn-On Delay Time	I_C = I_{C90}	$t_{d(on)}$	—	—	100	ns
Current Rise Time	V_{CC} = 0.8 x $V_{(BR)CES}$, V_{GE} = 15 V, R_G = 42 Ω	t_r	—	—	200	ns
Turn-Off Delay Time		$t_{d(off)}$	—	—	500	ns
Current Fall Time		t_f	—	—	500	ns
Inductive Load					
Turn-Off Delay Time	I_C = I_{C90}, T_J = 125 °C (4)	$t_{d(off)}$	—	—	500	ns
Current Fall Time	V_{CC} = 0.8 x $V_{(BR)CES}$, V_{GE} = 15 V, R_G = 42 Ω	t_f	—	—	600	ns
Turn-off Energy		E_{off}	—	—	1	mJ

REVERSE DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C unless otherwise specified)

Diode Forward Voltage (2)	I_F = I_{C90}, V_{GE} = 0 V		V_F	—	—	1.75	V
Reverse Recovery Time	I_F = I_{C90}, dI_F/dt = 100 A/µs, V_R = 100 V	T_J = 25 °C	t_{rr}	—	—	150	ns
		T_J = 125 °C	t_{rr}	—	—	300	ns
Reverse Recovery Charge	I_F = I_{C90}, dI_F/dt = 100 A/µs, V_R = 100 V	T_J = 25 °C	Q_{rr}	—	—	.53	µC
		T_J = 125 °C	Q_{rr}	—	—	1.8	µC
Peak Recovery Current	I_F = I_{C90}, dI_F/dt = 100 A/µs, V_R = 100 V	T_J = 25 °C	$I_{RM(rec)}$	—	—	7	A
		T_J = 125 °C	$I_{RM(rec)}$	—	—	12	A

(1) T_J = 25 °C to 150 °C
(2) Pulse Test: Pulse width ≤ 300 µS, duty cycle ≤ 2%
(3) Repetitive Rating: Pulse width limited by max. junction temperature
(4) Switching times may increase for V_{CE} (Clamp) > 0.8 x $V_{(BR)CES}$ or T_J > 125 °C

IXYS Corporation • 2355 Zanker Rd., San Jose, CA 95131-1109 • TEL: (408) 435-1900 • TLX: 384928 IXYS SNJ UD • FAX: (408) 435-0670