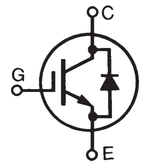
IXYS

High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

IXBH 10N170
IXBT 10N170

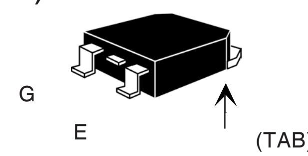
V_{CES} = 1700 V
I_{C25} = 20 A
$V_{CE(sat)}$ = 3.8 V

Preliminary Data Sheet

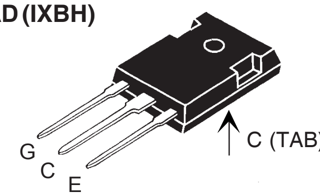


Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	1700	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ	1700	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	20	A
I_{C90}	T_C = 90°C	10	A
I_{CM}	T_C = 25°C, 1 ms	40	A
SSOA (RBSOA)	V_{GE} = 15 V, T_{VJ} = 125°C, R_G = 33 Ω Clamped inductive load	I_{CM} = 20 V_{CES} = 1350	A V
P_C	T_C = 25°C	140	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
Maximum Lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	°C
Maximum Tab temperature for soldering SMD devices for 10 s		260	°C
M_d	Mounting torque (M3) (TO-247)	1.13/10Nm/lb.in.	
Weight	TO-247 AD	6	g
	TO-268	4	g

TO-268 (IXBT)



TO-247 AD (IXBH)



G = Gate, C = Collector,
E = Emitter, TAB = Collector

Features

- High Blocking Voltage
- JEDEC TO-268 surface and JEDEC TO-247 AD
- Low conduction losses
- High current handling capability
- MOS Gate turn-on
  - drive simplicity
- Molding epoxies meet UL 94 V-0 flammability classification

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
BV_{CES}	I_C = 250 µA, V_{GE} = 0 V		1700			V
	Temperature Coefficent			0.10		%/K
$V_{GE(th)}$	I_C = 250 µA, V_{CE} = V_{GE}		3.0		5.0	V
	Temperature Coefficent			- 0.24		%/K
I_{CES}	V_{CE} = 0.8 V_{CES}	T_J = 25°C			10	µA
	V_{GE} = 0 V	T_J = 125°C			100	µA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±100	nA
$V_{CE(sat)}$	I_C = I_{C90}, V_{GE} = 15 V			3.4	3.8	V
		T_J = 125°C		4.1		V

Applications

- AC motor speed control
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies
- Capacitor discharge circuits

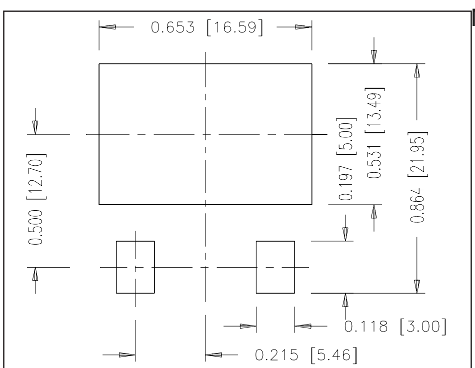
Advantages

- High power density
- Suitable for surface mounting
- Easy to mount with 1 screw, (isolated mounting screw hole)

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 %	4.0	6.5		S
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		700		pF
C_{oes}			40		pF
C_{res}			12		pF
Q_g	$I_C = I_{C90}$, V_{GE} = 15 V, $V_{CE} = 0.5\ V_{CES}$		30		nC
Q_{ge}			6		nC
Q_{gc}			10		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C** $I_C = I_{C90}$, V_{GE} = 15 V $V_{CE} = 0.8\ V_{CES}$, $R_G = R_{off}$ = 56 Ω		35		ns
t_{ri}			28		ns
$t_{d(off)}$			500		ns
t_{fi}			1000		ns
E_{off}			6		mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C** $I_C = I_{C90}$, V_{GE} = 15 V $V_{CE} = 0.8\ V_{CES}$, $R_G = R_{off}$ = 56 Ω		35		ns
t_{ri}			28		ns
E_{on}			0.7		mJ
$t_{d(off)}$			600		ns
t_{fi}			1200		ns
E_{off}			8		mJ
R_{thJC}				0.89	K/W
R_{thCK}	(TO-247)		0.25		K/W

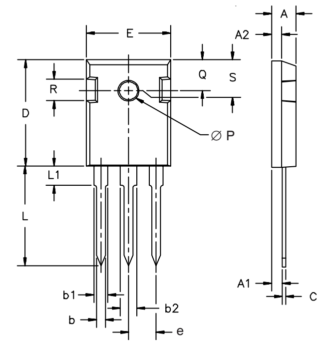
Reverse Diode

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
V_F	$I_F = I_{C90}$, V_{GE} = 0 V, Pulse test, t ≤ 300 us, duty cycle d ≤ 2%			3.0	V
I_{RM}	$I_F = I_{C90}$, V_{GE} = 0 V, $-di_F/dt$ = 50 A/us, v_R = 100 V		10		A
t_{rr}			360		ns



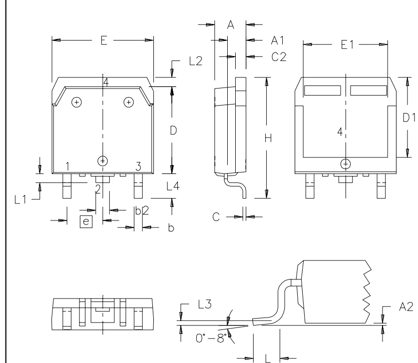
Min Recommended Footprint

TO-247 AD Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
∅P	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15 BSC		242 BSC	

TO-268 Outline



SYM	INCHES MIN	MAX	MILLIMETERS MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

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

Fig. 1. Output Characteristics @ 25 Deg. C

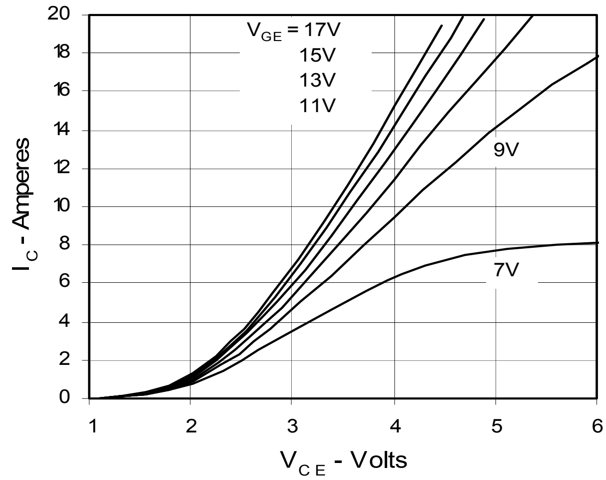


Fig. 2. Extended Output Characteristics @ 25 deg. C

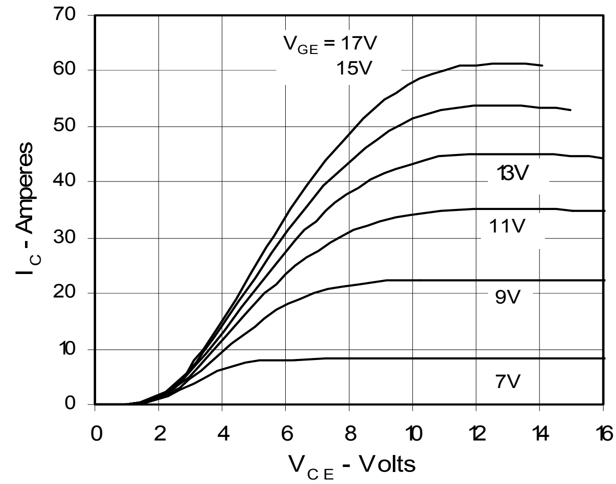


Fig. 3. Output Characteristics @ 125 Deg. C

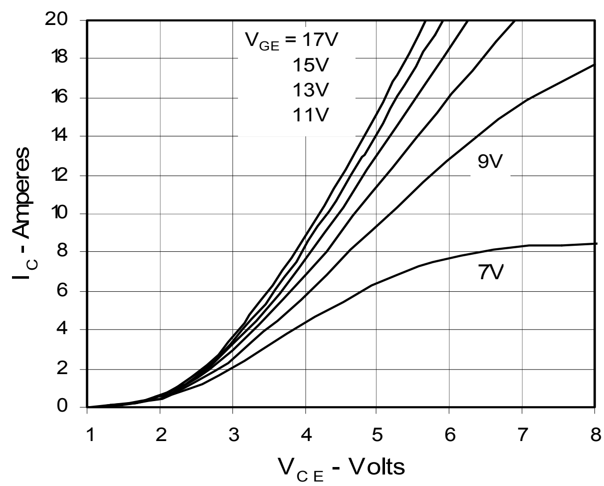


Fig. 4. Temperature Dependence of $V_{CE(sat)}$

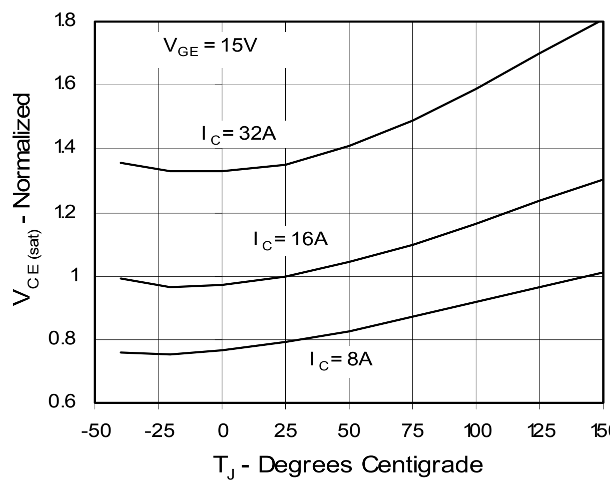


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emiiter voltage

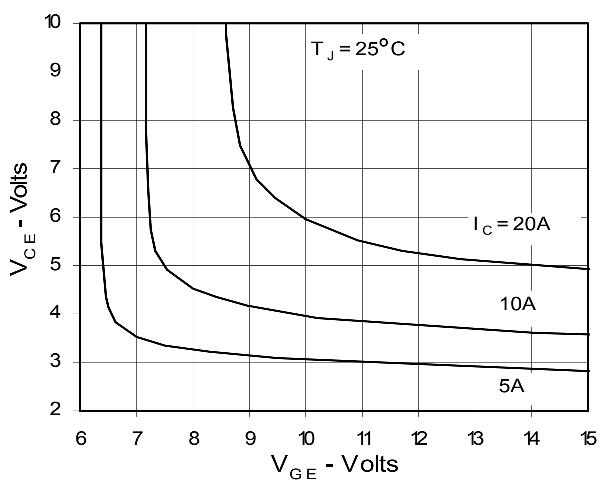


Fig. 6. Input Admittance

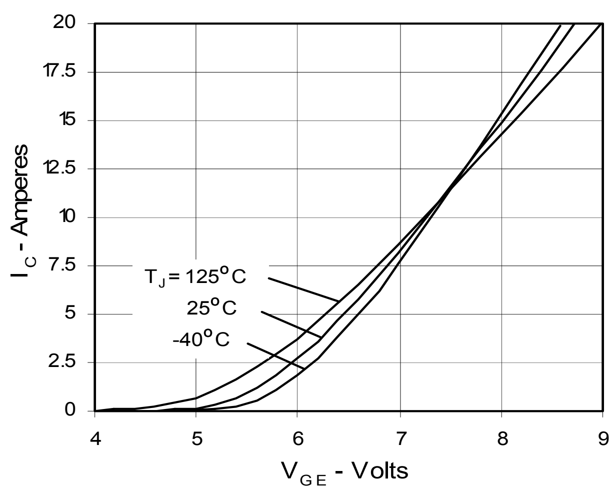


Fig. 7. Transconductance

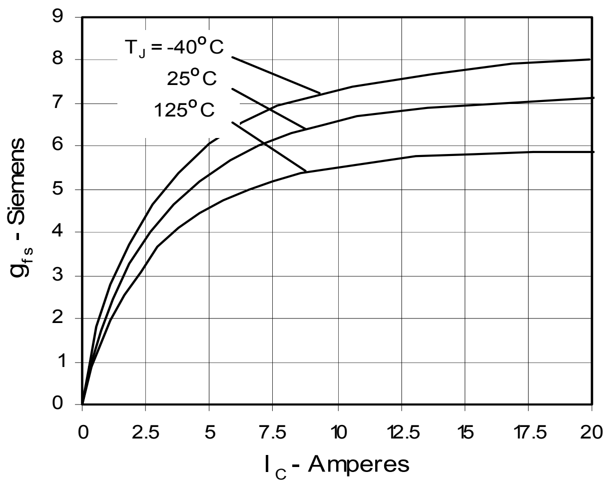


Fig. 8. Forward Voltage Drop of Intrinsic Diode

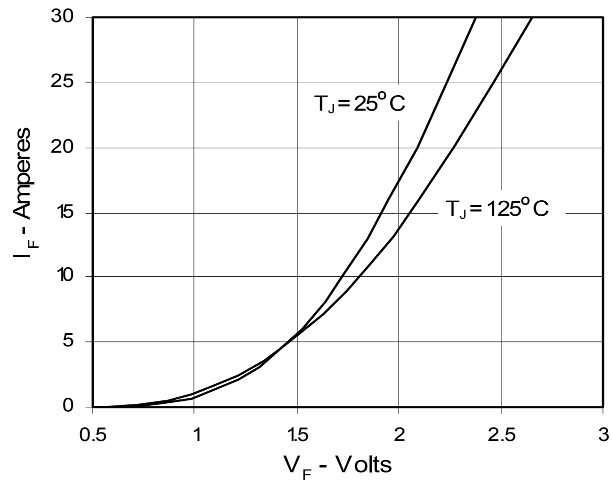


Fig. 9. Dependence of E_{off} on R_G

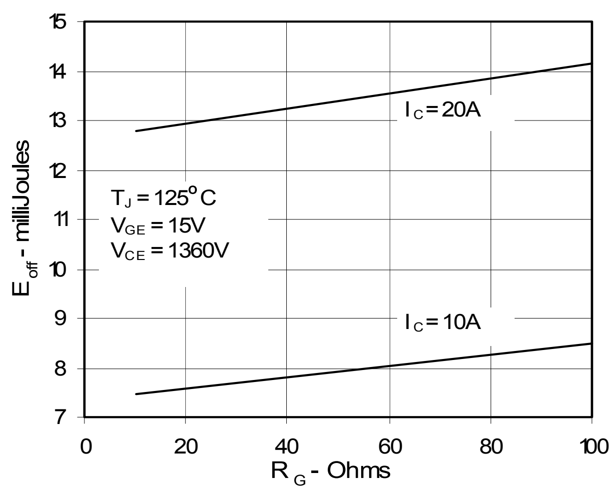


Fig. 10. Dependence of E_{off} on I_C

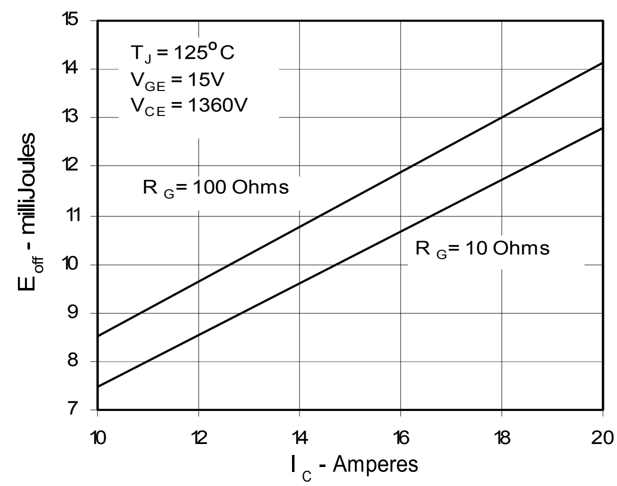


Fig. 11. Dependence of E_{off} on Temperature

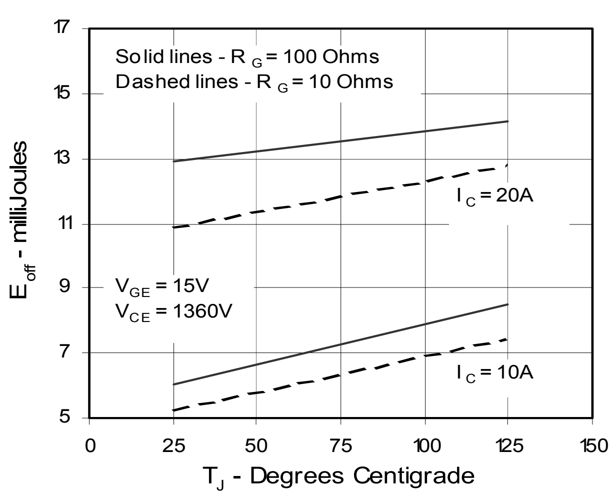


Fig. 12. Gate Charge

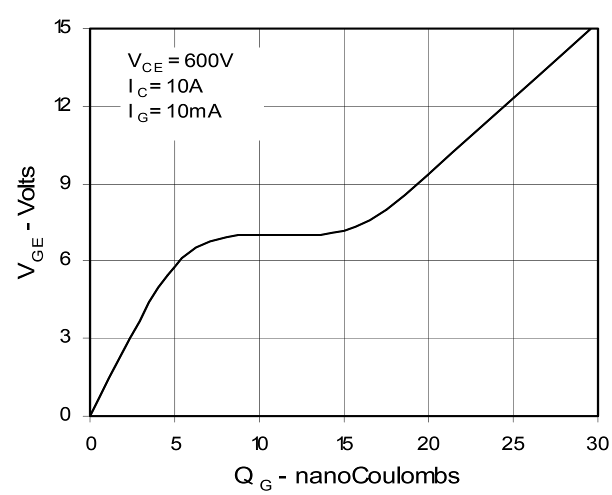


Fig. 12. Capacitance

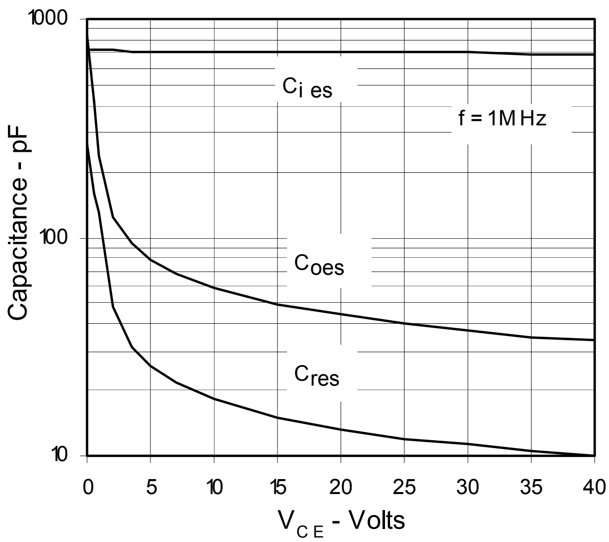


Fig. 13. Maximum Transient Thermal Resistance