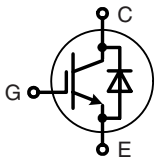
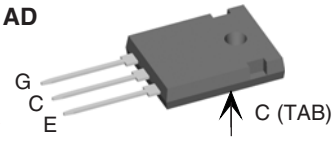
High Voltage BIMOSFET™ Monolithic Bipolar MOS Transistor

N-Channel, Enhancement Mode

I_{C25} = 33 A
V_{CES} = 1600 V
$V_{CE(sat)}$ = 6.2 V typ.
t_{fi} = 40 ns



TO-247 AD



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

Symbol	Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	1600	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ	1600	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	33	A
I_{C90}	T_C = 90°C	20	A
I_{CM}	T_C = 25°C, 1 ms	40	A
SSOA (RBSOA)	V_{GE} = 15 V, T_{VJ} = 125°C, R_G = 22 Ω V_{CE} = 0.8·V_{CES} Clamped inductive load, L = 100 µH	I_{CM} = 40	A
P_C	T_C = 25°C	350	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6 mm (0.063 in) from case for 10 s	300	°C
M_d	Mounting torque	1.15/10	Nm/lb.in.
Weight		6	g

Symbol	Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
BV_{CES}	I_C = 1 mA, V_{GE} = 0 V	1600			V
$V_{GE(th)}$	I_C = 2 mA, V_{CE} = V_{GE}	4		8	V
I_{CES}	V_{CE} = 0.8·V_{CES} T_J = 25°C			400	µA
	V_{GE} = 0 V T_J = 125°C			3	mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V			± 500	nA
$V_{CE(sat)}$	I_C = I_{C90}, V_{GE} = 15 V		6.2	7.1	V
	T_J = 125°C			7.8	V

Features

- International standard package JEDEC TO-247 AD
- High Voltage BIMOSFET™
  - replaces high voltage Darlingtons and series connected MOSFETs
  - lower effective $R_{DS(on)}$
- Monolithic construction
  - high blocking voltage capability
  - very fast turn-off characteristics
- MOS Gate turn-on
  - drive simplicity
- Intrinsic diode

Applications

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

Advantages

- Easy to mount with 1 screw (isolated mounting screw hole)
- Space savings
- High power density

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

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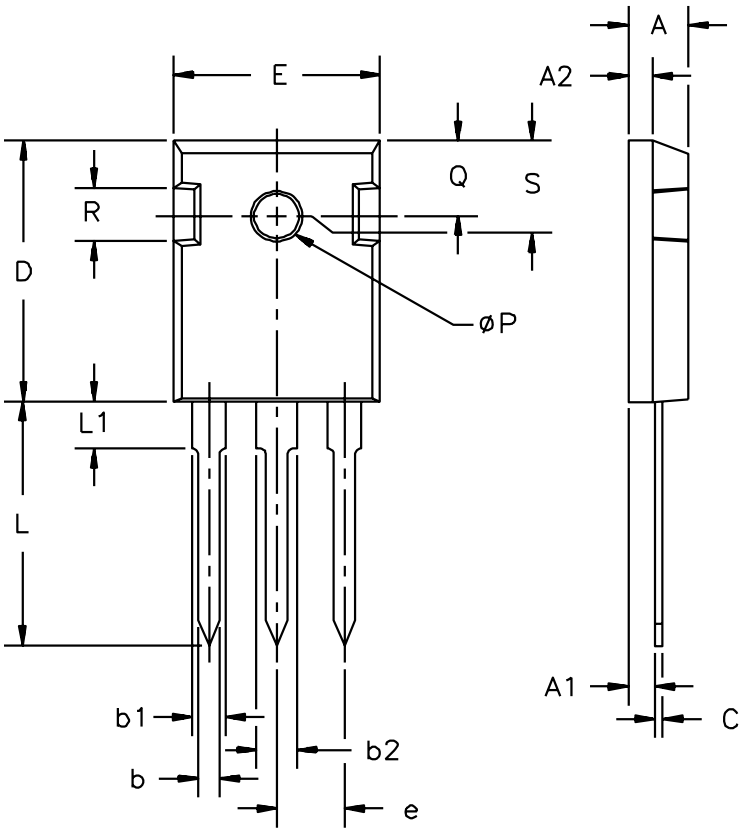
Symbol	Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		3300		pF
C_{oes}			220		pF
C_{res}			30		pF
Q_g	I_C = 20 A, V_{CE} = 600 V, V_{GE} = 15 V		130		nC
$t_{d(on)}$	**Inductive load, T_J = 125°C**		200		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15 V, L = 100 µH,		60		ns
$t_{d(off)}$	V_{CE} = 960 V, R_G = 22 Ω		270		ns
t_{fi}			40		ns
R_{thJC}				0.35	K/W
R_{thCK}			0.25		K/W

Reverse Conduction

Symbol	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 µs, duty cycle d ≤ 2%		2.5	5	V

TO-247 AD Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	19.81	20.32	0.780	0.800
B	20.80	21.46	0.819	0.845
C	15.75	16.26	0.610	0.640
D	3.55	3.65	0.140	0.144
E	4.32	5.49	0.170	0.216
F	5.4	6.2	0.212	0.244
G	1.65	2.13	0.065	0.084
H	-	4.5	-	0.177
J	1.0	1.4	0.040	0.055
K	10.8	11.0	0.426	0.433
L	4.7	5.3	0.185	0.209
M	0.4	0.8	0.016	0.031
N	1.5	2.49	0.087	0.102

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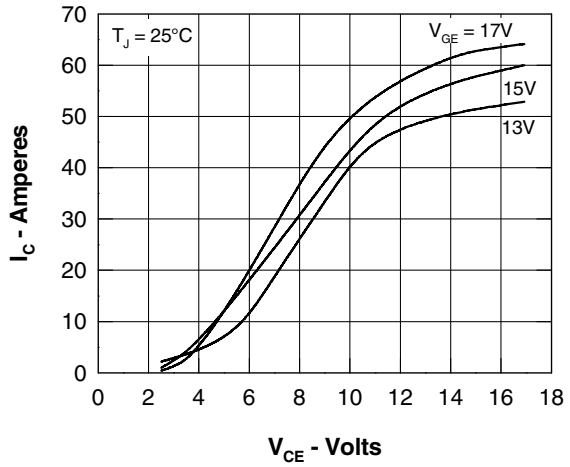

Fig. 1 Typ. Output Characteristics

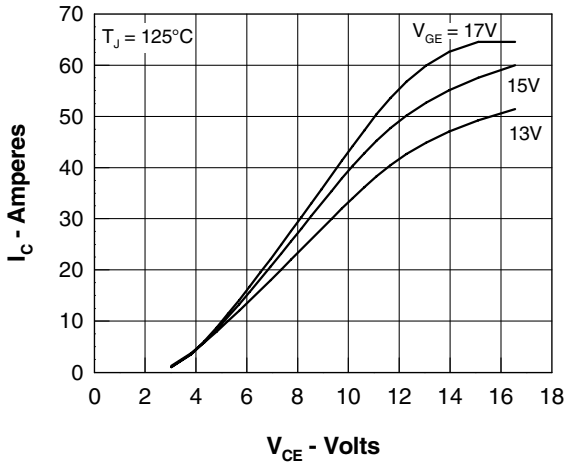

Fig. 2 Typ. Output Characteristics

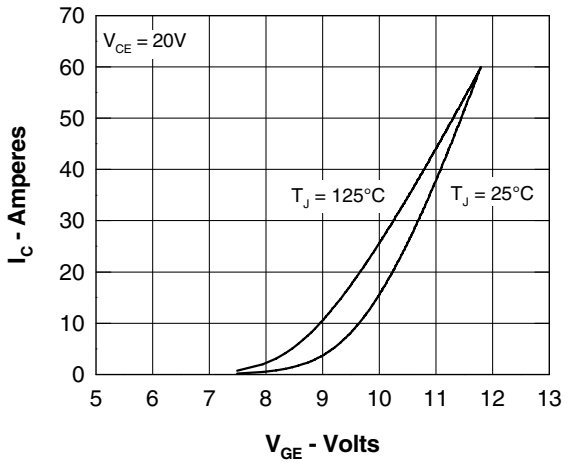

Fig. 3 Typ. Transfer Characteristics

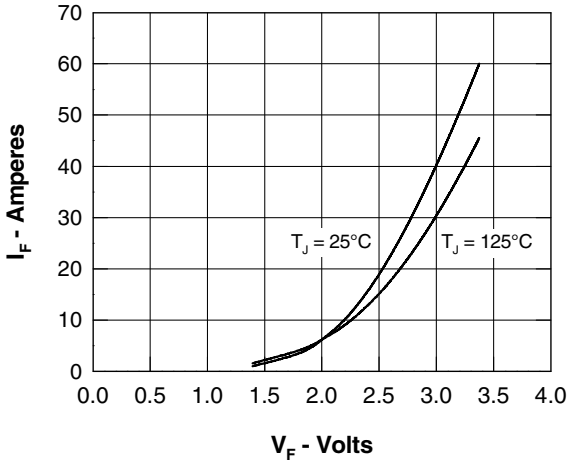

Fig. 4 Typ. Characteristics of Reverse Conduction

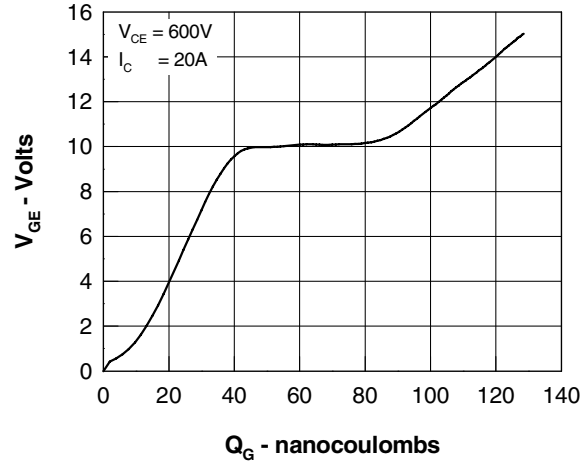

Fig. 5 Typ. Gate Charge characteristics

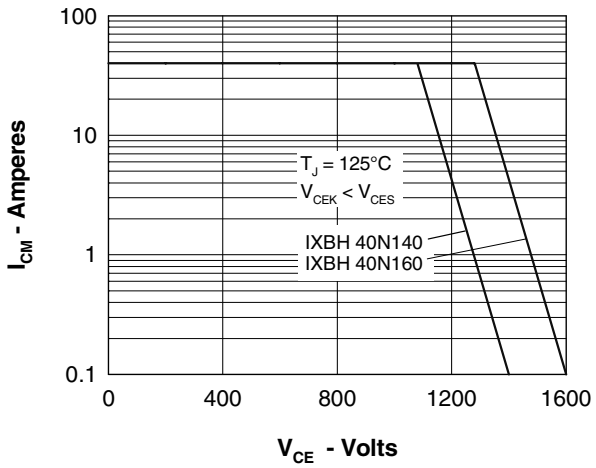

Fig. 6 Reverse Based Safe Operating Area RBSOA

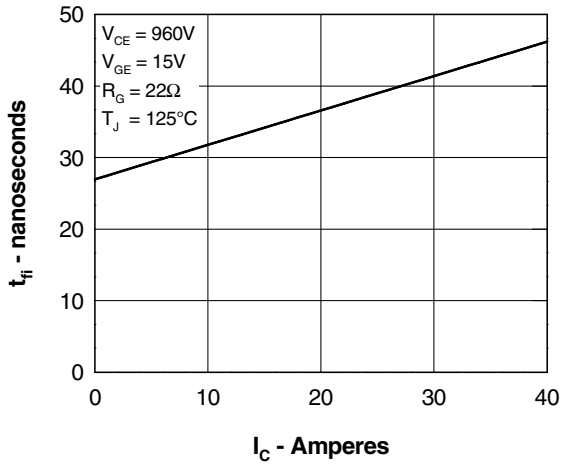

Fig. 7 Typ. Fall Time

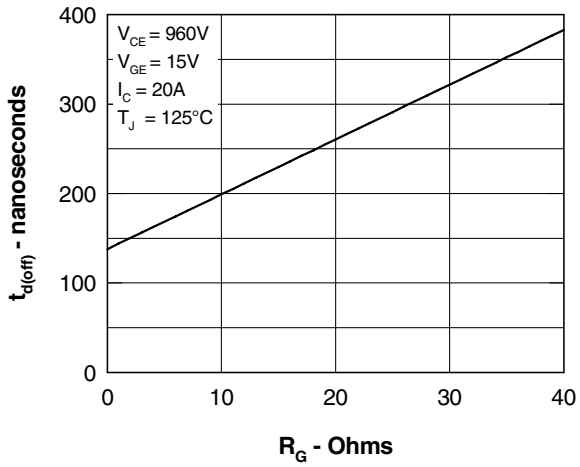

Fig. 8 Typ. Turn Off Delay Time

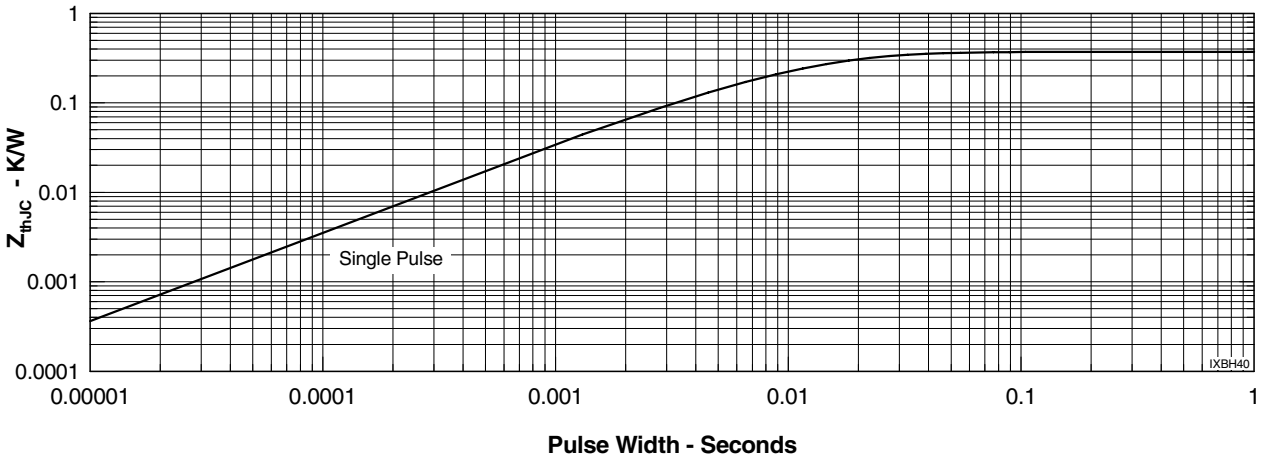

Fig. 9 Typ. Transient Thermal Impedance