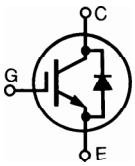
High Voltage BIMOSFET™ Monolithic Bipolar MOS Transistor

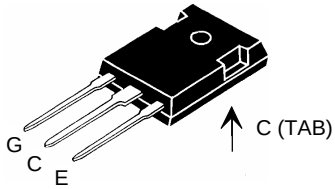
N-Channel, Enhancement Mode

IXBH 15N140
IXBH 15N160

V_{CES} = 1400/1600 V
I_{C25} = 15 A
$V_{CE(sat)}$ = 5.8 V typ.
t_{fi} = 40 ns



TO-247 AD



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

Symbol	Conditions	Maximum Ratings 15N140	15N160	
V_{CES}	T_J = 25°C to 150°C	1400	1600	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ	1400	1600	V
V_{GES}	Continuous		±20	V
V_{GEM}	Transient		±30	V
I_{C25}	T_C = 25°C,		15	A
I_{C90}	T_C = 90°C		9	A
I_{CM}	T_C = 25°C, 1 ms		18	A
SSOA (RBSOA)	V_{GE} = 15 V, T_{VJ} = 125°C, R_G = 47 Ω V_{CE} = 0.8•V_{CES} Clamped inductive load, L = 100 µH		I_{CM} = 18	A
P_C	T_C = 25°C		150	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	15N140	1400			V
		15N160	1600			V
$V_{GE(th)}$	I_C = 1 mA, V_{CE} = V_{GE}		4		8	V
I_{CES}	V_{CE} = 0.8 • V_{CES}	T_J = 25°C			100	µA
	V_{GE} = 0 V	T_J = 125°C			0.5	mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				± 500	nA
$V_{CE(sat)}$	I_C = I_{C90}, V_{GE} = 15 V			5.8	7.0	V
		T_J = 125°C			8.0	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
- Reverse conducting capability

Applications

- Flyback converters
- 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

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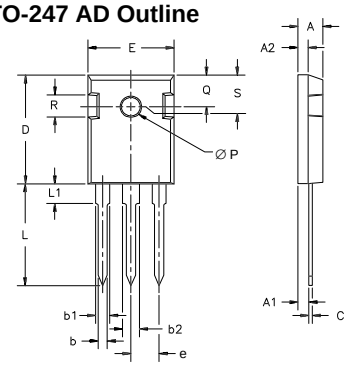
Symbol	Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		1200		pF
C_{oes}			80		pF
C_{res}			11		pF
Q_g	I_C = 9 A, V_{CE} = 0.5 • V_{CES}, V_{GE} = 15 V		tbd		nC
Q_{ge}			tbd		nC
Q_{gc}			tbd		nC
$t_{d(on)}$	**Inductive load, T_J = 125°C**		200		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15 V, L = 100 µH,		60		ns
E_{on}	V_{CE} = 960 V, R_G = 47 Ω		0.55		mJ
$t_{d(off)}$	Remarks: Switching times may increase		180		ns
t_{fi}	for V_{CE} (Clamp) > 960 V, higher T_J or		40		ns
E_{off}	increased R_G		0.45		mJ
R_{thJC}				0.83	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 %			4.1	V

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	

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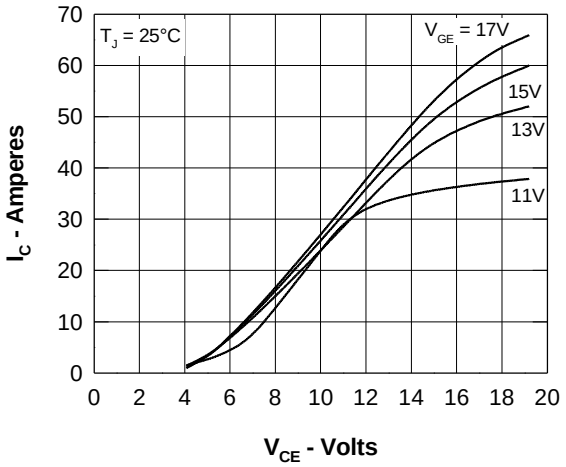

Fig. 1 Typ. Output Characteristics

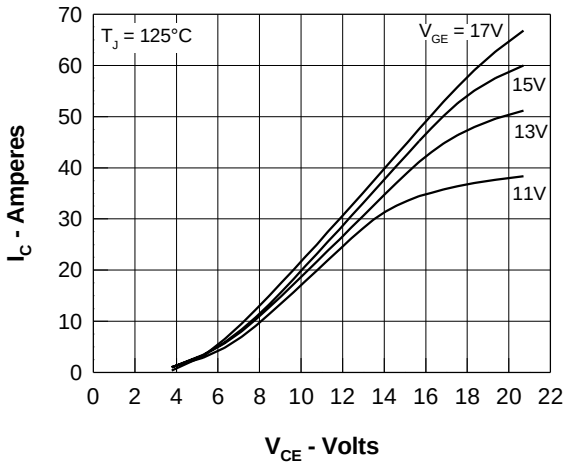

Fig. 2 Typ. Output Characteristics

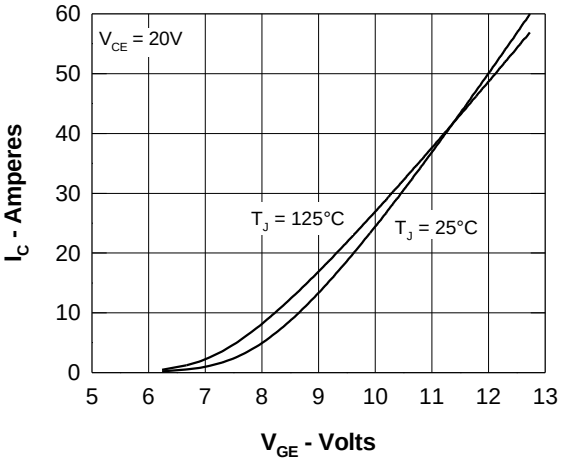

Fig. 3 Typ. Transfer Characteristics

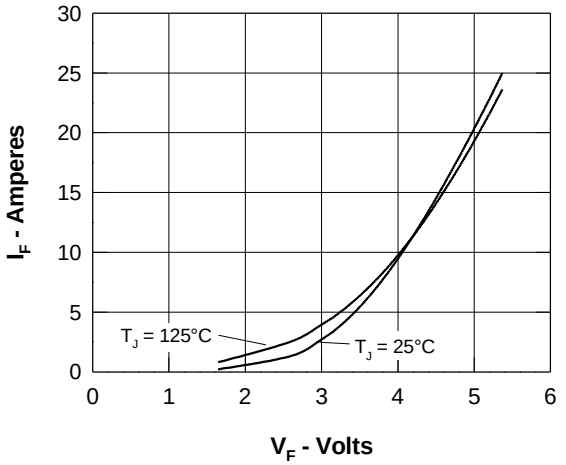

Fig. 4 Typ. Characteristics of Reverse Conduction

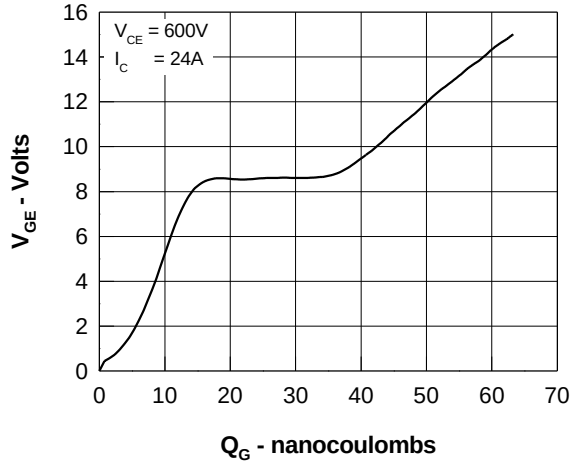

Fig. 5 Typ. Gate Charge characteristics

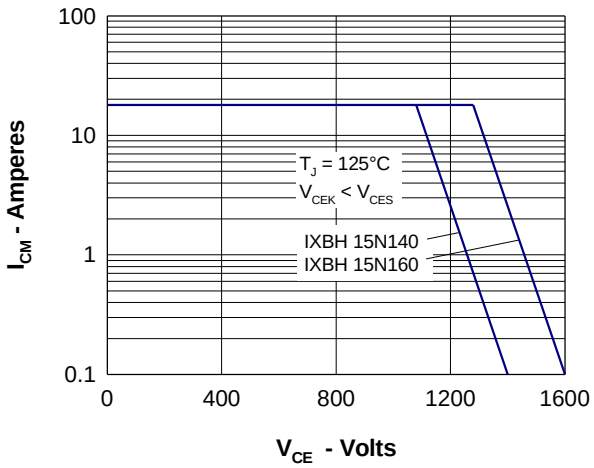

Fig. 6 Reverse Biased Safe Operating Area RBSOA

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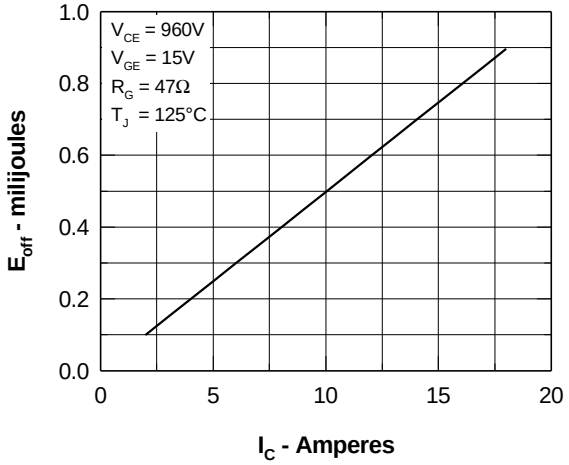

Fig. 7 Typ. Turn off energy

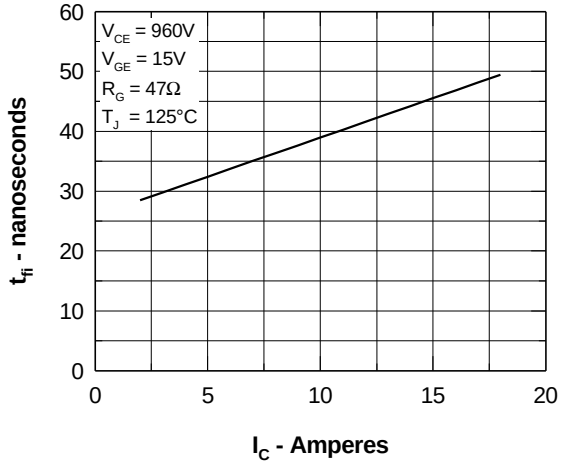

Fig. 8 Typ. Collector Current Fall Time

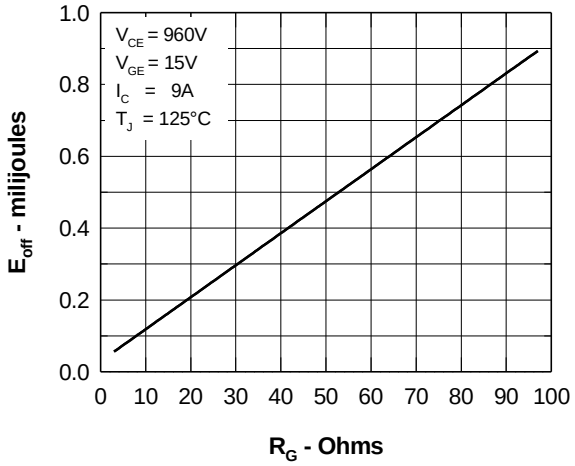

Fig. 9 Typ. Turn Off Energy

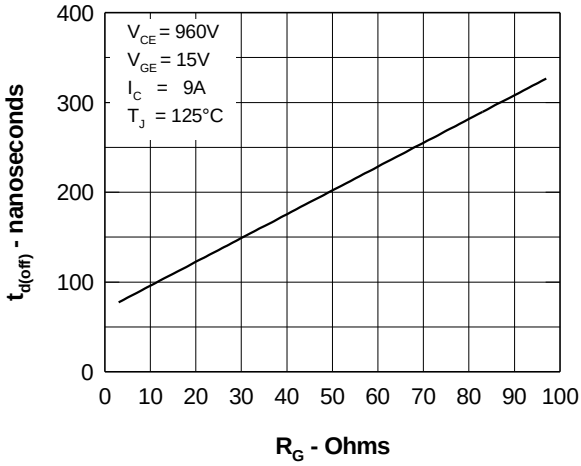

Fig.10 Typ. Turn Off Delay Time

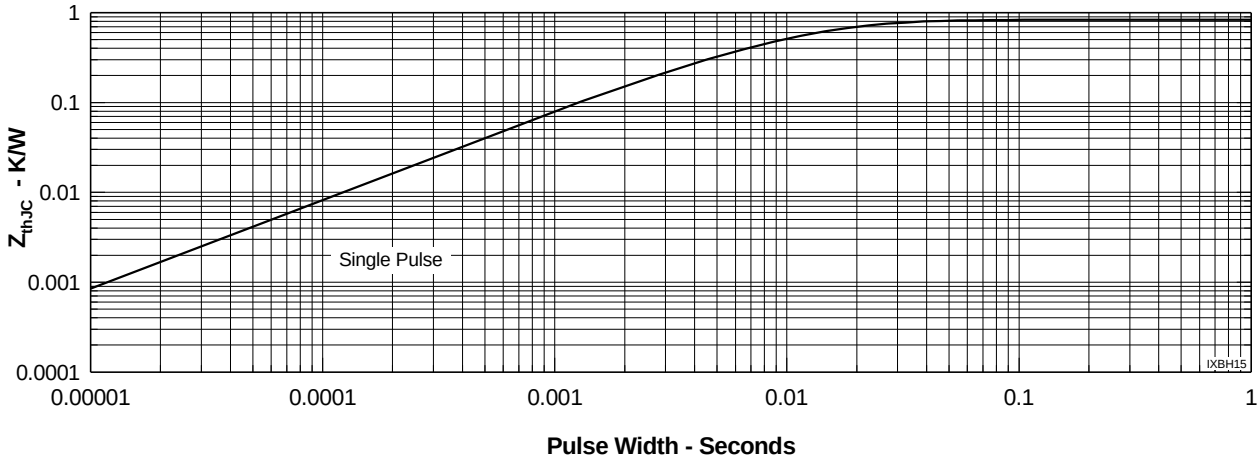

Fig. 11 Typ. Transient Thermal Impedance

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