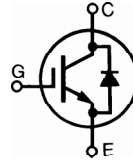


# High Voltage BIMOSFET™ Monolithic Bipolar MOS Transistor

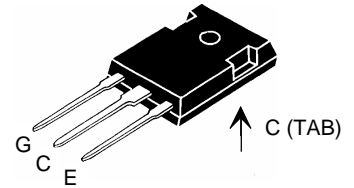
N-Channel, Enhancement Mode

**IXBH 15N140**  
**IXBH 15N160**

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



TO-247 AD



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

Symbol	Conditions	Maximum Ratings		
		15N140	15N160	
$V_{CES}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	1400	1600	V
$V_{CGR}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1\text{ M}\Omega$	1400	1600	V
$V_{GES}$	Continuous		$\pm 20$	V
$V_{GEM}$	Transient		$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ\text{C},$		15	A
$I_{C90}$	$T_C = 90^\circ\text{C}$		9	A
$I_{CM}$	$T_C = 25^\circ\text{C}, 1\text{ ms}$		18	A
<b>SSOA (RBSOA)</b>	$V_{GE} = 15\text{ V}, T_{VJ} = 125^\circ\text{C}, R_G = 47\ \Omega, V_{CE} = 0.8 \cdot V_{CES}$ Clamped inductive load, $L = 100\ \mu\text{H}$		$I_{CM} = 18$	A
$P_C$	$T_C = 25^\circ\text{C}$		150	W
$T_J$		-55 ... +150		$^\circ\text{C}$
$T_{JM}$			150	$^\circ\text{C}$
$T_{stg}$		-55 ... +150		$^\circ\text{C}$
$T_L$	1.6 mm (0.063 in) from case for 10 s		300	$^\circ\text{C}$
$M_d$	Mounting torque		1.15/10	Nm/lb.in.
<b>Weight</b>			6	g

## 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

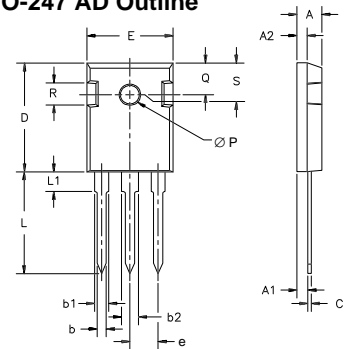
- Easy to mount with 1 screw (isolated mounting screw hole)
- Space savings
- High power density

Symbol	Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$BV_{CES}$	$I_C = 1\text{ mA}, V_{GE} = 0\text{ V}$	15N140 15N160	1400 1600	V
$V_{GE(th)}$	$I_C = 1\text{ mA}, V_{CE} = V_{GE}$		4	8 V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0\text{ V}$	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$		100 $\mu\text{A}$ 0.5 mA
$I_{GES}$	$V_{CE} = 0\text{ V}, V_{GE} = \pm 20\text{ V}$			$\pm 500\text{ nA}$
$V_{CE(sat)}$	$I_C = I_{C90}, V_{GE} = 15\text{ V}$	$T_J = 125^\circ\text{C}$	5.8	7.0 V 8.0 V

Symbol	Conditions	Characteristic Values		
		(T <sub>J</sub> = 25°C, unless otherwise specified)		
		min.	typ.	max.
C <sub>ies</sub>	V <sub>CE</sub> = 25 V, V <sub>GE</sub> = 0 V, f = 1 MHz		1200	pF
C <sub>oes</sub>			80	pF
C <sub>res</sub>			11	pF
Q <sub>g</sub>	I <sub>C</sub> = 9 A, V <sub>CE</sub> = 0.5 • V <sub>CES</sub> , V <sub>GE</sub> = 15 V		tbd	nC
Q <sub>ge</sub>			tbd	nC
Q <sub>gc</sub>			tbd	nC
t <sub>d(on)</sub>	<b>Inductive load, T<sub>J</sub> = 125°C</b> I <sub>C</sub> = I <sub>C90</sub> , V <sub>GE</sub> = 15 V, L = 100 μH, V <sub>CE</sub> = 960 V, R <sub>G</sub> = 47 Ω Remarks: Switching times may increase for V <sub>CE</sub> (Clamp) > 960 V, higher T <sub>J</sub> or increased R <sub>G</sub>		200	ns
t <sub>ri</sub>			60	ns
E <sub>on</sub>			0.55	mJ
t <sub>d(off)</sub>			180	ns
t <sub>fi</sub>			40	ns
E <sub>off</sub>			0.45	mJ
R <sub>thJC</sub>			0.83	K/W
R <sub>thCK</sub>		0.25		K/W

**Reverse Conduction**

Symbol	Conditions	Characteristic Values		
		(T <sub>J</sub> = 25°C, unless otherwise specified)		
		min.	typ.	max.
V <sub>F</sub>	I <sub>F</sub> = I <sub>C90</sub> , V <sub>GE</sub> = 0 V, Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %			4.1 V

**TO-247 AD Outline**


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	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
ØP	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

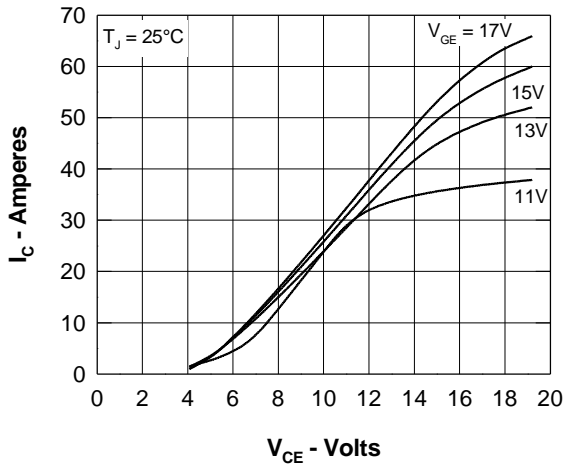


Fig. 1 Typ. Output Characteristics

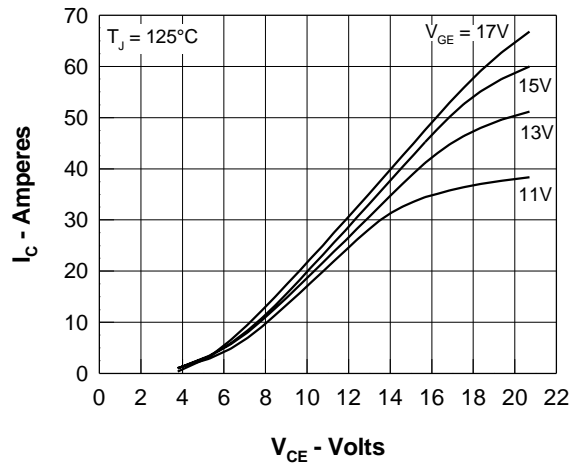


Fig. 2 Typ. Output Characteristics

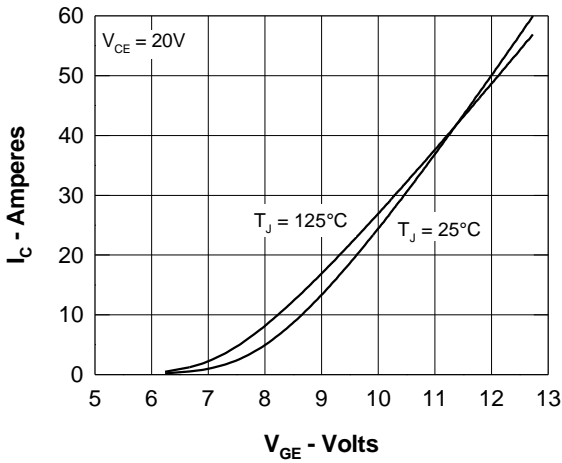


Fig. 3 Typ. Transfer Characteristics

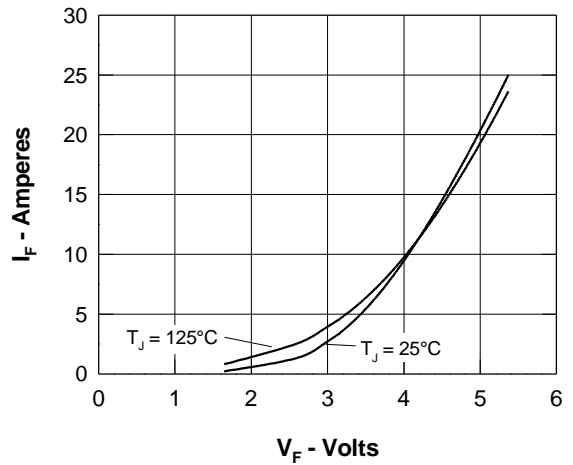


Fig. 4 Typ. Characteristics of Reverse Conduction

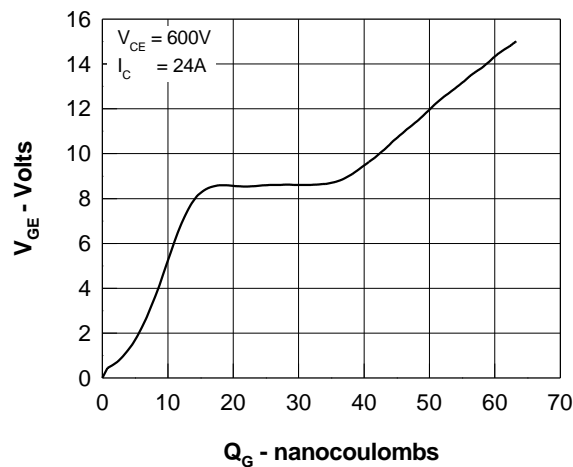


Fig. 5 Typ. Gate Charge characteristics

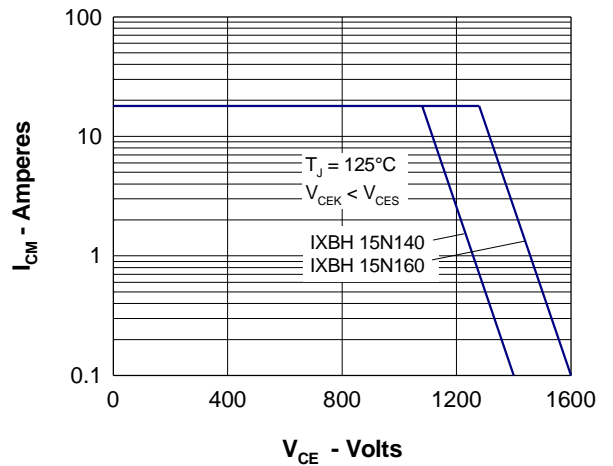


Fig. 6 Reverse Biased Safe Operating Area RBSOA

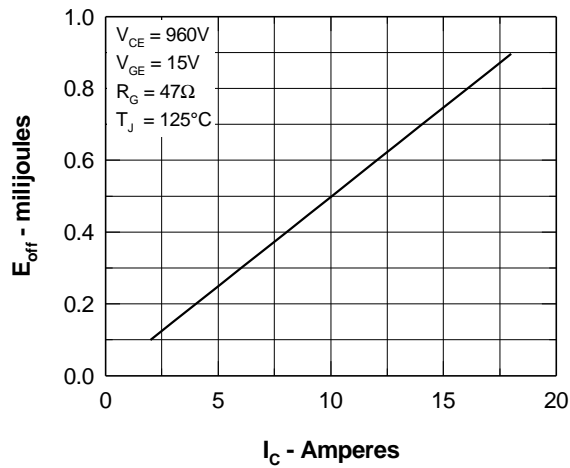


Fig. 7 Typ. Turn off energy

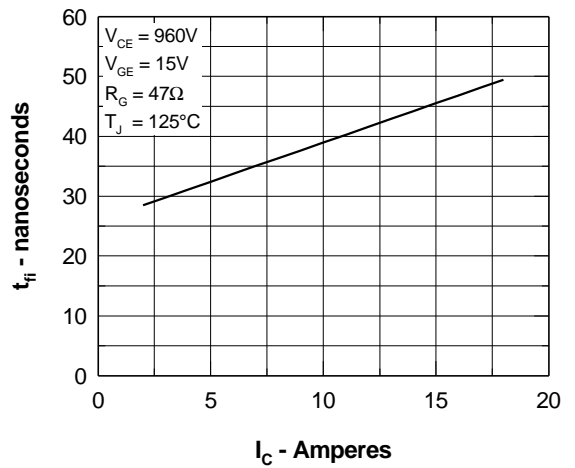


Fig. 8 Typ. Collector Current Fall Time

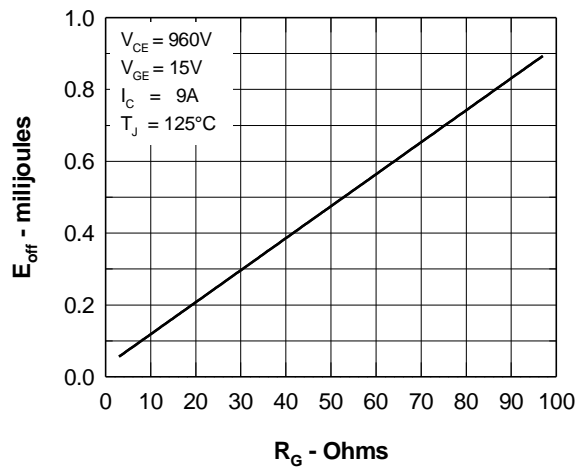


Fig. 9 Typ. Turn Off Energy

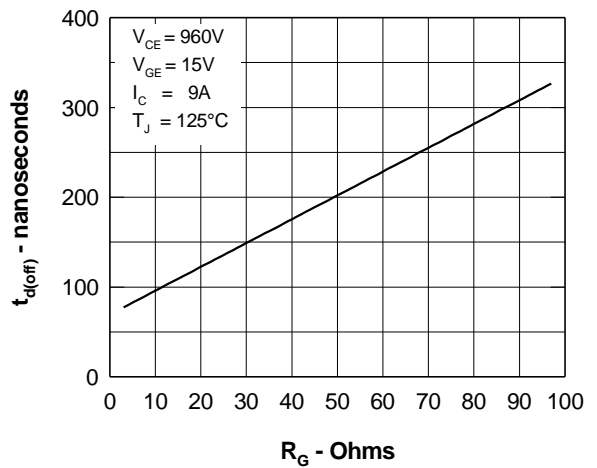


Fig.10 Typ. Turn Off Delay Time

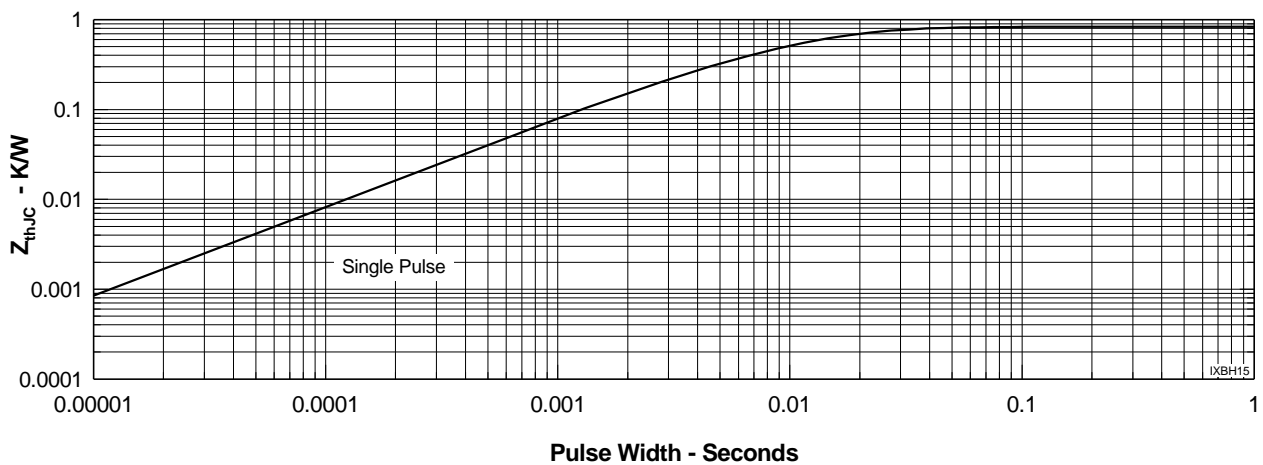


Fig. 11 Typ. Transient Thermal Impedance