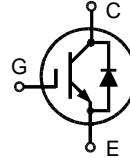


# High Voltage BIMOSFET™ Monolithic Bipolar MOS Transistor

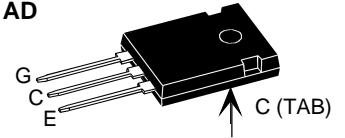
N-Channel, Enhancement Mode

**IXBH 40N140**  
**IXBH 40N160**

**$V_{CES} = 1400/1600\text{ V}$**   
 **$I_{C25} = 33\text{ A}$**   
 **$V_{CE(sat)} = 6.2\text{ V typ.}$**   
 **$t_{fi} = 40\text{ ns}$**



TO-247 AD



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

Symbol	Conditions	Maximum Ratings		
		40N140	40N160	
$V_{CES}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	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
$I_{C25}$	$T_C = 25^\circ\text{C}$ ,		33	A
$I_{C90}$	$T_C = 90^\circ\text{C}$		20	A
$I_{CM}$	$T_C = 25^\circ\text{C}$ , 1 ms		40	A
<b>SSOA (RBSOA)</b>	$V_{GE} = 15\text{ V}$ , $T_{VJ} = 125^\circ\text{C}$ , $R_G = 22\ \Omega$ , $V_{CE} = 0.8 \cdot V_{CES}$ , Clamped inductive load, $L = 100\ \mu\text{H}$		$I_{CM} = 40$	A
$P_C$	$T_C = 25^\circ\text{C}$		350	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
- 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

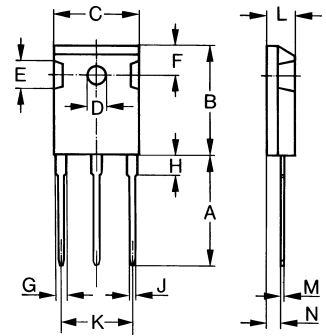
Symbol	Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)			
			min.	typ.	max.
$BV_{CES}$	$I_C = 1\text{ mA}$ , $V_{GE} = 0\text{ V}$	40N140 40N160	1400 1600		V V
$V_{GE(th)}$	$I_C = 2\text{ mA}$ , $V_{CE} = V_{GE}$		4		8 V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ , $V_{GE} = 0\text{ V}$	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$			400 $\mu\text{A}$ 3 mA
$I_{GES}$	$V_{CE} = 0\text{ V}$ , $V_{GE} = \pm 20\text{ V}$				$\pm 500\text{ nA}$
$V_{CE(sat)}$	$I_C = I_{C90}$ , $V_{GE} = 15\text{ V}$	$T_J = 125^\circ\text{C}$		6.2	7.1 V 7.8 V

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

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		3300	pF
C <sub>oes</sub>			220	pF
C <sub>res</sub>			30	pF
Q <sub>g</sub>	I <sub>C</sub> = 20 A, V <sub>CE</sub> = 600 V, V <sub>GE</sub> = 15 V		130	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> = 22 Ω		200	ns
t <sub>ri</sub>			60	ns
t <sub>d(off)</sub>			270	ns
t <sub>fi</sub>			40	ns
R <sub>thJC</sub>				0.35 K/W
R <sub>thCK</sub>		0.25		K/W

**Reverse Conduction** **Characteristic Values**  
(T<sub>J</sub> = 25°C, unless otherwise specified)

Symbol	Conditions	Characteristic Values		
		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 %		2.5	5 V

**TO-247 AD Outline**


Dim.	Millimeter		Inches	
	Min.	Max.	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

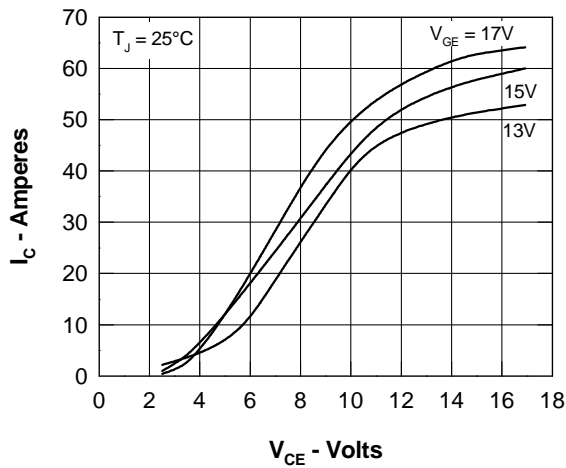


Fig. 1 Typ. Output Characteristics

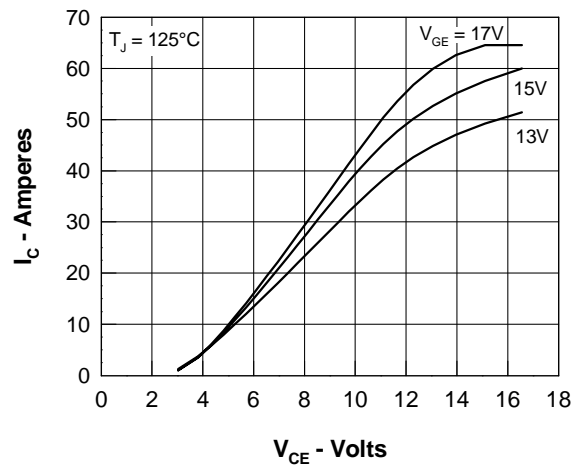


Fig. 2 Typ. Output Characteristics

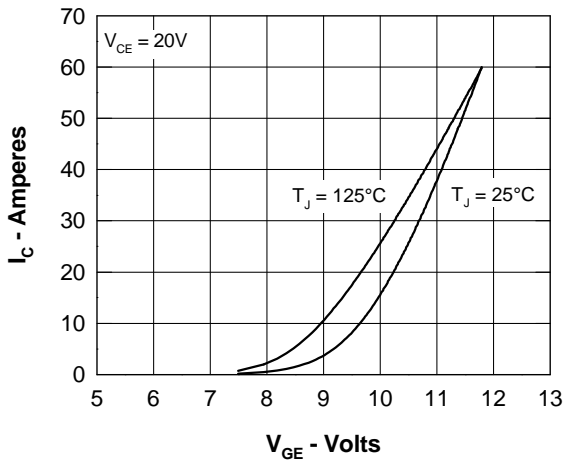


Fig. 3 Typ. Transfer Characteristics

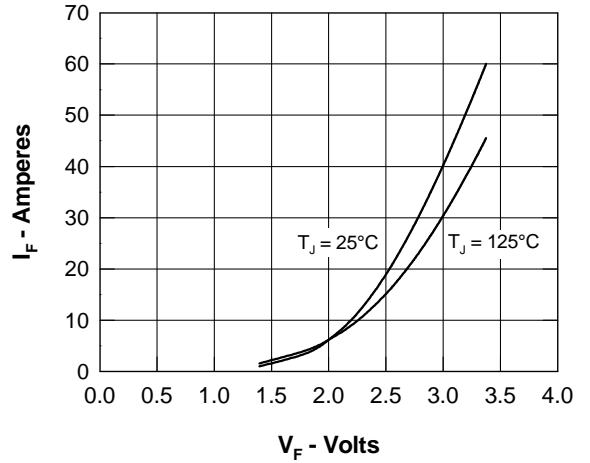


Fig. 4 Typ. Characteristics of Reverse Conduction

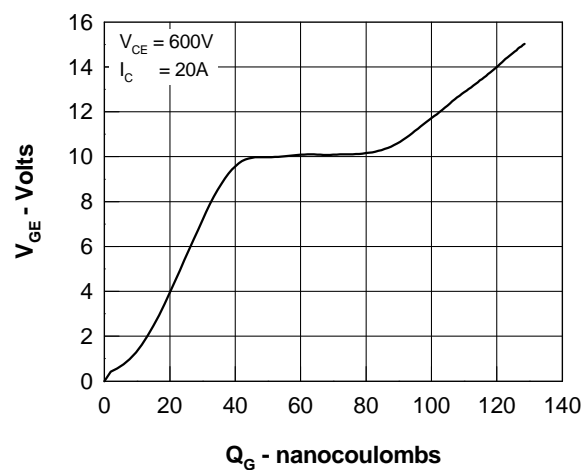


Fig. 5 Typ. Gate Charge characteristics

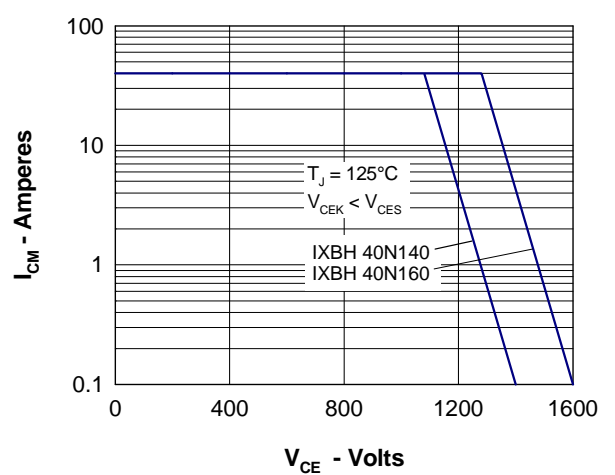


Fig. 6 Reverse Based Safe Operating Area RBSOA

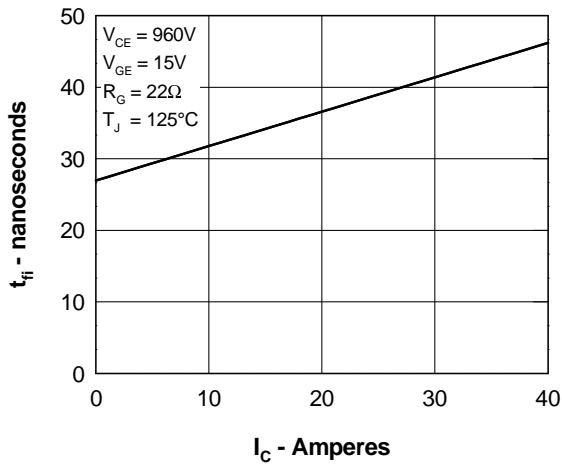


Fig. 7 Typ. Fall Time

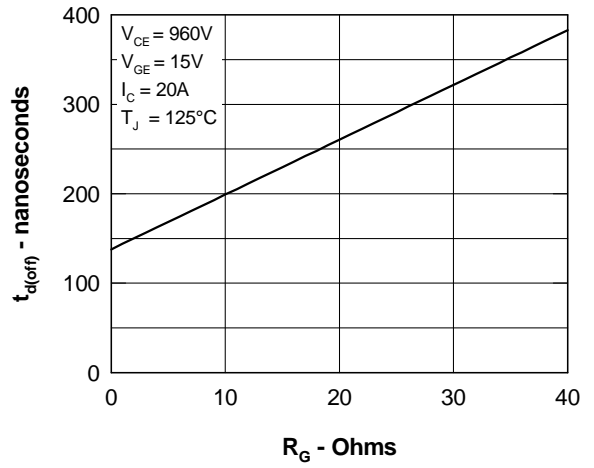


Fig. 8 Typ. Turn Off Delay Time

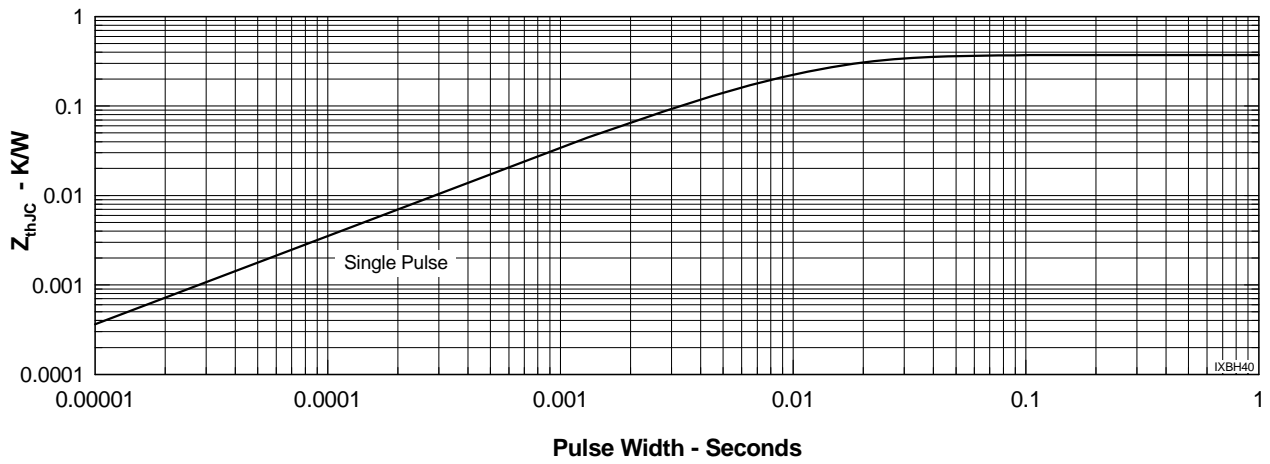


Fig. 9 Typ. Transient Thermal Impedance