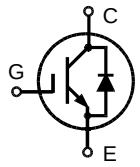
IXYS

High Voltage BIMOSFET™ Monolithic Bipolar MOS Transistor

IXBJ 40N140
IXBJ 40N160

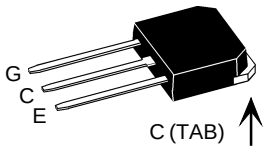
V_{CES} = 1400/1600 V
I_{C25} = 33 A
$V_{CE(sat)}$ = 7.1 V
t_{fi} = 40 ns

N-Channel, Enhancement Mode



Symbol	Test Conditions	Maximum Ratings 40N140	40N160	
V_{CES}	T_J = 25°C to 150°C	1400	1600	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MW	1400	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 mH		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

TO-268



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

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
BV_{CES}	I_C = 1 mA, V_{GE} = 0 V	40N140	1400			V
		40N160	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

- Leaded TO-268 package
- 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

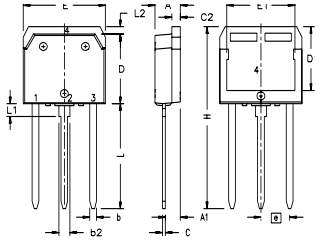
- Space savings
- High power density

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 ms, duty cycle d ≤ 2 %		2.5	5	V

Leaded TO-268



All metal area are solder plated
1 - gate
2 - drain (collector)
3 - source (emitter)
4 - drain (collector)

Dim.	Inches Min	Inches Max	Millimeters Min	Millimeters Max
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	.040	.065
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	1.365	1.395	34.67	35.43
L	.780	.800	19.81	20.32
L1	.079	.091	2.00	2.30
L2	.039	.045	1.00	1.15

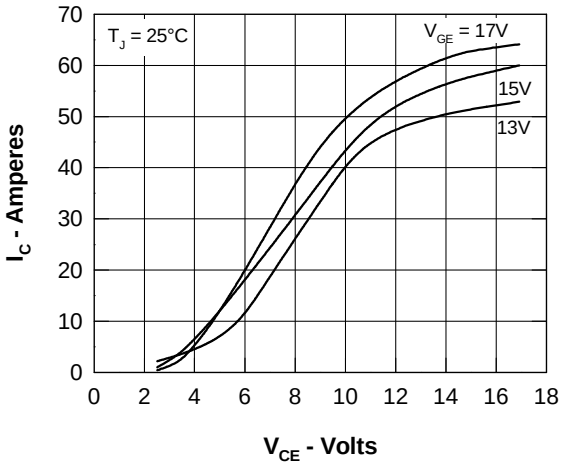


Fig. 1 Output Characteristics

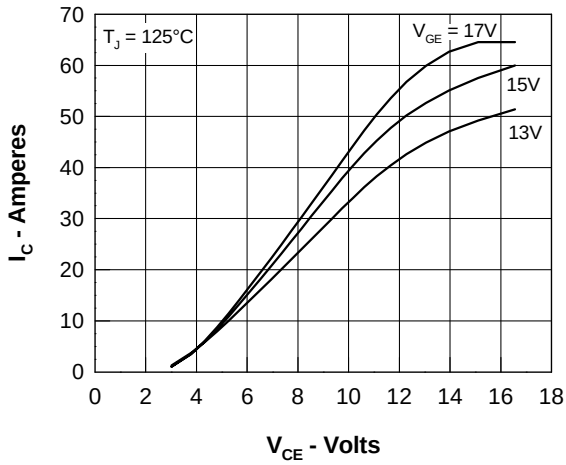


Fig. 2 High Temperature Output Chacteristics

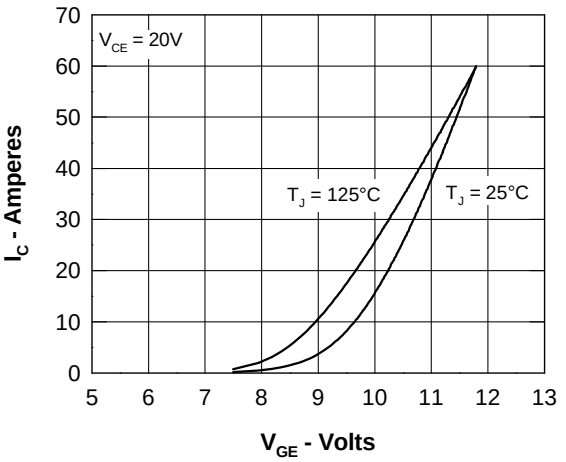


Fig. 3 Transfer Characteristics

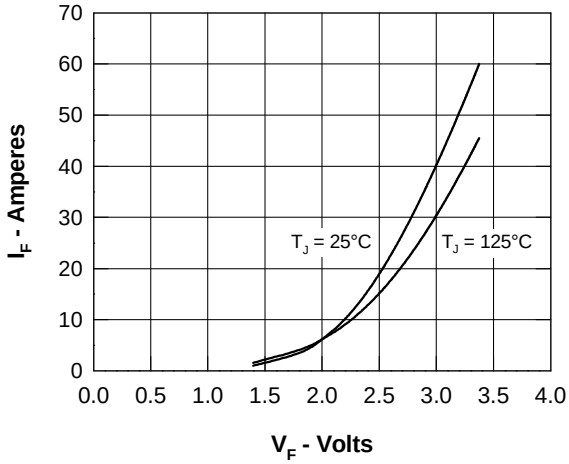


Fig. 4 Forward voltage drop of the Intrinsic Diode

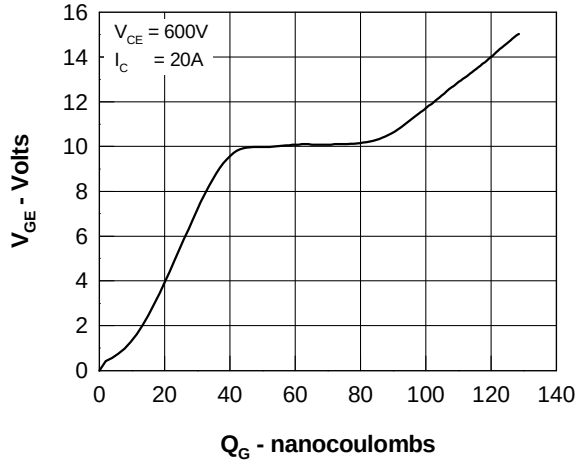


Fig. 5 Gate Charge Characteristics

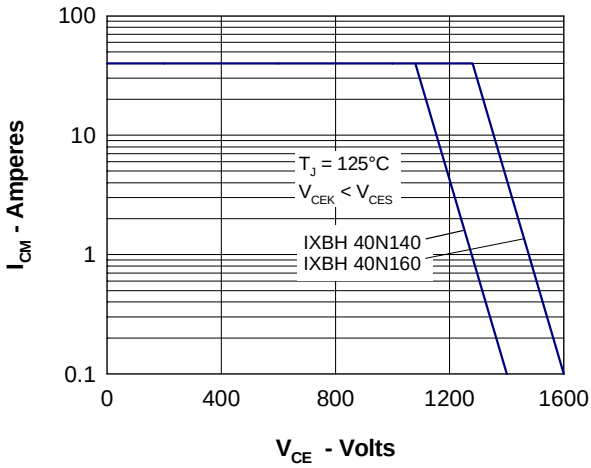


Fig. 6 Reverse Based Safe Operating Area

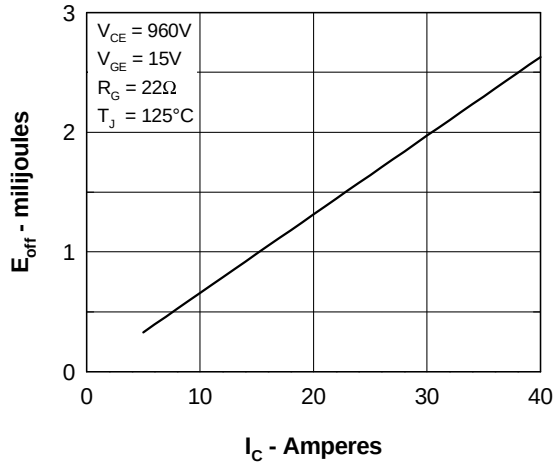


Fig. 7 Turn off Energy vs. Collector Current

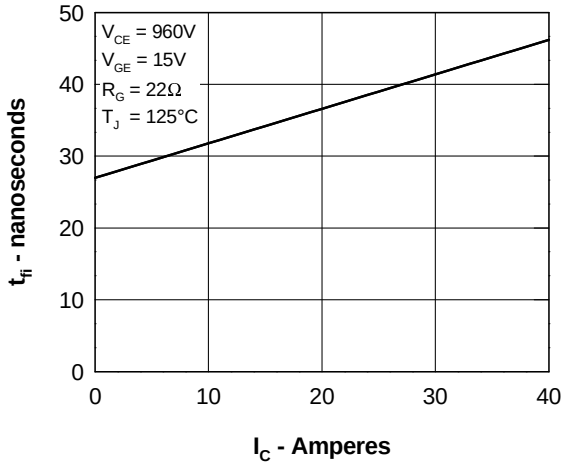


Fig. 8 Collector Current Fall Time

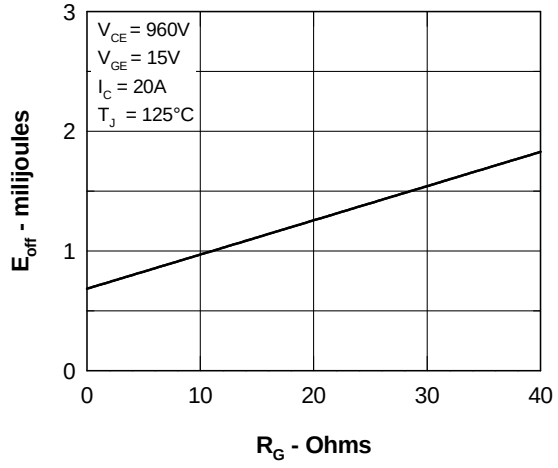


Fig. 9 Turn-off Energy vs. Gate Resistance

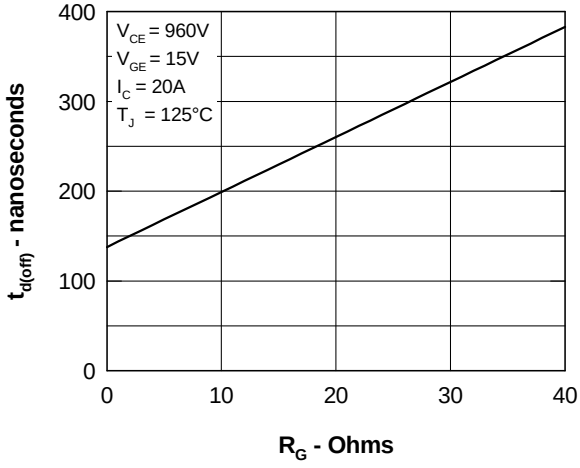


Fig.10 Turn Off Delay Time vs. Gate Resistance

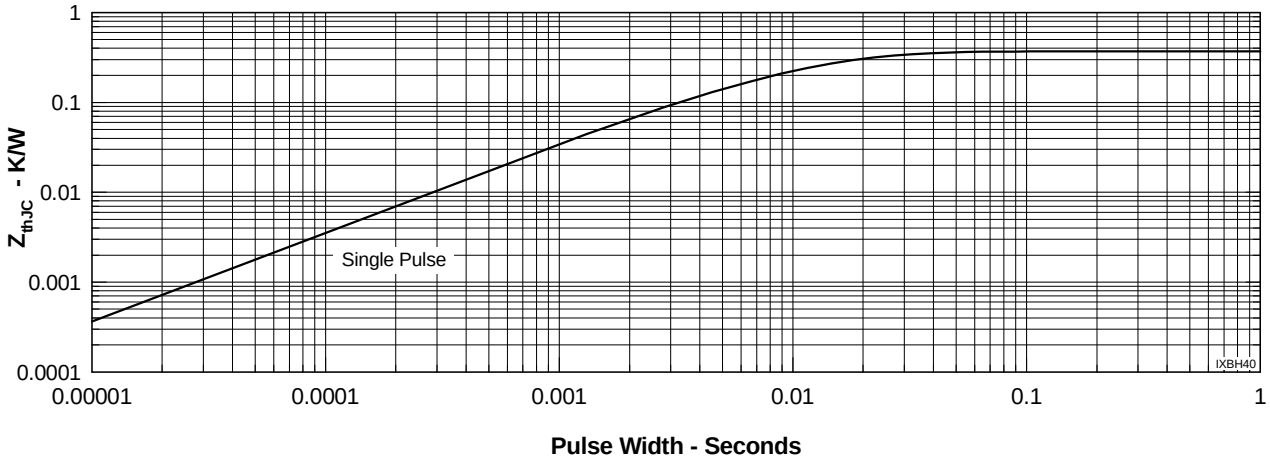


Fig.11 Transient Thermal Impedance