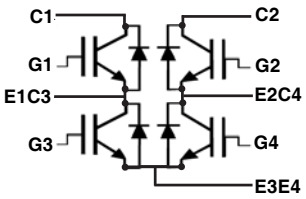
IXYS

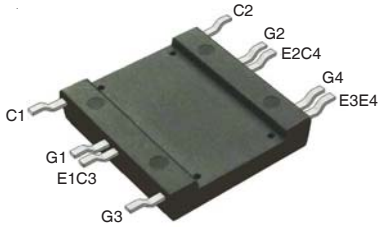
High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

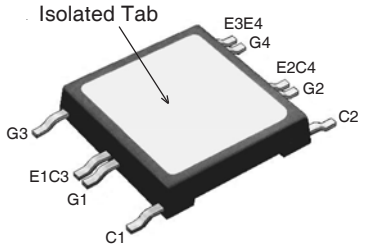
MMIX4B22N300

V_{CES} = 3000V
I_{C90} = 22A
$V_{CE(sat)}$ ≤ 2.7V

(Electrically Isolated Tab)







G = Gate E = Emitter
C = Collector

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	3000	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	3000	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	T_C = 25°C	38	A
I_{C90}	T_C = 90°C	22	A
I_{CM}	T_C = 25°C, 1ms	165	A
SSOA	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 15Ω	I_{CM} = 180	A
(RBSOA)	Clamped Inductive Load	$V_{CES} \leq$ 1500	V
T_{SC}	V_{GE} = 15V, T_J = 125°C,		
(SCSOA)	R_G = 52Ω, V_{CE} = 1500V, Non-Repetitive	10	μs
P_C	T_C = 25°C	150	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	Plastic Body for 10s	260	°C
F_C	Mounting Force	50..200 / 11..45	N/lb
V_{ISOL}	50/60Hz, 1 minute	4000	V~
Weight		8	g

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250μA, V_{GE} = 0V	3000			V
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			35	μA
	Note 2, T_J = 125°C			1.5	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V			±100	nA
$V_{CE(sat)}$	I_C = 22A, V_{GE} = 15V, Note 1		2.2	2.7	V
	T_J = 125°C		2.7		V

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 4000V~ Electrical Isolation
- High Blocking Voltage
- High Peak Current Capability
- Low Saturation Voltage

Advantages

- Low Gate Drive Requirement
- High Power Density

Applications

- Switch-Mode and Resonant-Mode Power Supplies
- Capacitor Discharge Circuits

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	I_C = 22A, V_{CE} = 10V, Note 1	13	22		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		2200		pF
C_{oes}			85		pF
C_{res}			30		pF
$Q_{g(on)}$	I_C = 22A, V_{GE} = 15V, V_{CE} = 1500V		110		nC
Q_{ge}			13		nC
Q_{gc}			45		nC
$t_{d(on)}$	**Resistive Switching Times, T_J = 25°C**		46		ns
t_r	I_C = 22A, V_{GE} = 15V		360		ns
$t_{d(off)}$	V_{CE} = 960V, R_G = 15Ω		205		ns
t_f			1820		ns
$t_{d(on)}$	**Resistive Switching Times, T_J = 125°C**		43		ns
t_r	I_C = 22A, V_{GE} = 15V		700		ns
$t_{d(off)}$	V_{CE} = 960V, R_G = 15Ω		220		ns
t_f			1650		ns
R_{thJC}				0.83	°C/W
R_{thCS}			0.05		°C/W
R_{thJA}			30		°C/W

Reverse Diode

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max	
V_F	I_F = 22A, V_{GE} = 0V, Note 1			2.7	V
t_{rr}	I_F = 11A, V_{GE} = 0V, $-di_F/dt$ = 100A/µs		1.4		µs
I_{RM}	V_R = 100V, V_{GE} = 0V		30		A
Q_{RM}			21		µC

Notes:

1. Pulse test, t ≤ 300µs, duty cycle, d ≤ 2%.
2. Device must be heatsunk for high temperature leakage current measurements to avoid thermal runaway.

Additional provisions for lead-to-lead voltage isolation are required at V_{CE} > 1200V.

Fig. 1. Output Characteristics @ T_J = 25°C

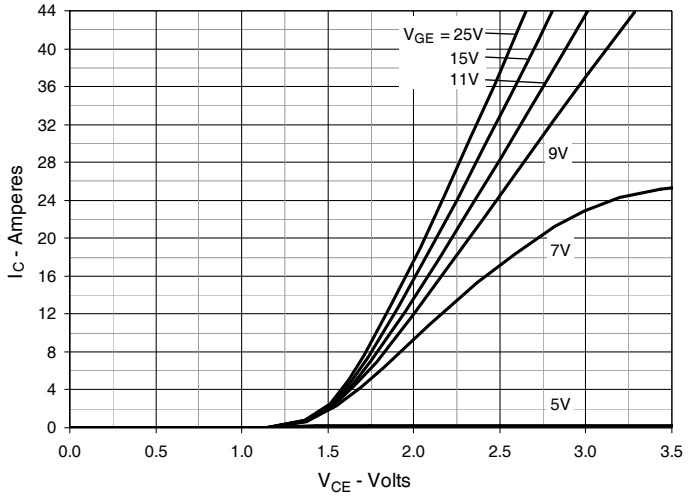


Fig. 2. Extended Output Characteristics @ T_J = 25°C

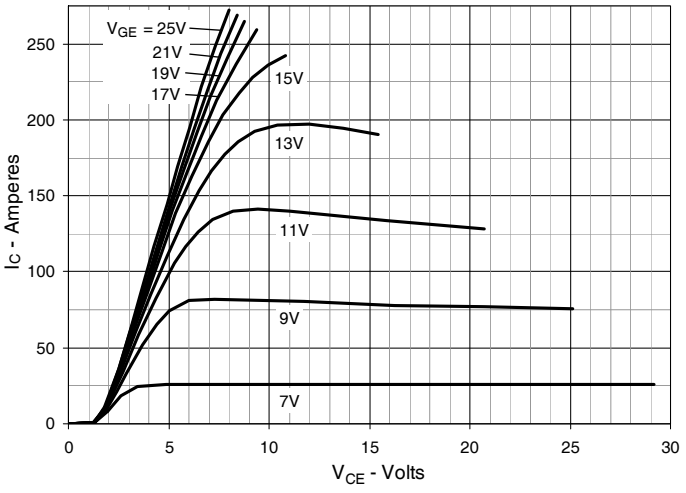


Fig. 3. Output Characteristics @ T_J = 125°C

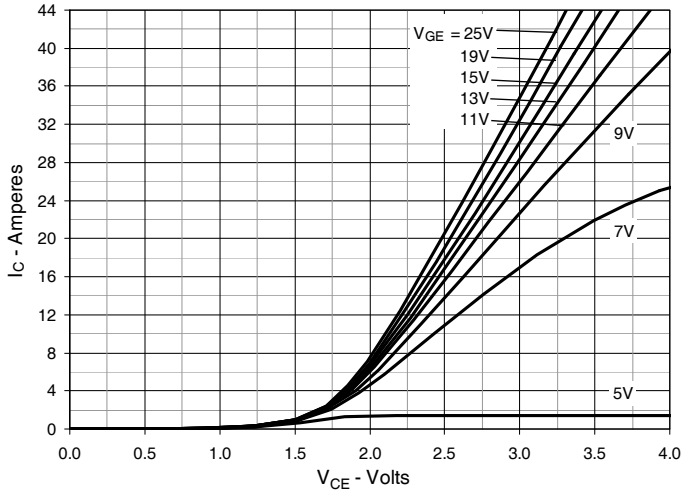


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

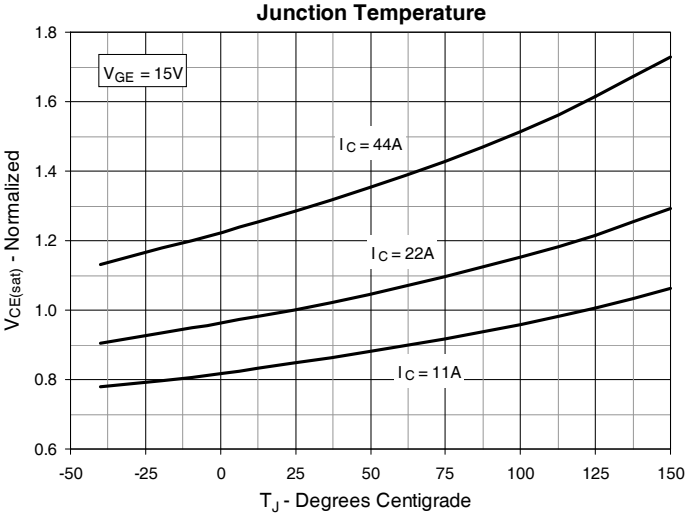


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

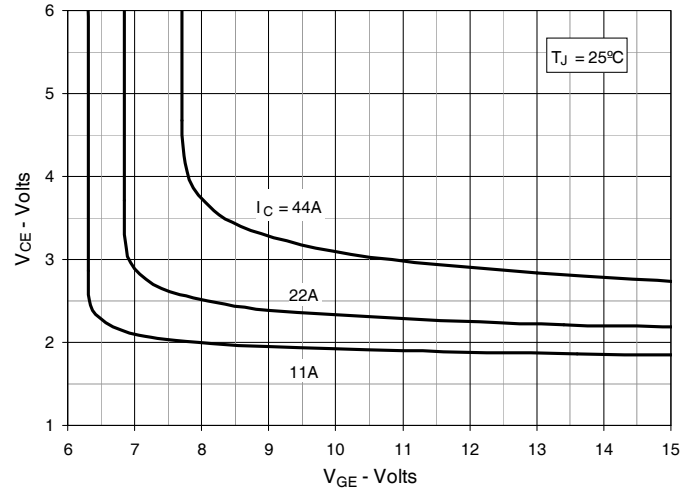


Fig. 6. Input Admittance

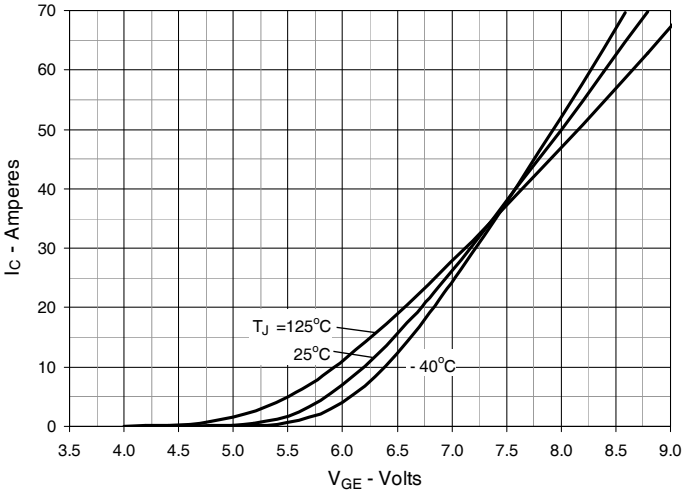


Fig. 7. Transconductance

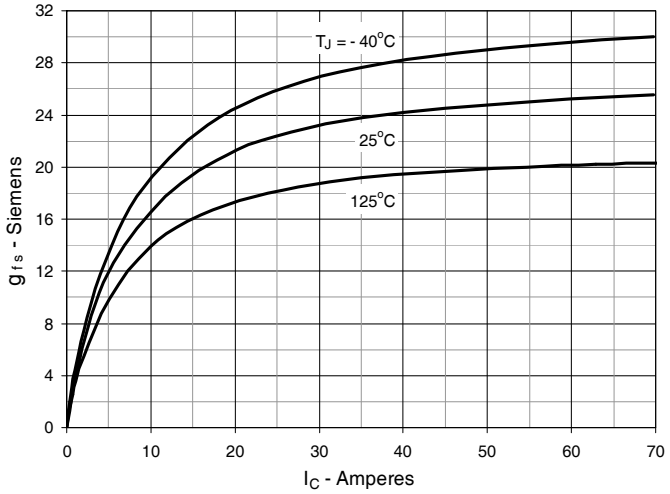


Fig. 8. Gate Charge

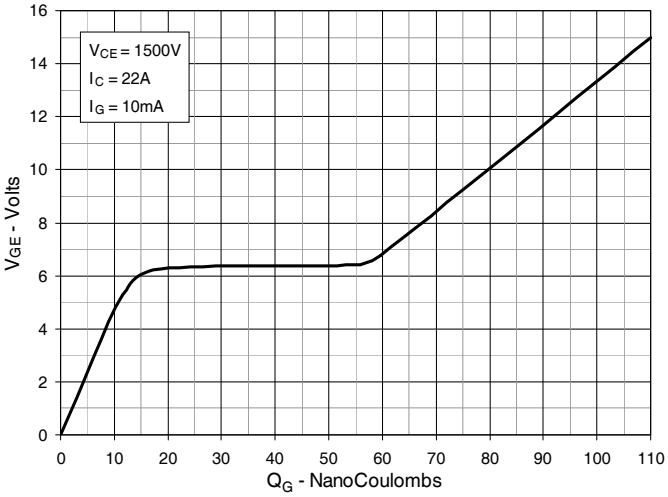


Fig. 9. Forward Voltage Drop of Intrinsic Diode

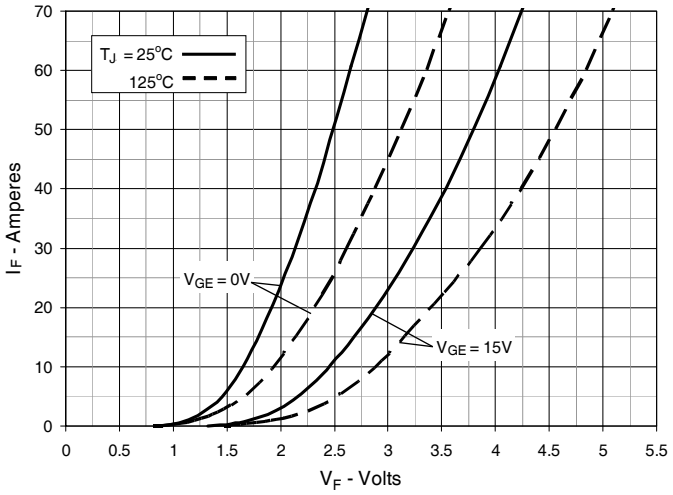


Fig. 10. Capacitance

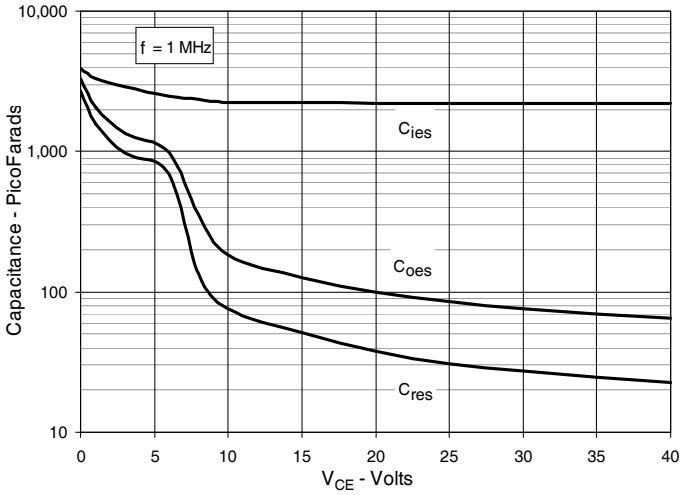


Fig. 11. Reverse-Bias Safe Operating Area

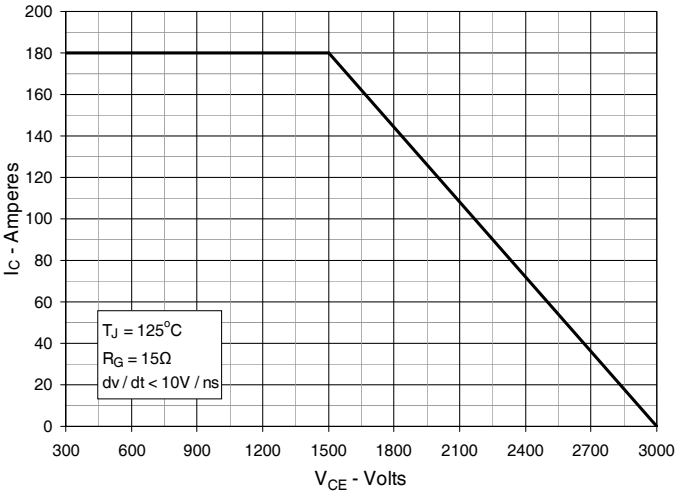


Fig. 12. Maximum Transient Thermal Impedance

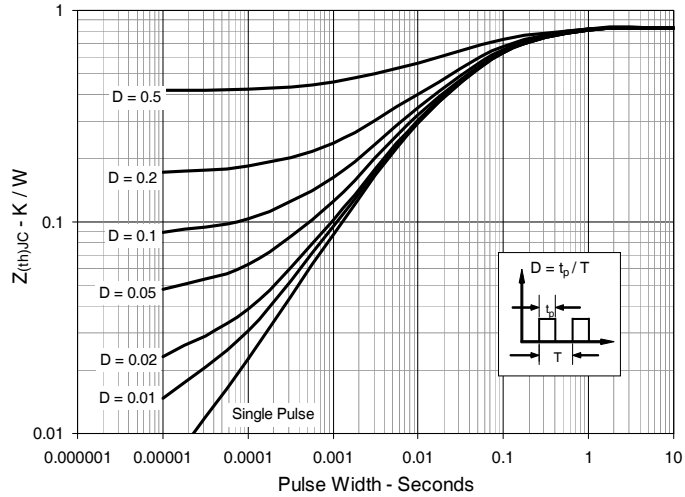


Fig. 13. Forward-Bias Safe Operating Area @ T_C = 25°C

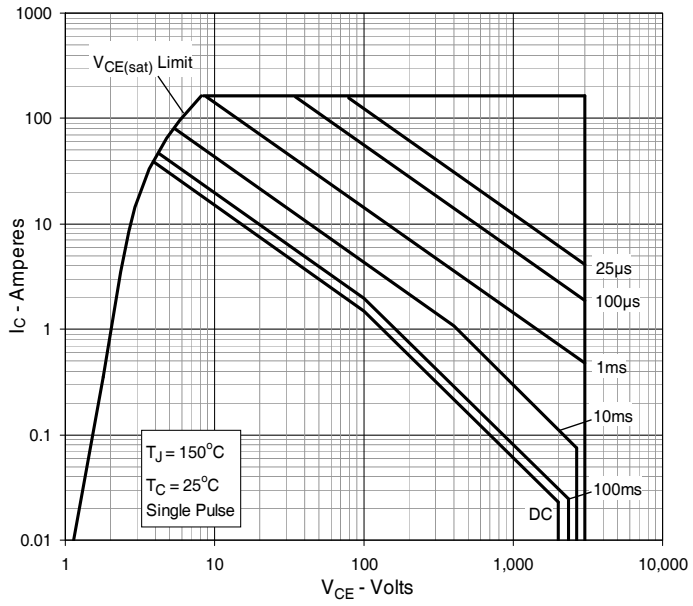
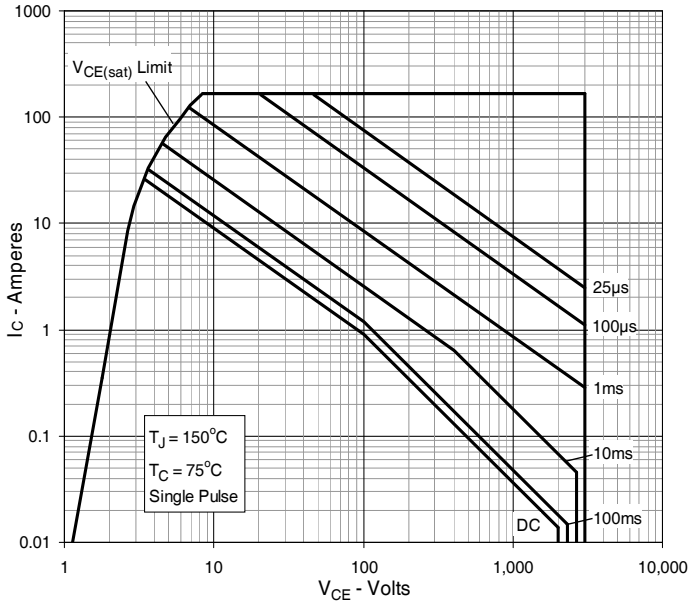
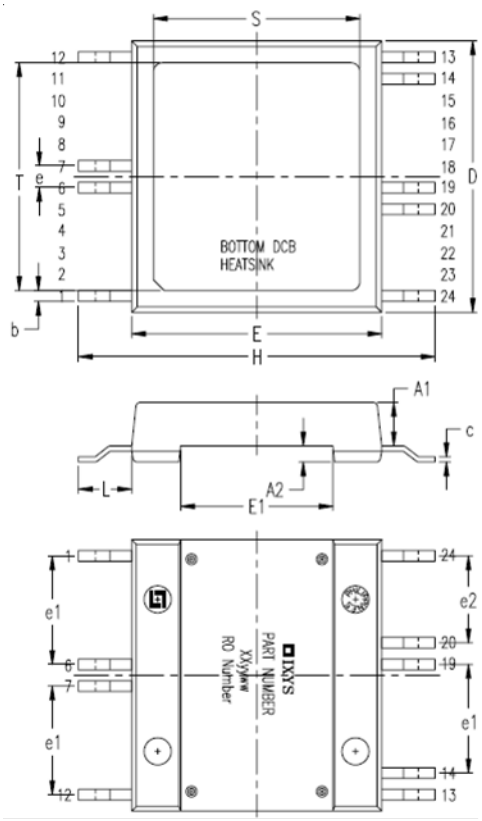
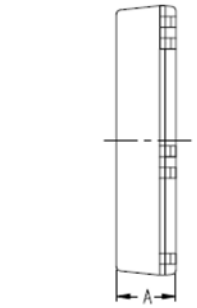


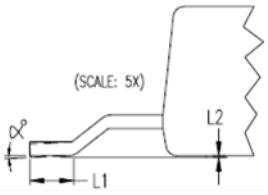
Fig. 14. Forward-Bias Safe Operating Area @ T_C = 75°C



Package Outline







SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.209	.224	5.30	5.70
A1	.154	.161	3.90	4.10
A2	.055	.063	1.40	1.60
b	.035	.045	0.90	1.15
c	.018	.026	0.45	0.65
D	.976	.994	24.80	25.25
E	.898	.915	22.80	23.25
E1	.543	.559	13.80	14.20
e	.079 BSC		2.00 BSC	
e1	.394 BSC		10.00 BSC	
e2	.315 BSC		8.00 BSC	
H	1.272	1.311	32.30	33.30
L	.181	.209	4.60	5.30
L1	.051	.067	1.30	1.70
L2	.000	.006	0.00	0.15
S	.736	.760	18.70	19.30
T	.815	.839	20.70	21.30
∝	0	4°	0	4°