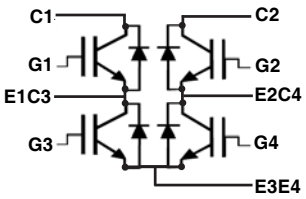
IXYS

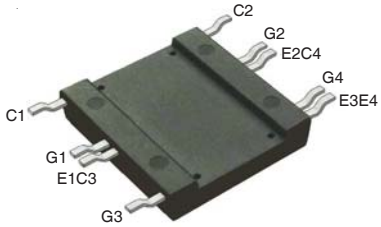
High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

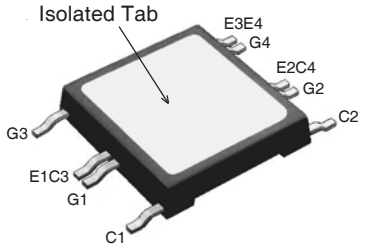
MMIX4B22N300

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

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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.

IXYS Reserves the Right to Change Limits, Test Conditions and Dimensions.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,850,072 4,881,106 4,931,844 5,017,508 5,034,796 5,049,961 5,063,307 5,187,117 5,237,481 5,381,025 5,486,715 6,162,665 6,259,123 B1 6,306,728 B1 6,404,065 B1 6,534,343 6,583,505 6,683,344 6,710,405 B2 6,710,463 6,727,585 6,759,692 6,771,478 B2 7,005,734 B2 7,063,975 B2 7,071,537 7,157,338B2

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

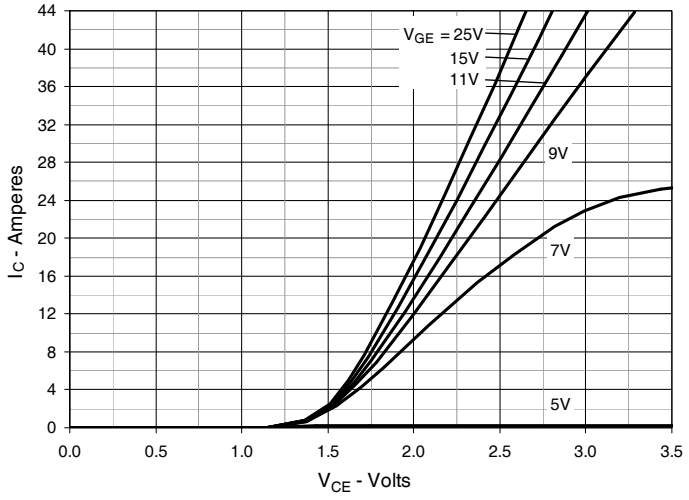


Fig. 2. Extended Output Characteristics @ T_J = 25°C

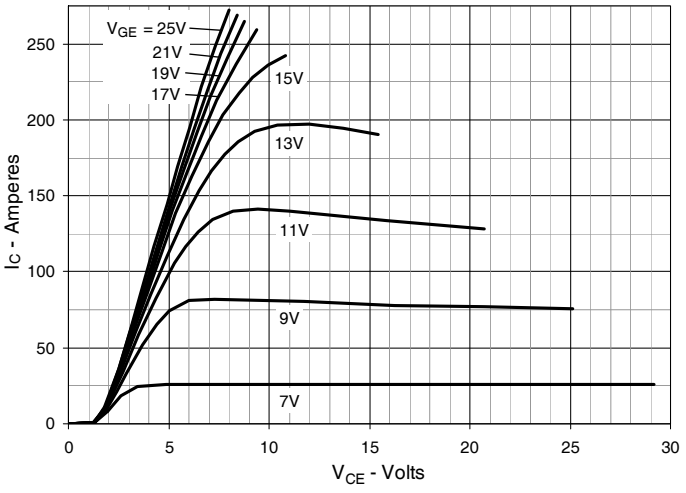


Fig. 3. Output Characteristics @ T_J = 125°C

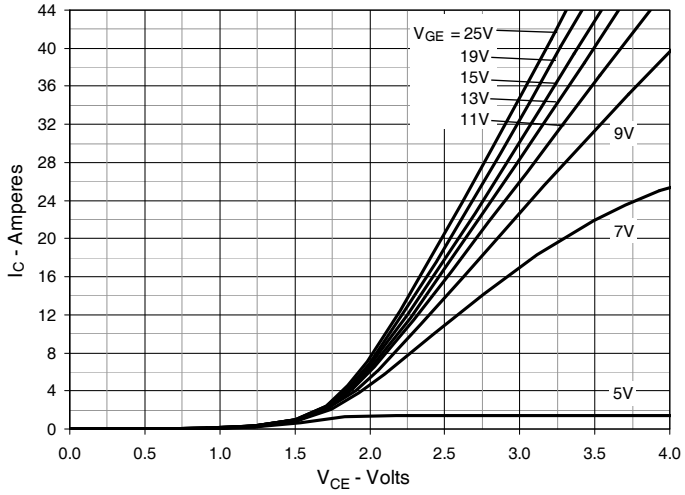


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

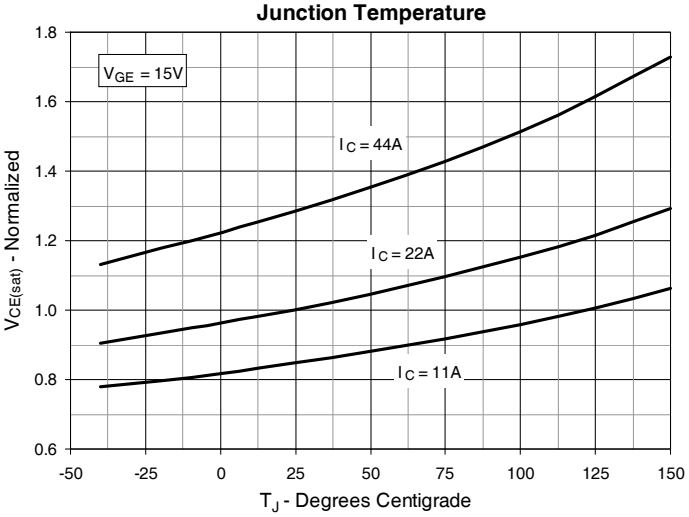


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

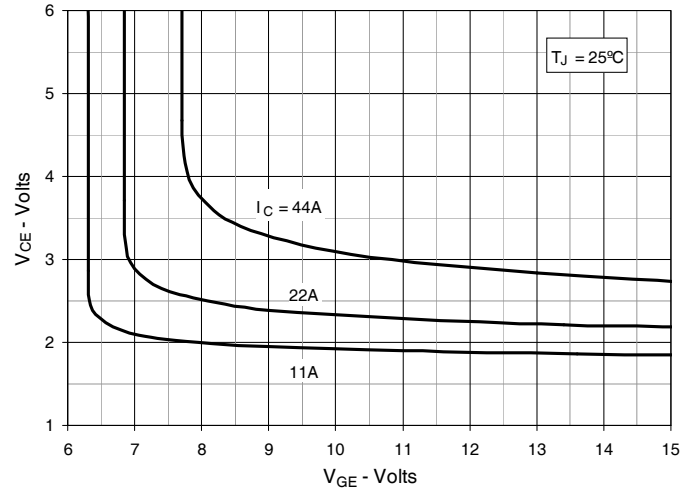
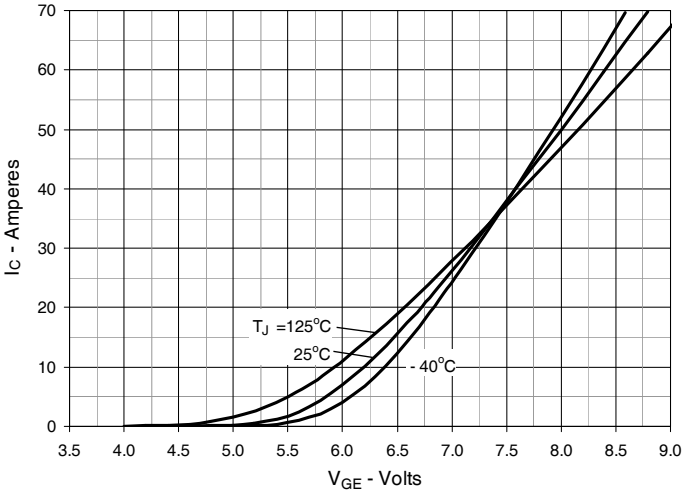


Fig. 6. Input Admittance



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Fig. 7. Transconductance

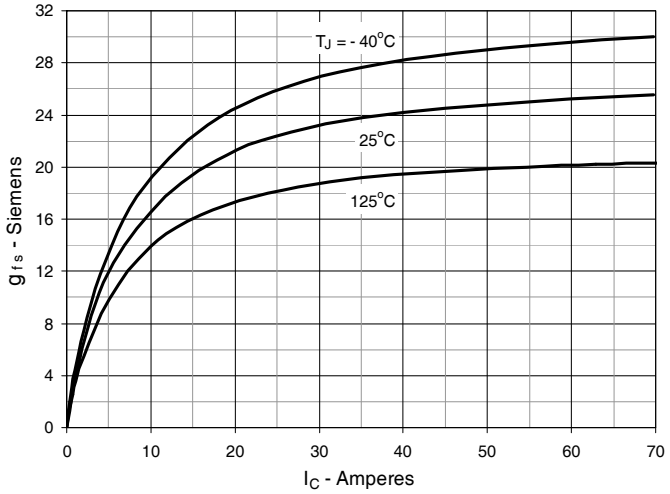


Fig. 8. Gate Charge

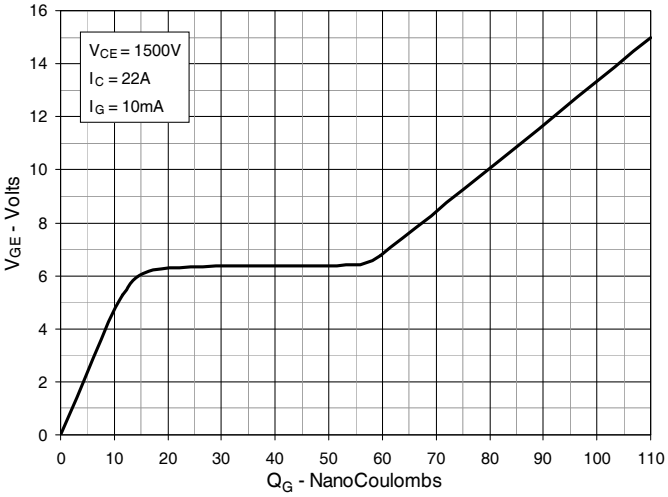


Fig. 9. Forward Voltage Drop of Intrinsic Diode

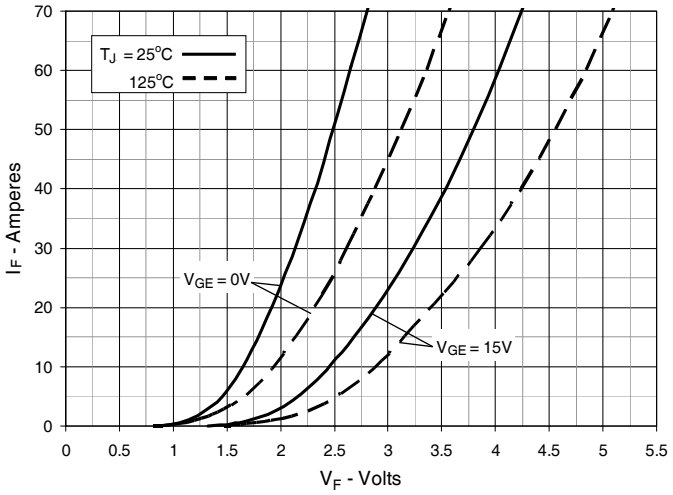


Fig. 10. Capacitance

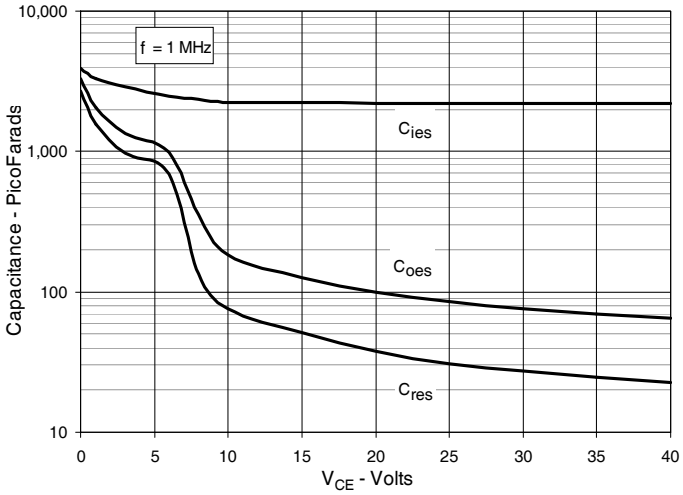


Fig. 11. Reverse-Bias Safe Operating Area

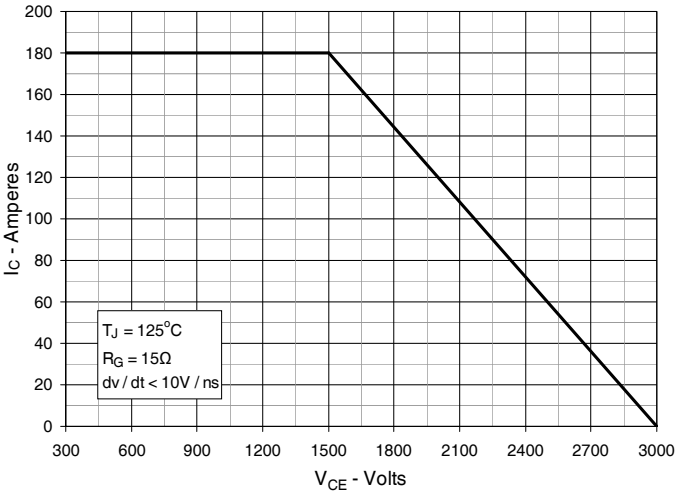
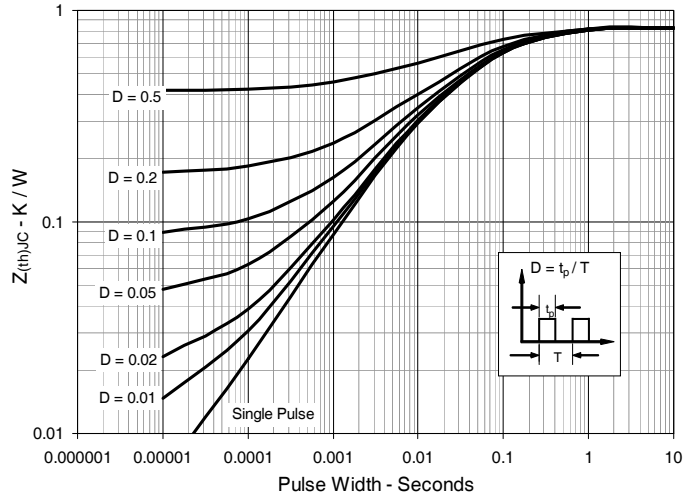


Fig. 12. Maximum Transient Thermal Impedance



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

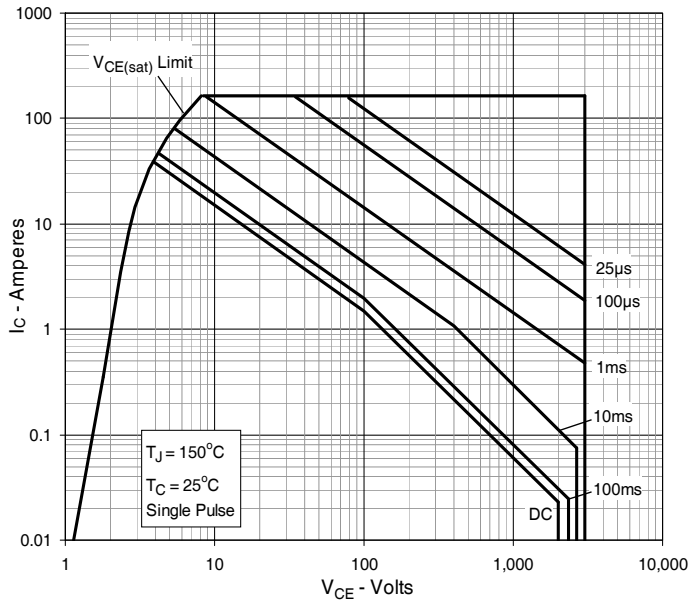
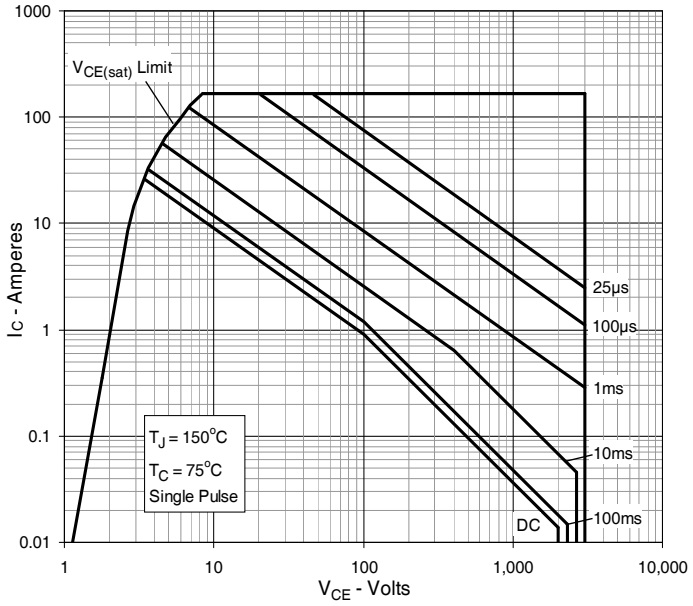
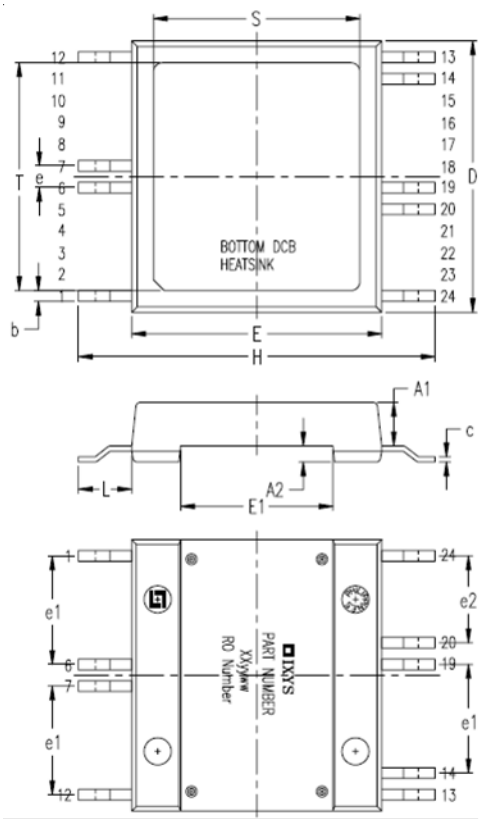


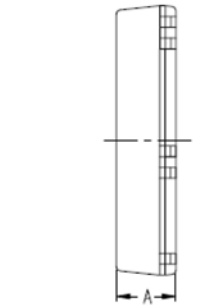
Fig. 14. Forward-Bias Safe Operating Area @ T_C = 75°C

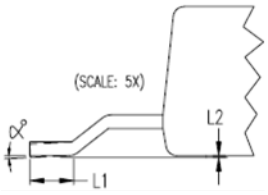


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Package Outline







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°

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