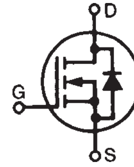
IXYS **Advance Technical Information**

HiperFET™ Power MOSFET Q3-Class

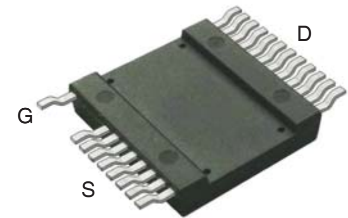
MMIX1F44N100Q3

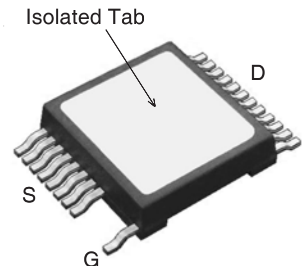
V_{DSS} = 1000V
I_{D25} = 30A
$R_{DS(on)}$ ≤ 245mΩ
t_{rr} ≤ 300ns

(Electrically Isolated Tab)



N-Channel Enhancement Mode
Fast Intrinsic Rectifier





G = Gate D = Drain
S = Source

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	1000	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	1000	V
V_{GSS}	Continuous	±30	V
V_{GSM}	Transient	±40	V
I_{D25}	T_C = 25°C	30	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	110	A
I_A	T_C = 25°C	44	A
E_{AS}	T_C = 25°C	4	J
dv/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$	50	V/ns
P_D	T_C = 25°C	694	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6mm (0.062 in.) from Case for 10s	300	°C
T_{SOLD}	Plastic Body for 10s	260	°C
V_{ISOL}	50/60 Hz, 1 Minute	2500	V~
F_C	Mounting Force	50..200 / 11..45	N/lb.
Weight		8	g

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Substrate
  - Excellent Thermal Transfer
  - Increased Temperature and Power Cycling Capability
  - High Isolation Voltage (2500V~)
- Low Intrinsic Gate Resistance
- Low Package Inductance
- Fast Intrinsic Rectifier
- Low $R_{DS(on)}$ and Q_G

Advantages

- High Power Density
- Easy to Mount
- Space Savings

Applications

- DC-DC Converters
- Battery Chargers
- Switch-Mode and Resonant-Mode Power Supplies
- DC Choppers
- Temperature and Lighting Controls

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 3mA	1000			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 8mA	3.5		6.5	V
I_{GSS}	V_{GS} = ±30V, V_{DS} = 0V			±200	nA
I_{DSS}	V_{DS} = V_{DSS}, V_{GS} = 0V			50	µA
	T_J = 125°C			3	mA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 22A, Note 1			245	mΩ

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Symbol	Test Conditions ($T_J = 25°C$ Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.
g_{fs}	$V_{DS} = 20V$, $I_D = 22A$, Note 1	26	43	S
C_{iss}	$V_{GS} = 0V$, $V_{DS} = 25V$, f = 1MHz		13.6	nF
C_{oss}			1046	pF
C_{rss}			86	pF
R_{Gi}	Gate Input Resistance		0.12	Ω
$t_{d(on)}$	**Resistive Switching Times** $V_{GS} = 10V$, $V_{DS} = 0.5 \bullet V_{DSS}$, $I_D = 22A$ $R_G = 0.5\Omega$ (External)		48	ns
t_r			30	ns
$t_{d(off)}$			66	ns
t_f			28	ns
$Q_{g(on)}$	$V_{GS} = 10V$, $V_{DS} = 0.5 \bullet V_{DSS}$, $I_D = 22A$		264	nC
Q_{gs}			76	nC
Q_{gd}			110	nC
R_{thJC}				0.18 °C/W
R_{thCS}			0.05	°C/W

Source-Drain Diode

Symbol	Test Conditions ($T_J = 25°C$ Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
I_S	$V_{GS} = 0V$			44	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			176	A
V_{SD}	$I_F = I_S$, $V_{GS} = 0V$, Note 1			1.4	V
t_{rr}	$I_F = 22A$, -di/dt = 100A/μs $V_R = 100V$, $V_{GS} = 0V$			300	ns
Q_{RM}			2.1		μC
I_{RM}			16.2		A

Note 1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.

ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585 7,005,734 B2 7,157,338B2 4,850,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692 7,063,975 B2 4,881,106 5,034,796 5,187,117 5,486,715 6,306,728 B1 6,583,505 6,710,463 6,771,478 B2 7,071,537

Fig. 1. Output Characteristics @ T_J = 25ºC

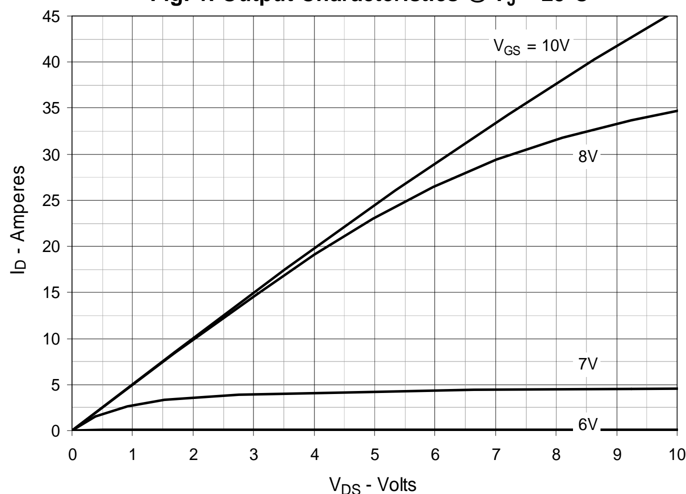


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

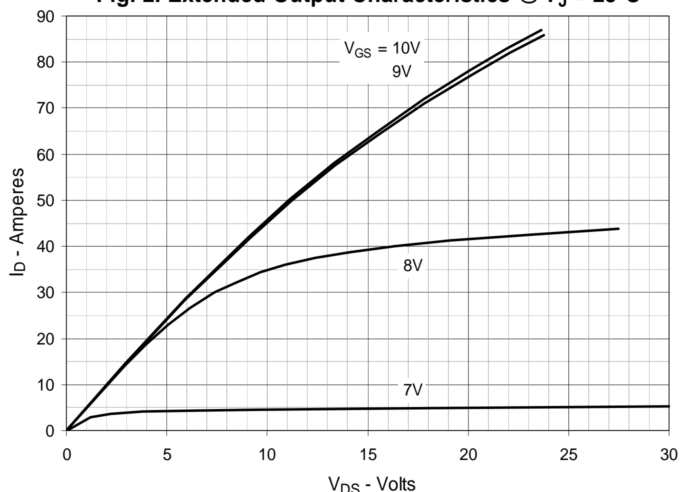


Fig. 3. Output Characteristics @ T_J = 125ºC

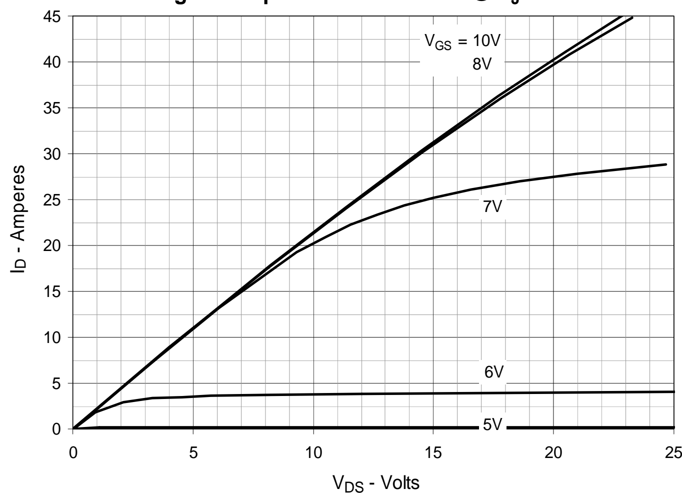


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 22A Value vs. Junction Temperature

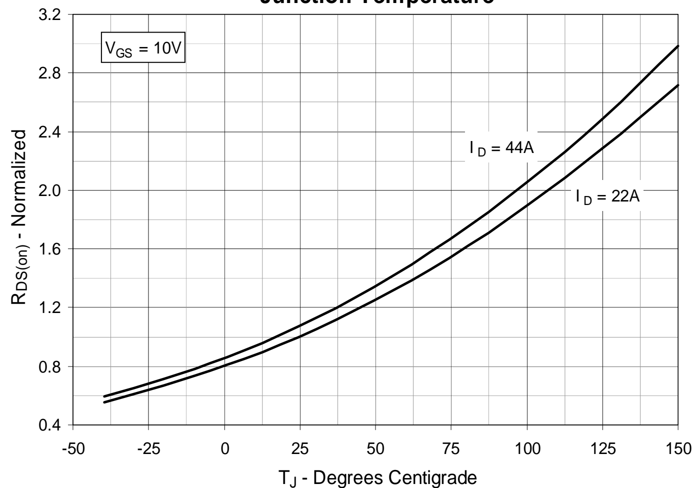


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 22A Value vs. Drain Current

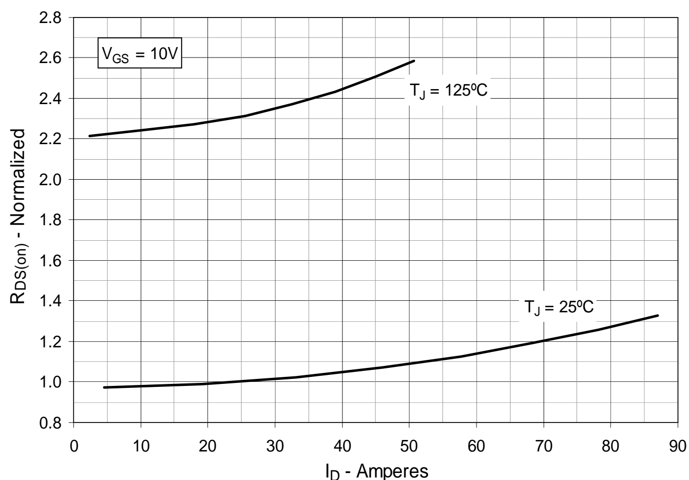
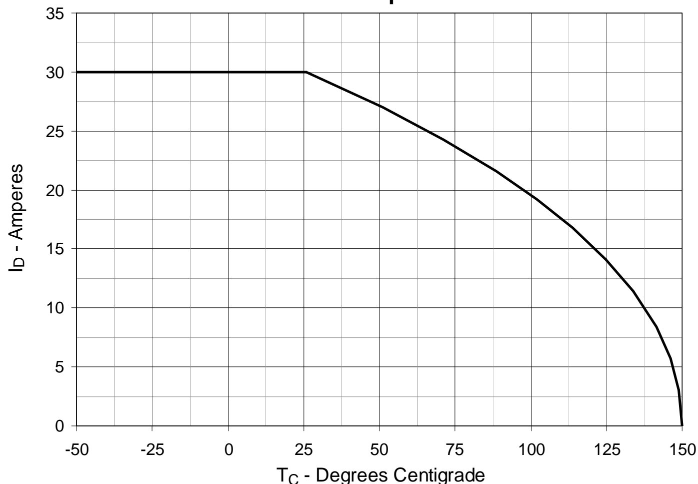


Fig. 6. Maximum Drain Current vs. Case Temperature



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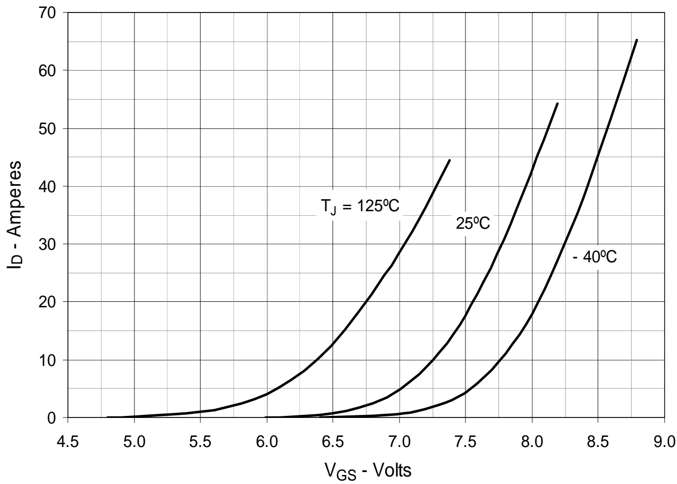

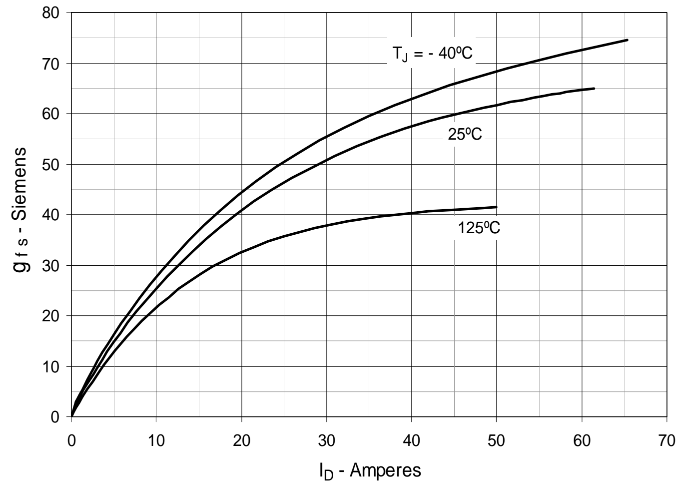

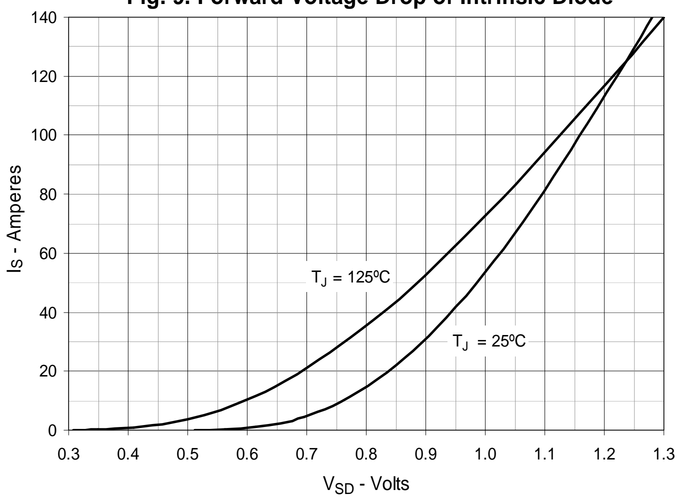

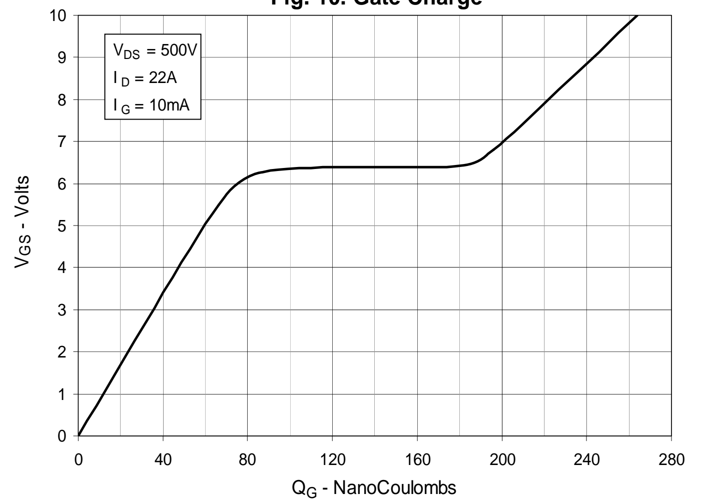

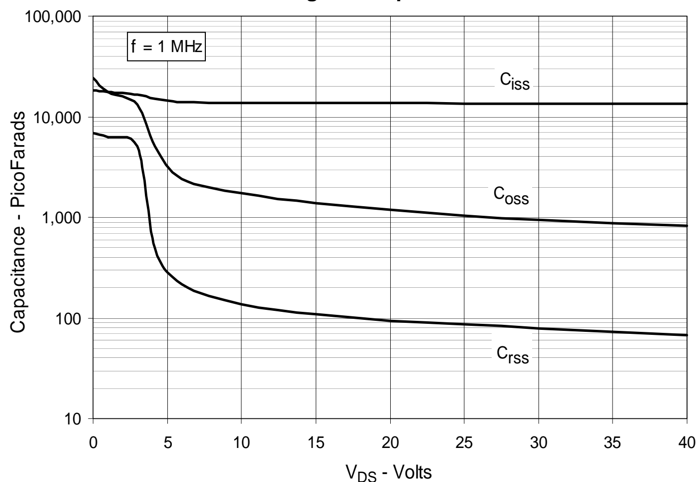

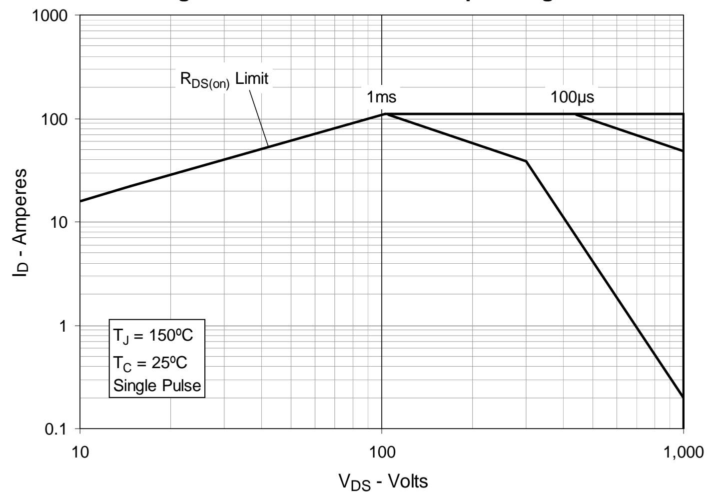

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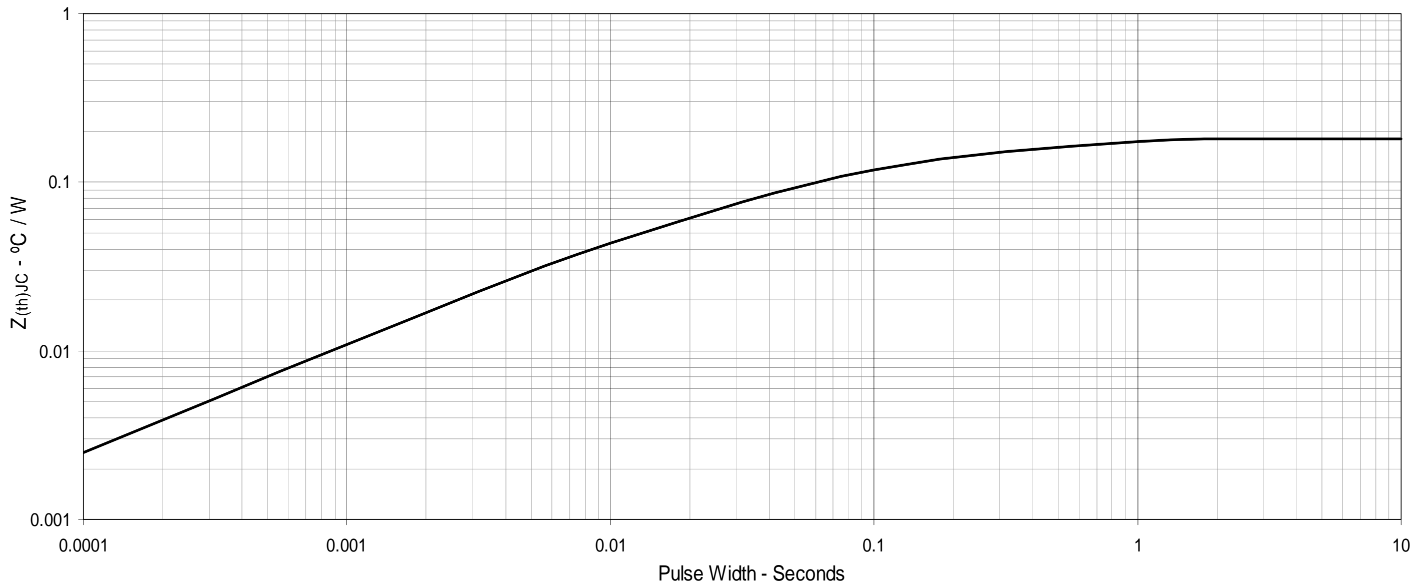

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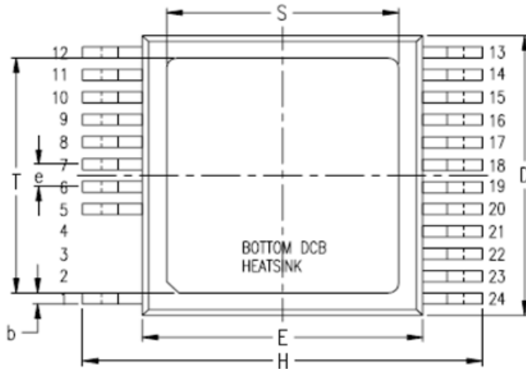

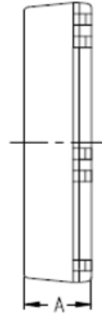

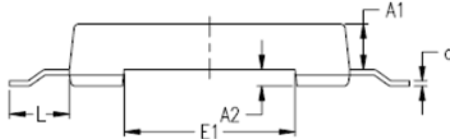

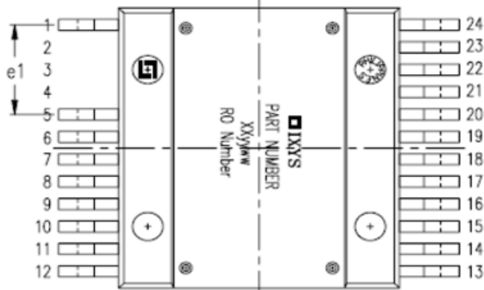

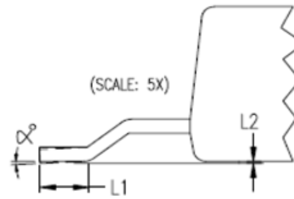

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.209	.224	5.30	5.70
A1	.154	.161	3.90	4.10
A2	.055	.063	1.40	1.60
b	.035	.045	0.90	1.15
c	.018	.026	0.45	0.65
D	.976	.994	24.80	25.25
E	.898	.915	22.80	23.25
E1	.543	.559	13.80	14.20
e	.079 BSC		2.00 BSC	
e1	.315 BSC		8.00 BSC	
H	1.272	1.311	32.30	33.30
L	.181	.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
α	0	4°	0	4°

PIN: **1 = Gate**
5-12 = Source
13-24 = Drain