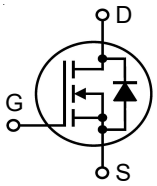
IXYS

X4-Class Power MOSFET™

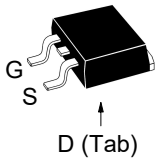
IXTA86N20X4

V_{DSS}	=	200V
I_{D25}	=	86A
$R_{DS(on)}$	≤	13mΩ

N-Channel Enhancement Mode
Avalanche Rated



TO-263 (IXTA)



G = Gate D = Drain
S = Source Tab = Drain

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 175°C	200	V
V_{DGR}	T_J = 25°C to 175°C, R_{GS} = 1MΩ	200	V
V_{GS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C	86	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	160	A
I_A	T_C = 25°C	43	A
E_{AS}	T_C = 25°C	500	mJ
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	300	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
T_{SOLD}	Plastic Body for 10s	260	°C
F_C	Mounting Force	10..65 / 2.2..14.6	N/lb
Weight		2.5	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 250μA	200			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.5		4.5	V
I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
I_{DSS}	V_{DS} = V_{DSS}, V_{GS} = 0V			5	μA
	T_J = 150°C			300	μA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 0.5 • I_{D25}, Note 1		11	13	mΩ

Features

- International Standard Package
- Low $R_{DS(ON)}$ and Q_G
- Avalanche Rated
- Low Package Inductance

Advantages

- High Power Density
- Easy to Mount
- Space Savings

Applications

- Switch-Mode and Resonant-Mode Power Supplies
- DC-DC Converters
- PFC Circuits
- AC and DC Motor Drives
- Robotics and Servo Controls

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Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 10V, I_D = 0.5 • I_{D25}, Note 1	50	82		S
R_{Gi}	Gate Input Resistance		4.75		Ω
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		2250		pF
C_{oss}			660		pF
C_{rss}			185		pF
$t_{d(on)}$	**Resistive Switching Times** V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25} R_G = 10Ω (External)		27		ns
t_r			38		ns
$t_{d(off)}$			76		ns
t_f			35		ns
$Q_{g(on)}$	V_{GS}= 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		70		nC
Q_{gs}			20		nC
Q_{gd}			38		nC
R_{thJC}				0.50	°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			86	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			344	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.4	V
t_{rr}	I_F = 43A, -di/dt = 200A/μs, V_R = 100V		96		ns
I_{RM}			16.7		A
Q_{RM}			0.8		μC

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

Littelfuse 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 4,860,072 5,017,508 5,063,307 5,381,025 6,259,123B1 6,534,343 6,710,405B2 6,759,692 7,063,975B2 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

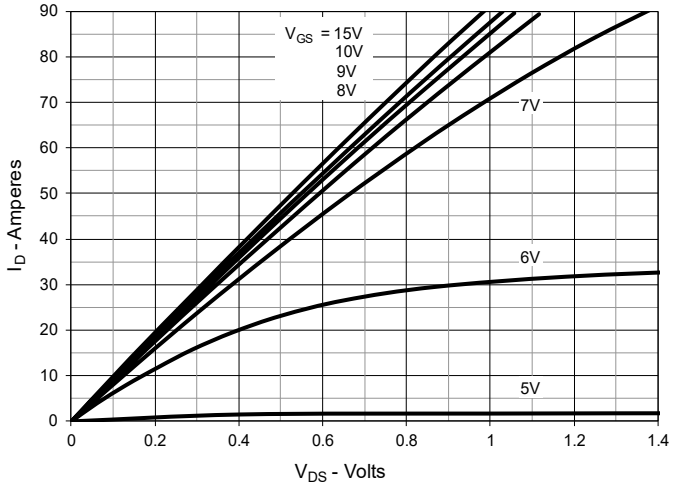

Fig. 2. Extended Output Characteristics @ T_J = 25ºC

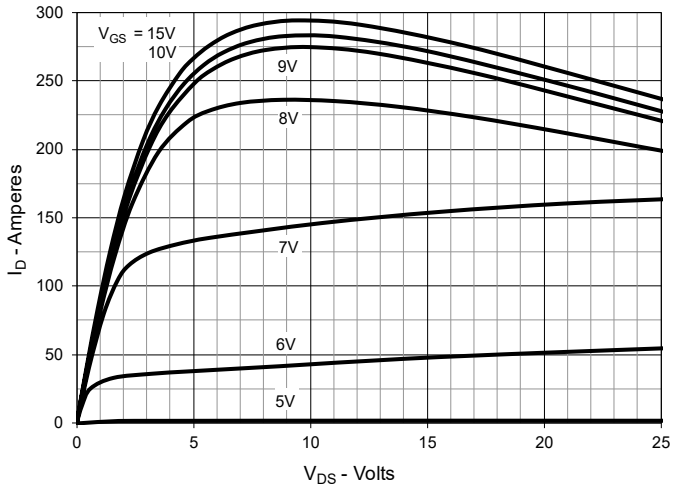

Fig. 3. Output Characteristics @ T_J = 150ºC

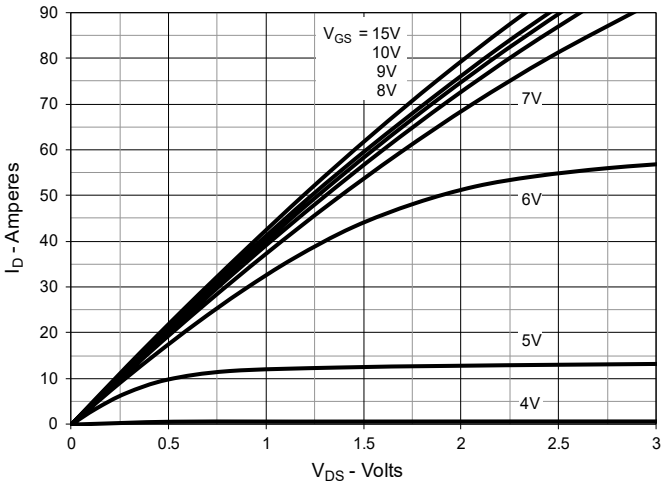

Fig. 4. $R_{DS(on)}$ Normalized to I_D = 43A Value vs. Junction Temperature

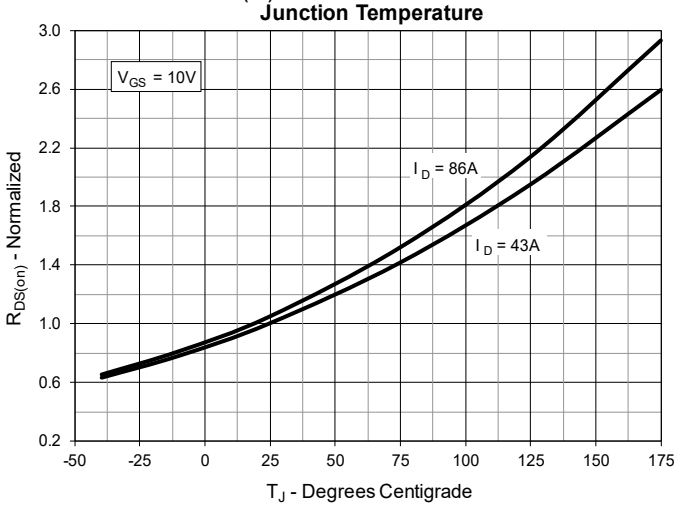

Fig. 5. $R_{DS(on)}$ Normalized to I_D = 43A Value vs. Drain Current

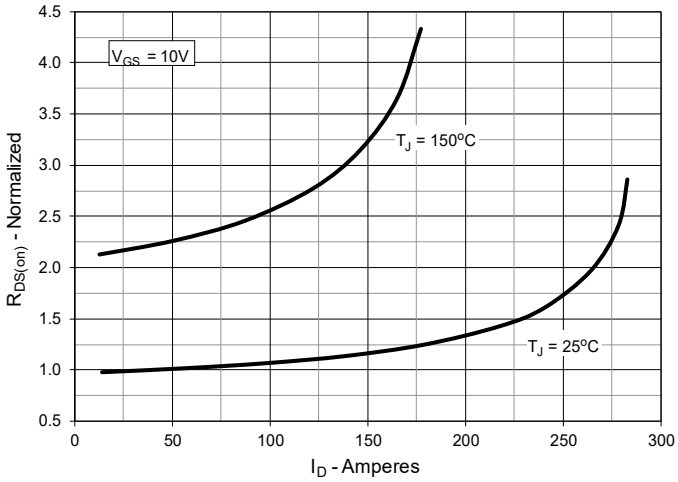

Fig. 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature

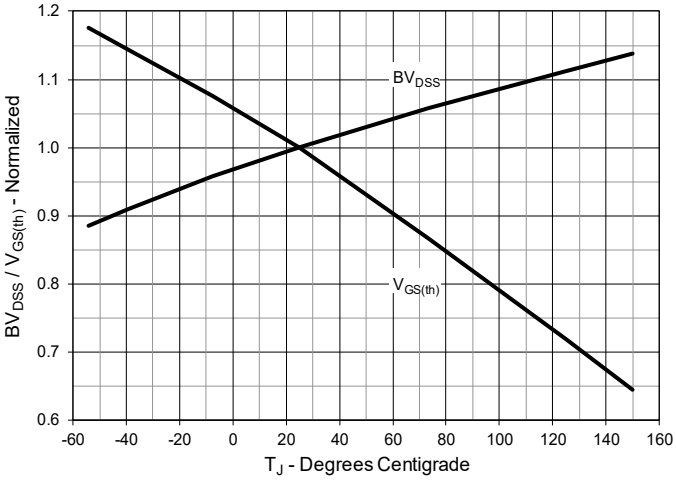

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Fig. 7. Maximum Drain Current vs. Case Temperature

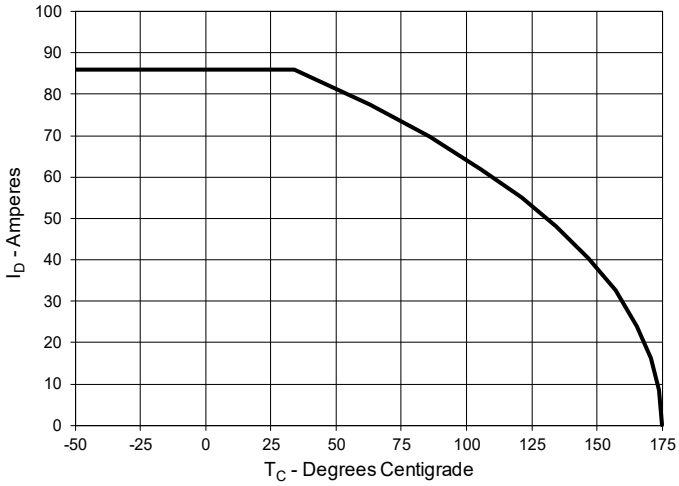

Fig. 8. Input Admittance

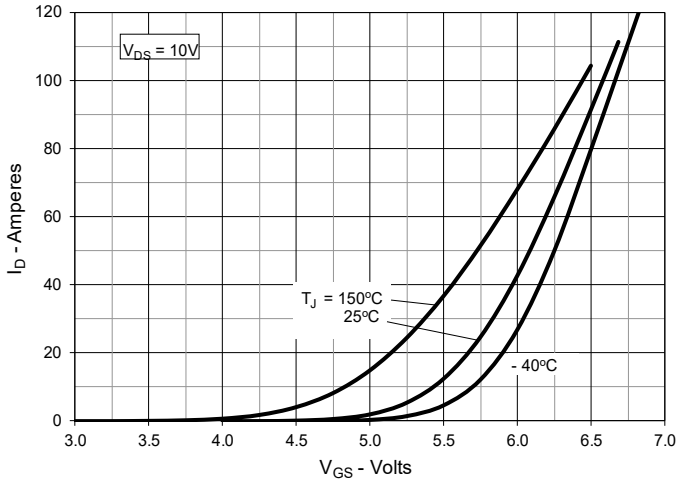

Fig. 9. Transconductance

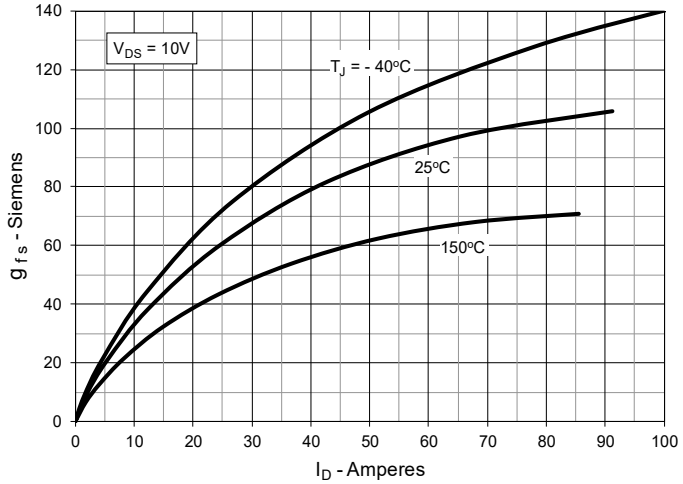

Fig. 10. Forward Voltage Drop of Intrinsic Diode

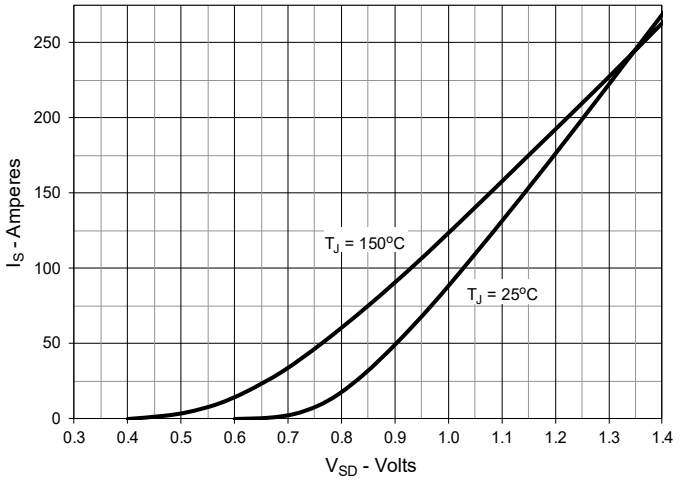

Fig. 11. Gate Charge

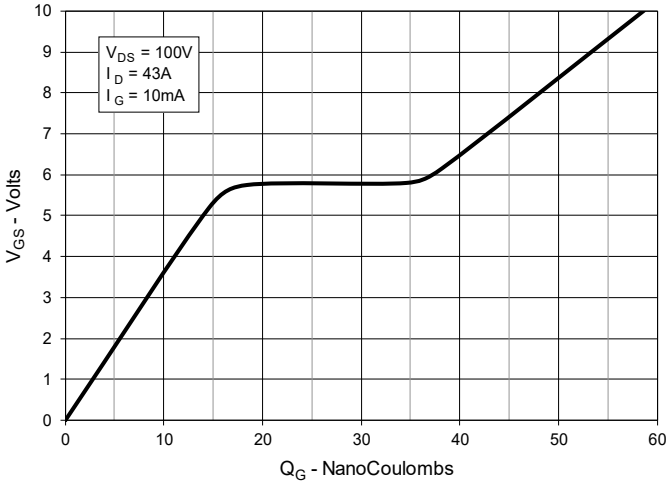

Fig. 12. Capacitance

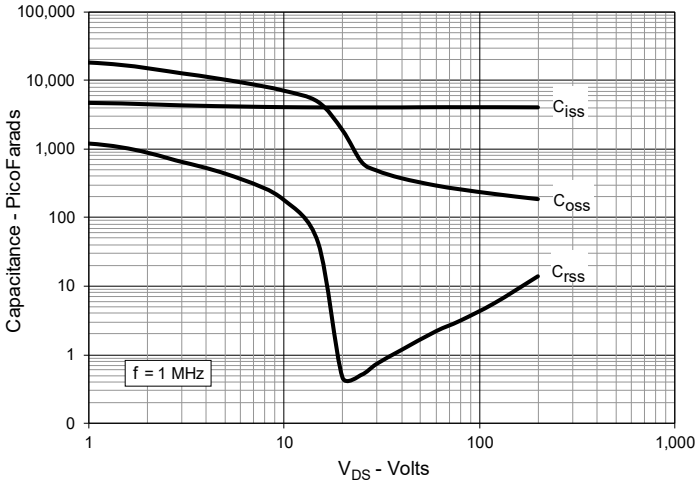

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Fig. 13. Output Capacitance Stored Energy

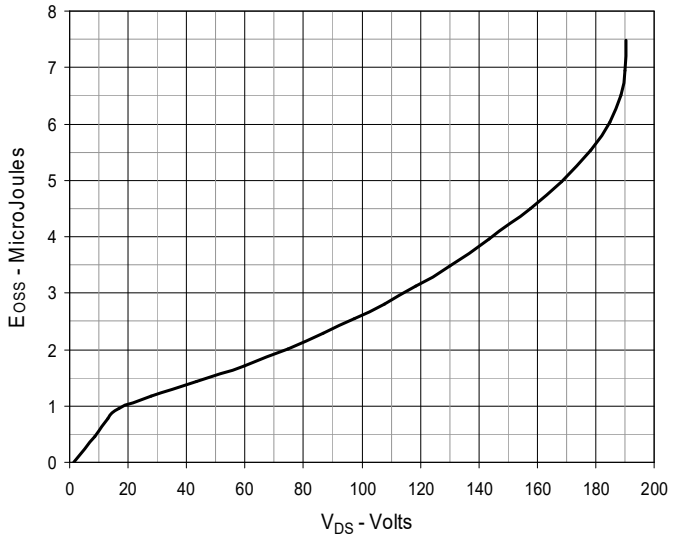


Fig. 14. Forward-Bias Safe Operating Area

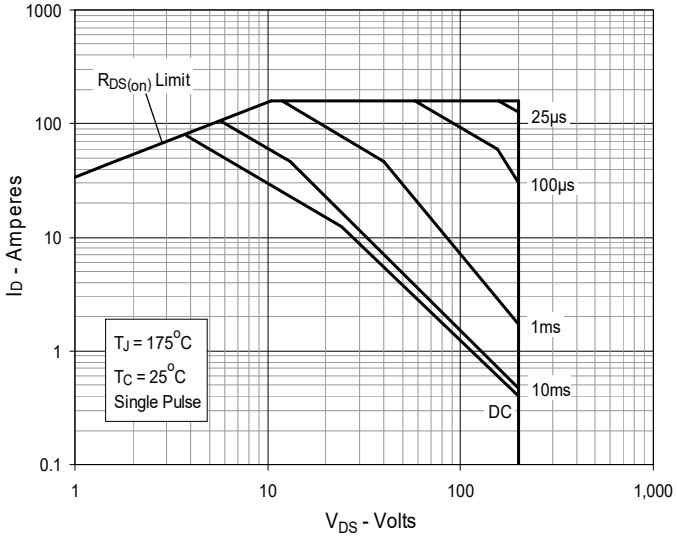
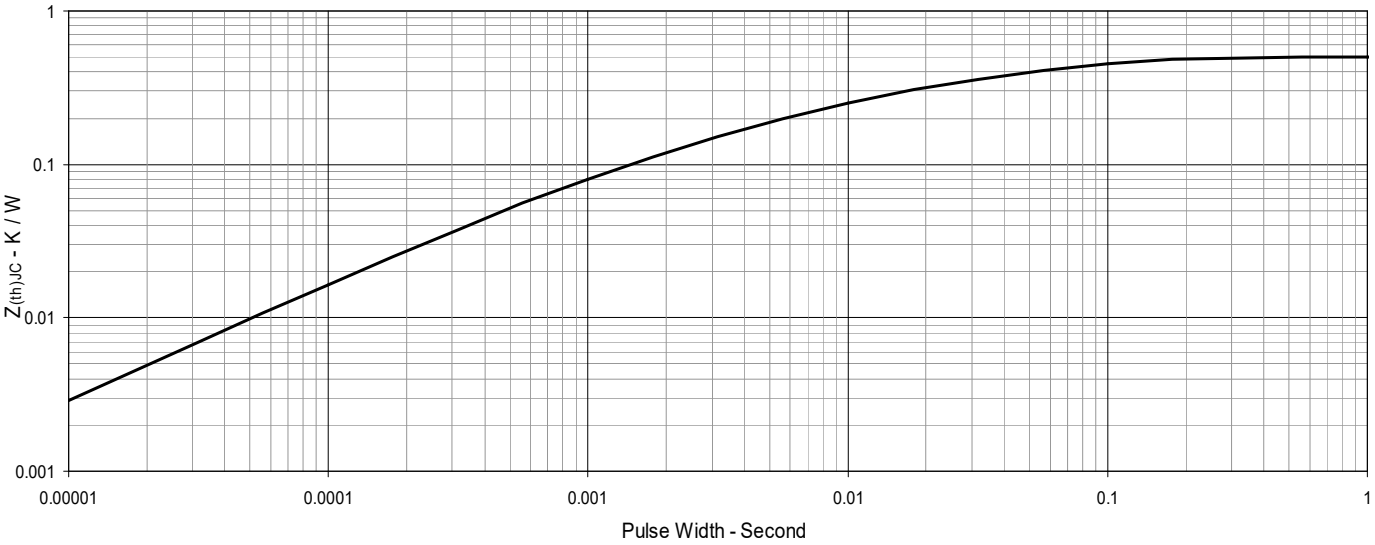


Fig. 15. Maximum Transient Thermal Impedance



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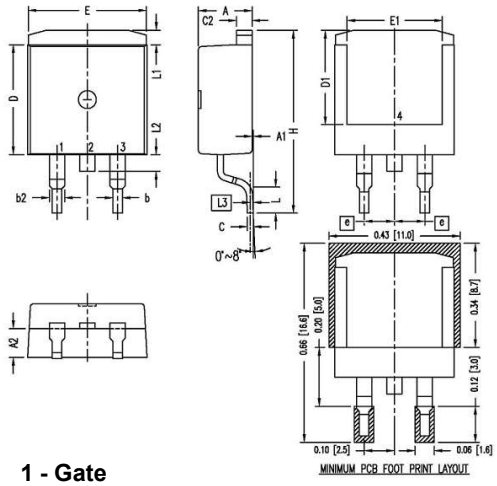
TO-263 Outline



1 - Gate
2,4 - Drain
3 - Source

SYM	INCHES		MILLIMETER	
	MIN	MAX	MIN	MAX
A	.170	.185	4.30	4.70
A1	.000	.008	0.00	0.20
A2	.091	.098	2.30	2.50
b	.028	.035	0.70	0.90
b2	.046	.060	1.18	1.52
C	.018	.024	0.45	0.60
C2	.049	.060	1.25	1.52
D	.340	.370	8.63	9.40
D1	.300	.327	7.62	8.30
E	.380	.410	9.65	10.41
E1	.270	.330	6.86	8.38
e	.100 BSC		2.54 BSC	
H	.580	.620	14.73	15.75
L	.075	.105	1.91	2.67
L1	.039	.060	1.00	1.52
L2	—	.070	—	1.77
L3	.010 BSC		0.254 BSC	

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