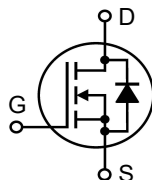


X4-Class Power MOSFET™

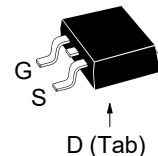
IXTA94N20X4

$$\begin{aligned} V_{DSS} &= 200V \\ I_{D25} &= 94A \\ R_{DS(on)} &\leq 10.6m\Omega \end{aligned}$$

N-Channel Enhancement Mode
Avalanche Rated



TO-263
(IXTA)



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ\text{C}$ to 175°C	200	V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 175°C , $R_{GS} = 1M\Omega$	200	V
V_{GSS}	Continuous	± 20	V
V_{GSM}	Transient	± 30	V
I_{D25}	$T_C = 25^\circ\text{C}$	94	A
I_{DM}	$T_C = 25^\circ\text{C}$, Pulse Width Limited by T_{JM}	220	A
I_A	$T_C = 25^\circ\text{C}$	47	A
E_{AS}	$T_C = 25^\circ\text{C}$	1	J
dv/dt	$I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$	20	V/ns
P_D	$T_C = 25^\circ\text{C}$	360	W
T_J		-55 ... +175	$^\circ\text{C}$
T_{JM}		175	$^\circ\text{C}$
T_{stg}		-55 ... +175	$^\circ\text{C}$
T_{SOLD}	Plastic Body for 10s	260	$^\circ\text{C}$
F_C	Mounting Force	10..65 / 2.2..14.6	N/lb
Weight		2.5	g

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

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSS}	$V_{GS} = 0V$, $I_D = 250\mu A$	200		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu A$	2.5		4.5 V
I_{GSS}	$V_{GS} = \pm 20V$, $V_{DS} = 0V$			± 100 nA
I_{DSS}	$V_{DS} = V_{DSS}$, $V_{GS} = 0V$ $T_J = 150^\circ\text{C}$			20 μA 500 μA
$R_{DS(on)}$	$V_{GS} = 10V$, $I_D = 0.5 \cdot I_{D25}$, Notes 1 & 2			10.6 m Ω

Symbol (T _J = 25°C, Unless Otherwise Specified)	Test Conditions	Characteristic Values		
		Min.	Typ.	Max
g_{fs}	V _{DS} = 10V, I _D = 0.5 • I _{D25} , Note 1	60	100	S
R_{Gi}	Gate Input Resistance		5.3	Ω
C_{iss}	V _{GS} = 0V, V _{DS} = 25V, f = 1MHz		5050	pF
C_{oss}			750	pF
C_{rss}			4	pF
Effective Output Capacitance				
C_{o(er)}	Energy related	V _{GS} = 0V V _{DS} = 0.8 • V _{DSS}	390	pF
C_{o(tr)}	Time related		1670	pF
t_{d(on)}	Resistive Switching Times V _{GS} = 10V, V _{DS} = 0.5 • V _{DSS} , I _D = 0.5 • I _{D25} R _G = 5Ω (External)		18	ns
t_r			9	ns
t_{d(off)}			97	ns
t_f			7	ns
Q_{g(on)}	V _{GS} = 10V, V _{DS} = 0.5 • V _{DSS} , I _D = 0.5 • I _{D25}		77	nC
Q_{gs}			21	nC
Q_{gd}			25	nC
R_{thJC}				0.42 °C/W

Source-Drain Diode

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max
I_S	$V_{GS} = 0\text{V}$			94 A
I_{SM}	Repetitive, pulse Width Limited by T_{JM}			376 A
V_{SD}	$I_F = I_S$, $V_{GS} = 0\text{V}$, Note 1			1.4 V
t_{rr}	$I_F = 47\text{A}$, $-di/dt = 200\text{A}/\mu\text{s}$ $V_R = 100\text{V}$		130	ns
Q_{RM}			1.1	μC
I_{RM}			17	A

- Notes: 1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.
2. On through-hole packages, $R_{DS(on)}$ Kelvin test contact location must be 5mm or less from the package body.

Littelfuse reserves the right to change limits, test conditions and dimensions.

IXYS MOSFETs and IGBTs are covered	4,835,592	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065B1	6,683,344	6,727,585	7,005,734B2	7,157,338B2
by one or more of the following U.S. patents:	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	6,306,728B1	6,583,505	6,710,463	6,771,478B2	7,071,537	

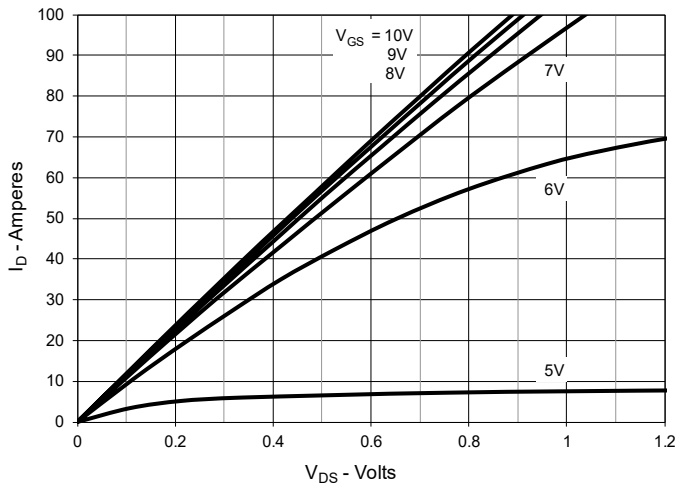
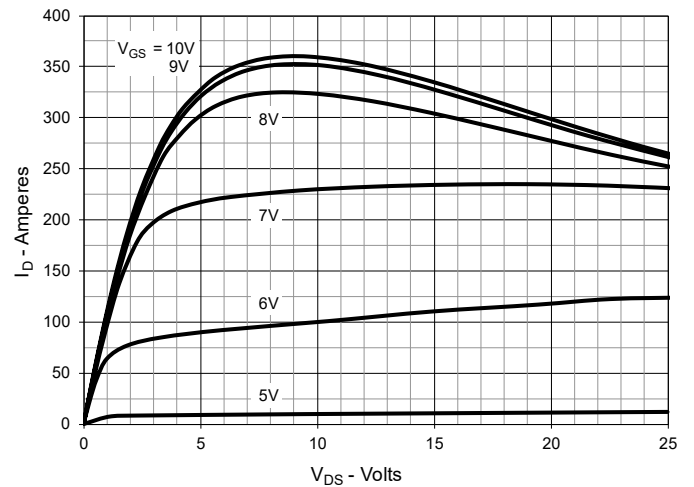
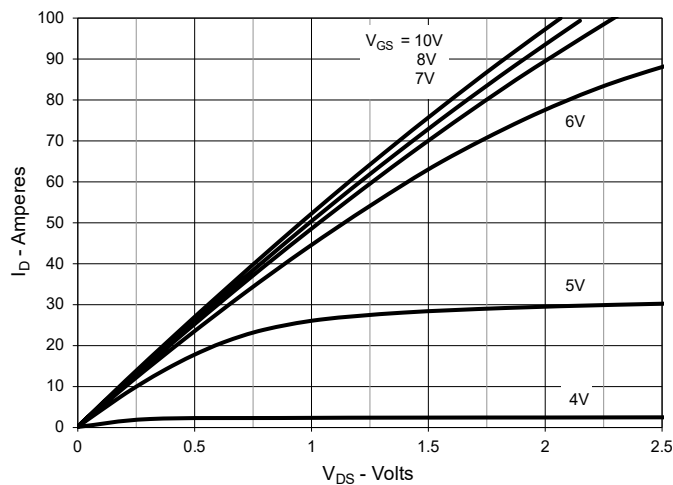
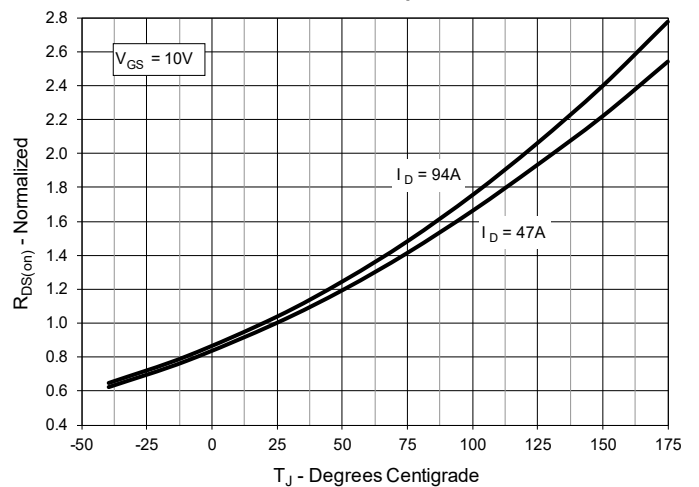
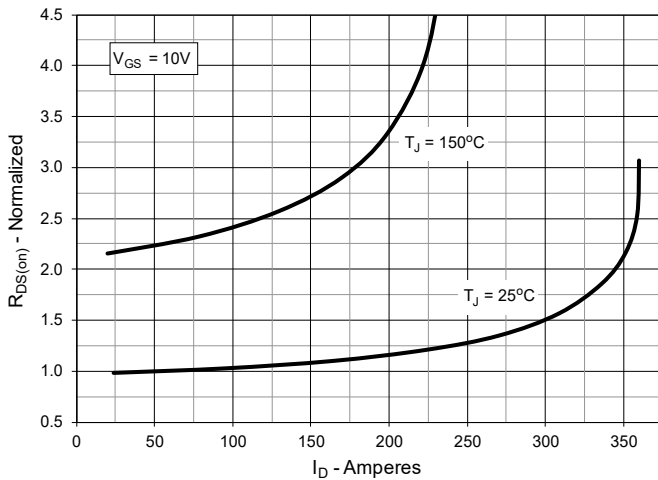
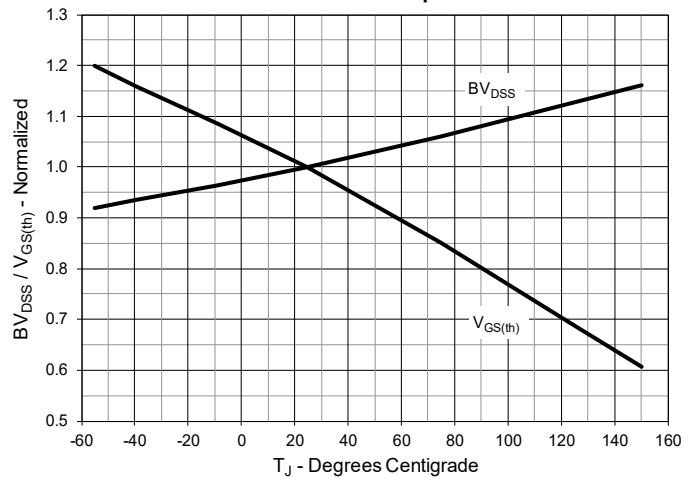
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

Fig. 3. Output Characteristics @ $T_J = 150^\circ\text{C}$

Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 47\text{A}$ Value vs. Junction Temperature

Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 47\text{A}$ Value vs. Drain Current

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


Fig. 7. Maximum Drain Current vs. Case Temperature

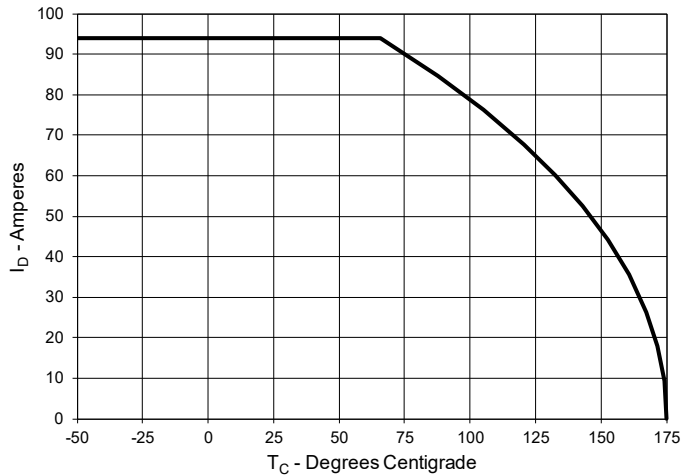


Fig. 8. Input Admittance

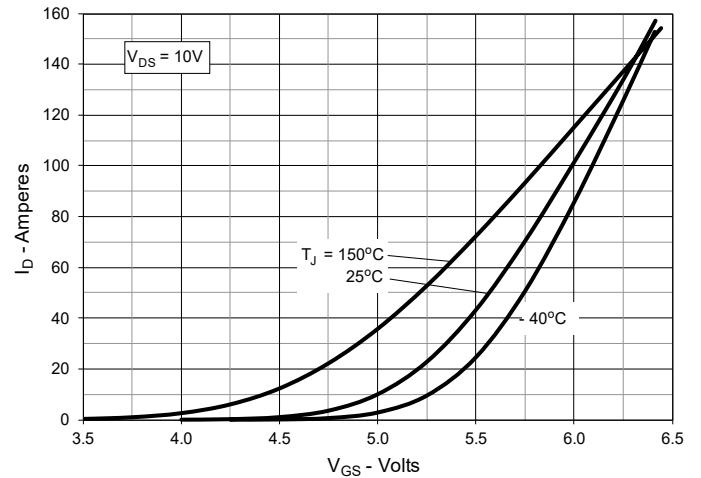


Fig. 9. Transconductance

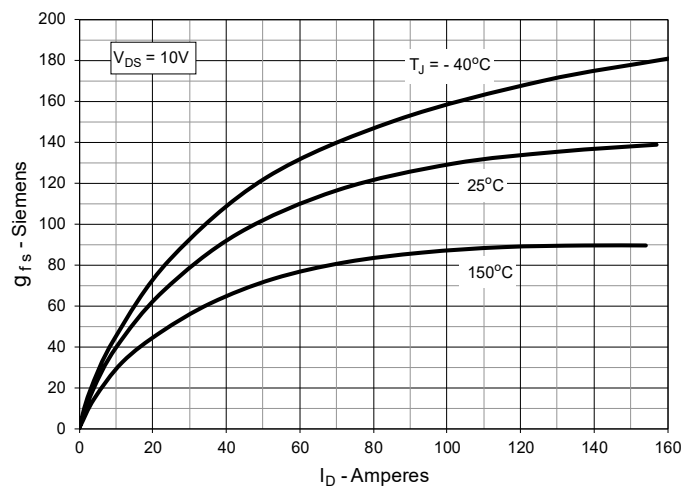


Fig. 10. Forward Voltage Drop of Intrinsic Diode

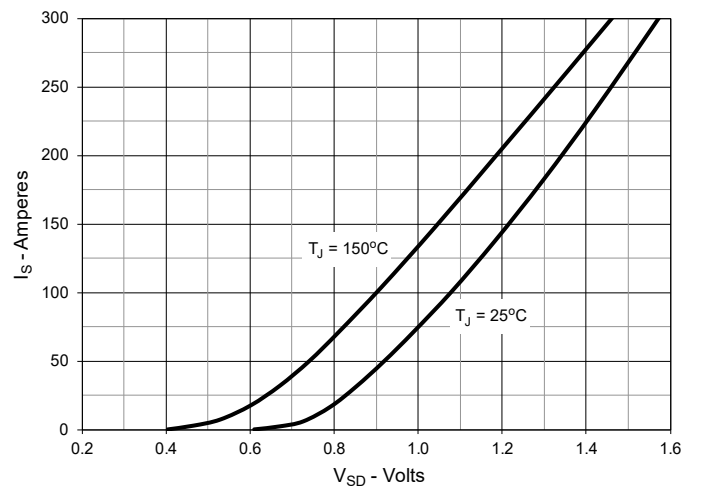


Fig. 11. Gate Charge

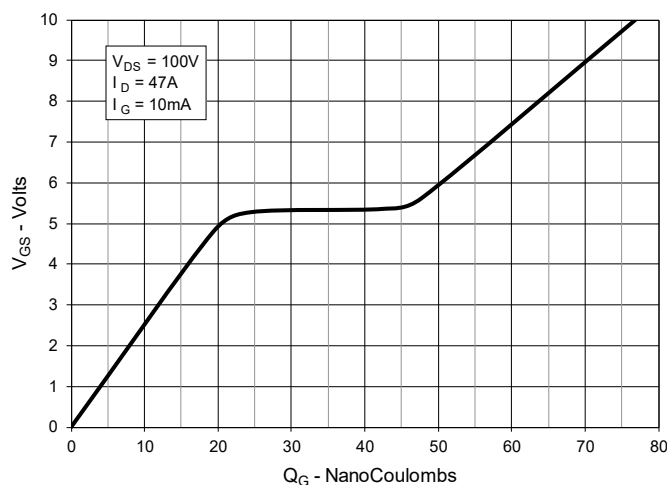


Fig. 12. Capacitance

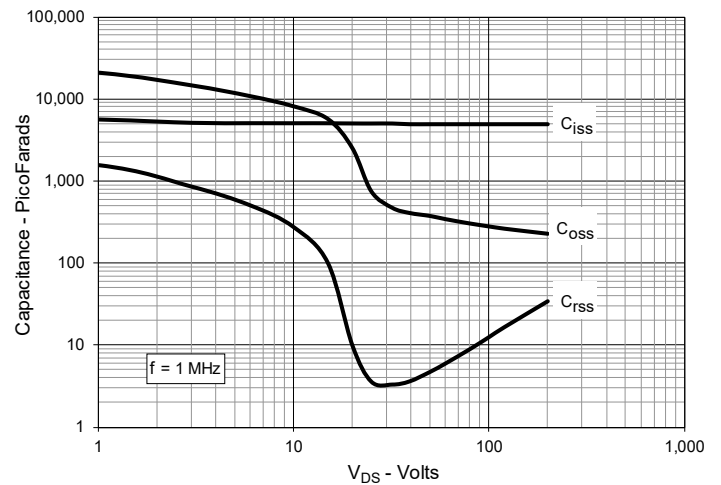


Fig. 13. Output Capacitance Stored Energy

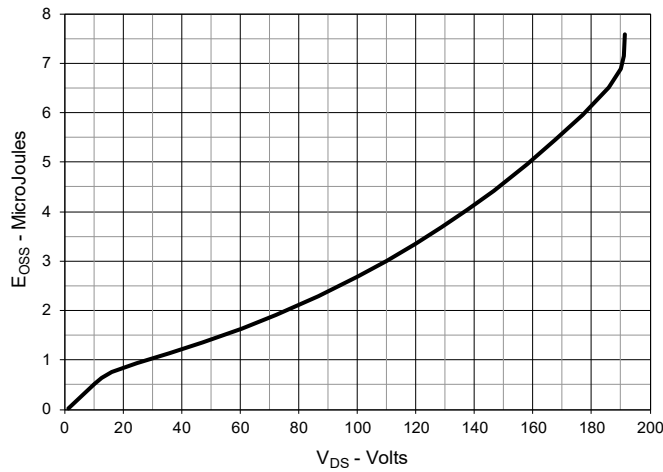


Fig. 14. Forward-Bias Safe Operating Area

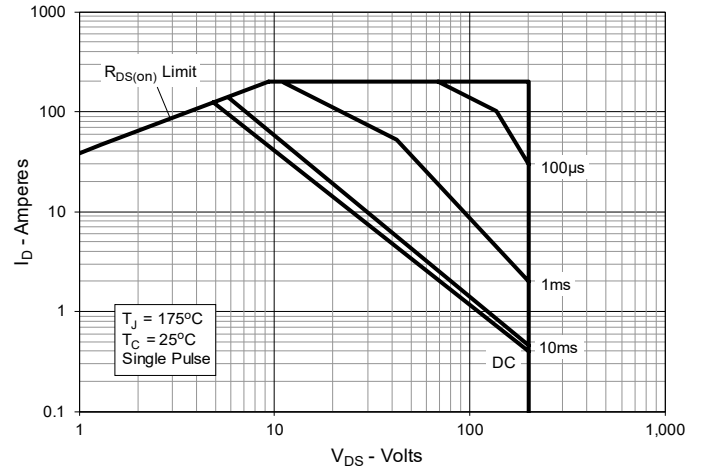
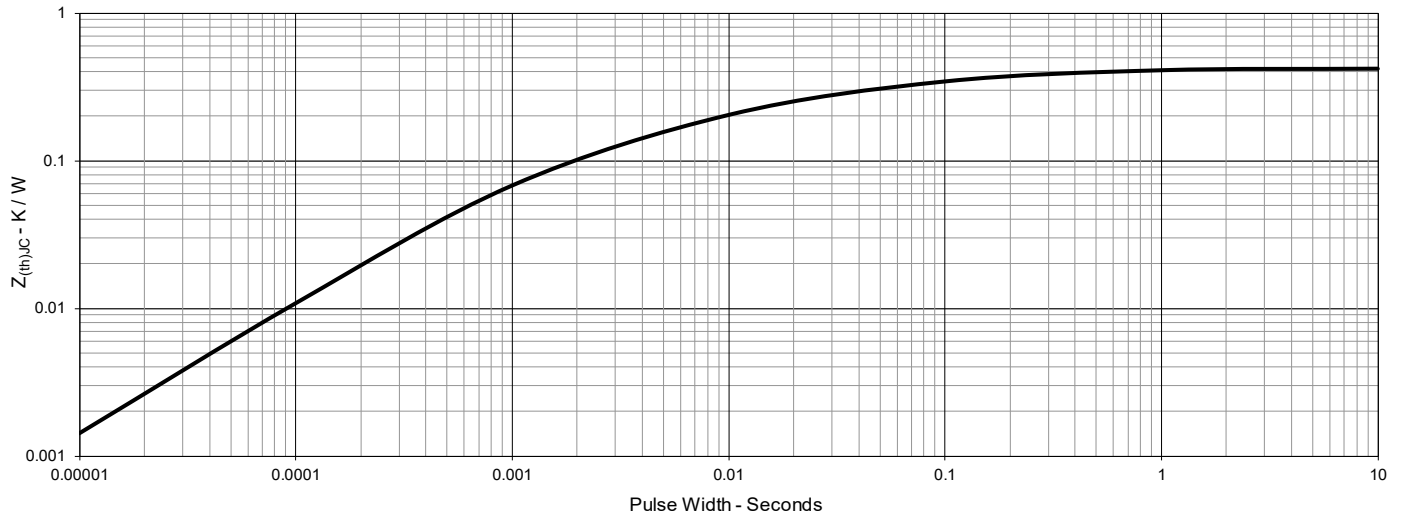
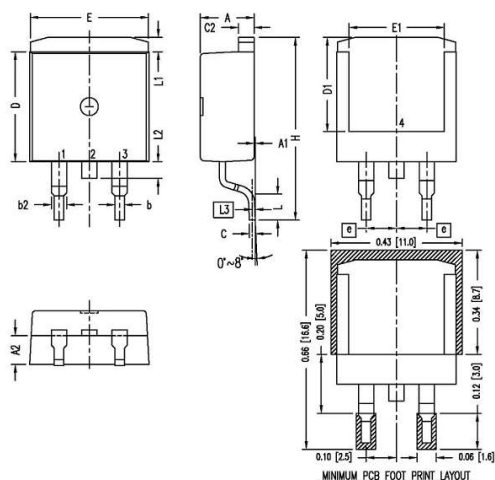


Fig. 15. Maximum Transient Thermal Impedance



TO-263 Outline


1 - Gate
2,4 - Drain
3 - Source

SYM	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.170	0.185	4.30	4.70
A1	0.000	0.008	0.00	0.20
A2	0.091	0.098	2.30	2.50
b	0.028	0.035	0.70	0.90
b2	0.046	0.060	1.18	1.52
c	0.018	0.024	0.45	0.60
C2	0.049	0.060	1.25	1.52
D	0.340	0.370	8.63	9.40
D1	0.300	0.327	7.62	8.30
E	0.380	0.410	9.65	10.41
E1	0.270	0.330	6.86	8.38
e	0.100	BSC	2.54	BSC
H	0.580	0.620	14.73	15.75
L	0.075	0.105	1.91	2.67
L1	0.039	0.060	1.00	1.52
L2	---	0.070	---	1.77
L3	0.100	BSC	0.254	BSC