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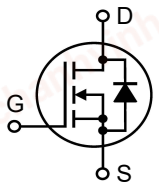
IXYS

X3-Class HiPerFET™ Power MOSFET

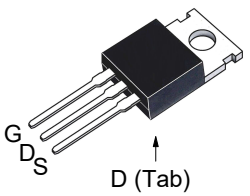
IXFP36N60X3

V_{DSS} = 600V
I_{D25} = 36A
$R_{DS(on)}$ ≤ 90mΩ

N-Channel Enhancement Mode
Avalanche Rated



TO-220 (IXFP)



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	600	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	600	V
V_{GSS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C	36	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	48	A
I_A	T_C = 25°C	8	A
E_{AS}	T_C = 25°C	750	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	446	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering 1.6 mm (0.062 in.) from Case for 10s	300	°C
M_d	Mounting Torque	1.13 / 10	Nm/lb.in
Weight		3	g

Symbol (T_J = 25°C, Unless Otherwise Specified)	Test Conditions	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 1mA	600			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 2.5mA	3.5		5.0	V
I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0V			25	μA
	T_J = 125°C			1	mA
$R_{DS(on)}$	V_{GS} = 10V, $I_D = 0.5 \bullet I_{D25}$, Note 1			90	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	16	26		S
R_{Gi}	Gate Input Resistance		2.1		Ω
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		2030		pF
C_{oss}			3050		pF
C_{rss}			3.6		pF
	Effective Output Capacitance				
$C_{o(er)}$	Energy related; V_{GS} = 0V, V_{DS} = 0.8 • V_{DSS}		110		pF
$C_{o(tr)}$	Time related; V_{GS} = 0V, V_{DS} = 0.8 • V_{DSS}		510		pF
$t_{d(on)}$	**Resistive Switching Times**		23		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		8		ns
$t_{d(off)}$	R_G = 10Ω (External)		45		ns
t_f			4		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		29		nC
Q_{gs}			10		nC
Q_{gd}			10		nC
R_{thJC}				0.28	°C/W
R_{thCS}			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			36	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			144	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.4	V
t_{rr}	I_F = 18A, -di/dt = 100A/μs		180		ns
Q_{RM}	V_R = 100V		1.6		μC
I_{RM}			18.0		A

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 4,860,072 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 6,259,123B1 6,306,728B1 6,404,065B1 6,534,343 6,583,505 6,683,344 6,710,405B2 6,710,463 6,727,585 6,759,692 6,771,478B2 7,005,734B2 7,063,975B2 7,071,537 7,157,338B2

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Fig. 1. Output Characteristics @ T_J = 25ºC

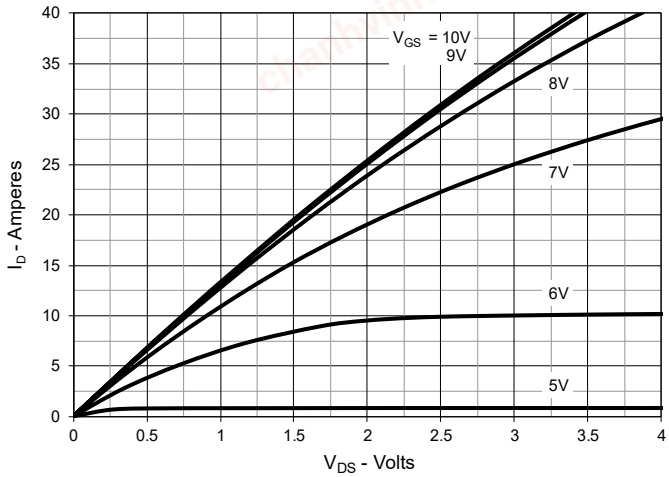


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

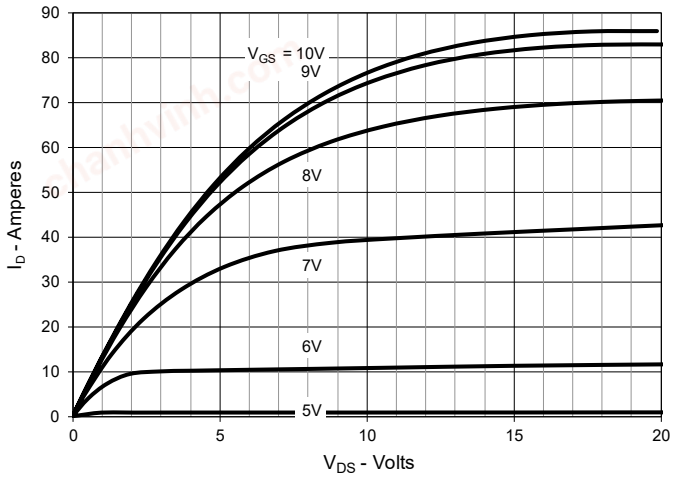


Fig. 3. Output Characteristics @ T_J = 125ºC

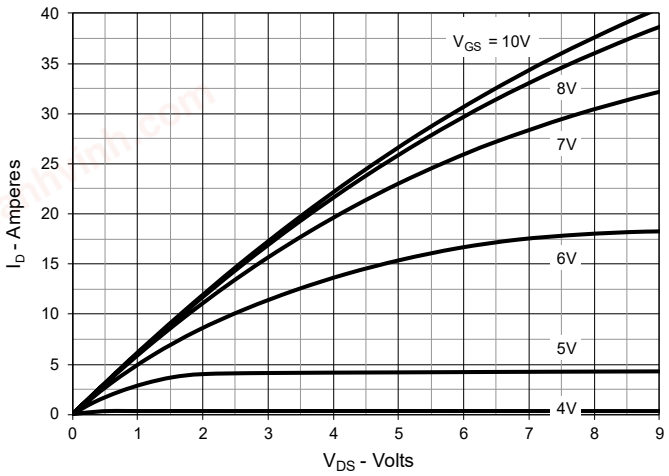


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 18A Value vs. Junction Temperature

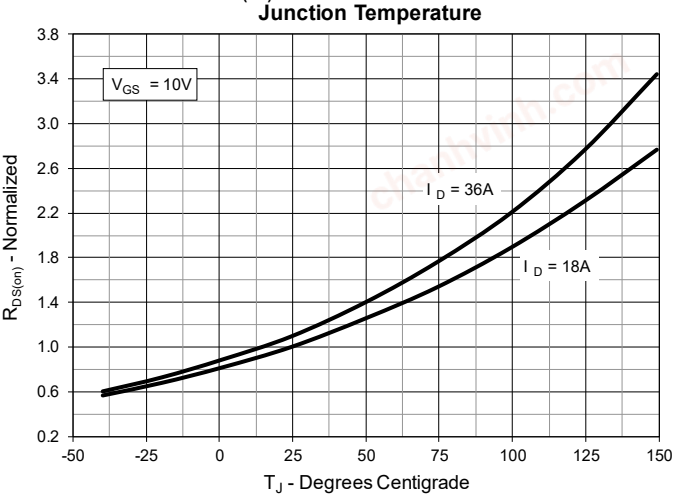


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 18A Value vs. Drain Current

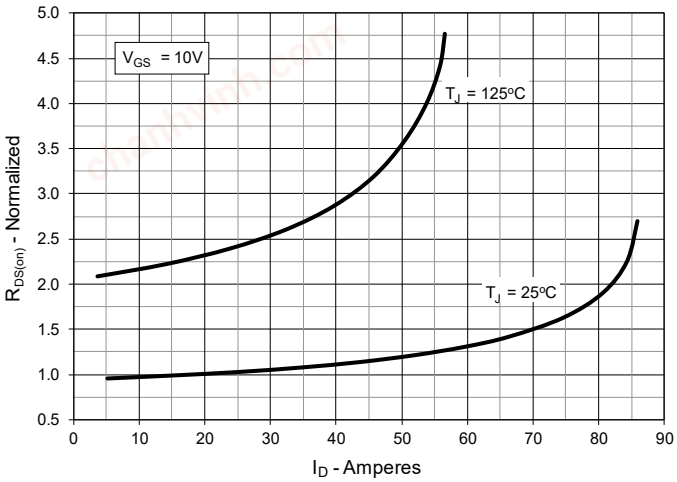
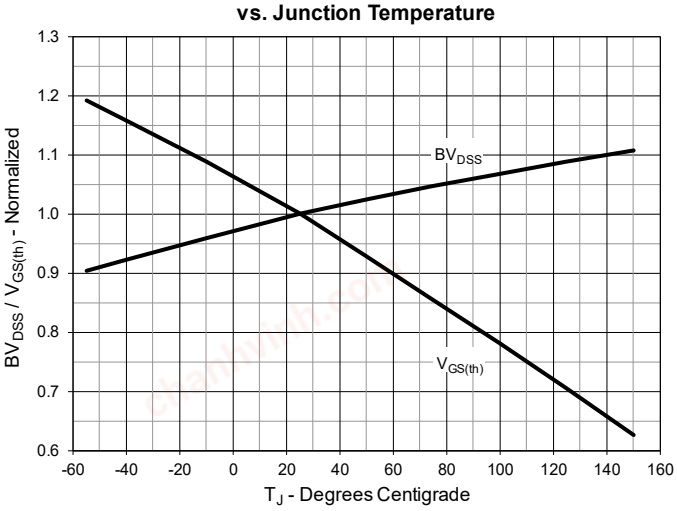


Fig. 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature



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Fig. 7. Maximum Drain Current vs. Case Temperature

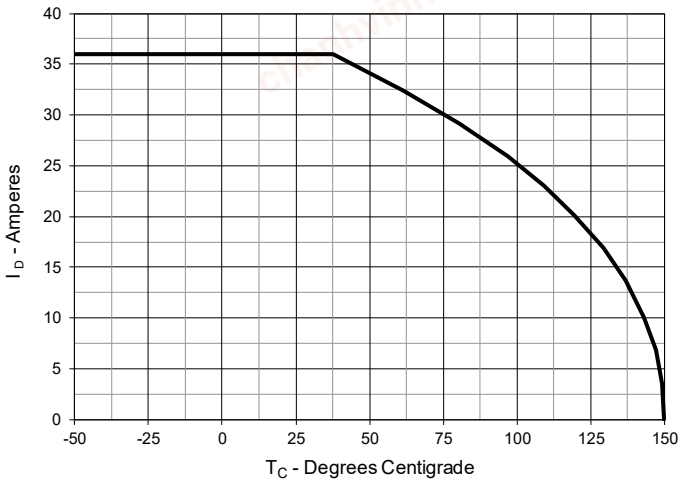


Fig. 8. Input Admittance

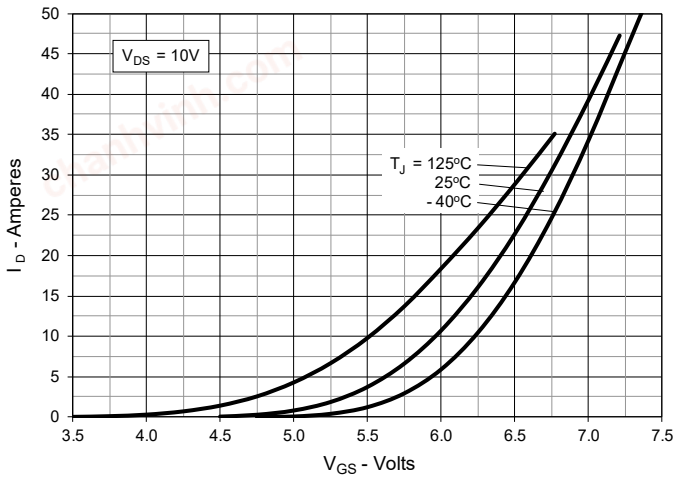


Fig. 9. Transconductance

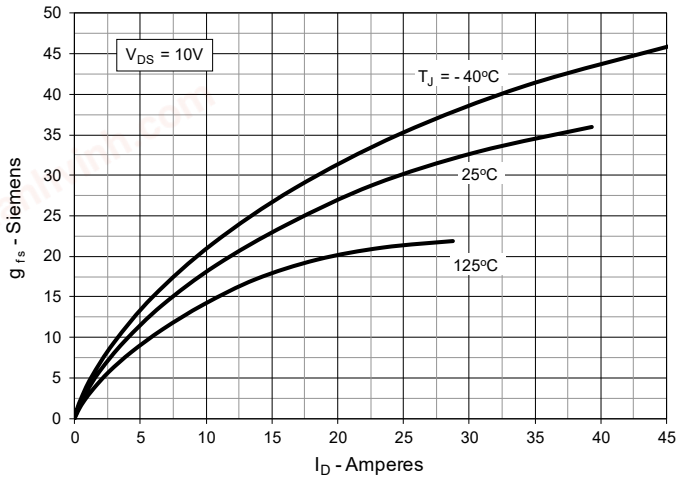


Fig. 10. Forward Voltage Drop of Intrinsic Diode

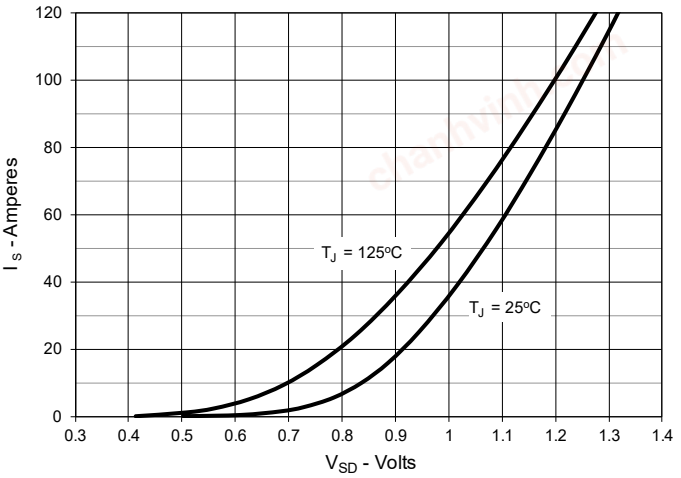


Fig. 11. Gate Charge

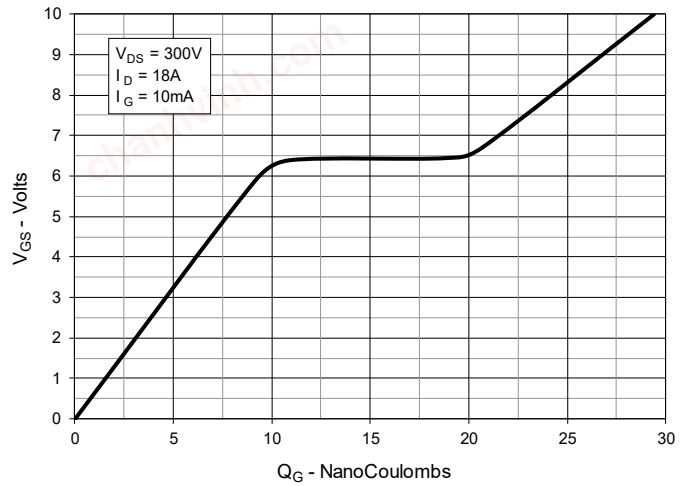
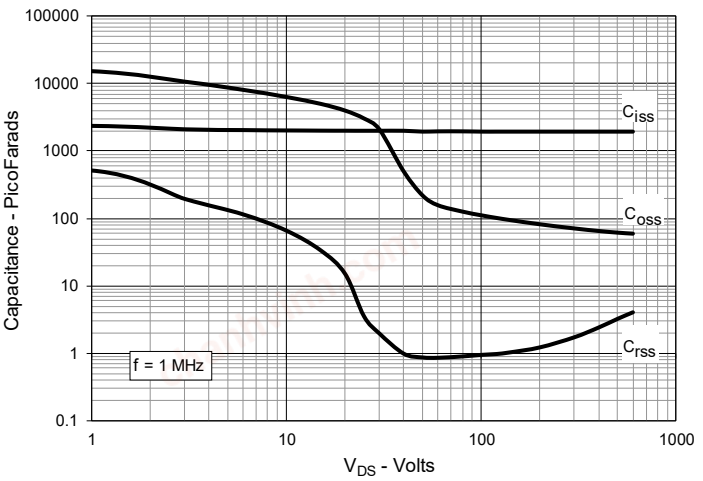


Fig. 12. Capacitance



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Fig. 13. Output Capacitance Stored Energy

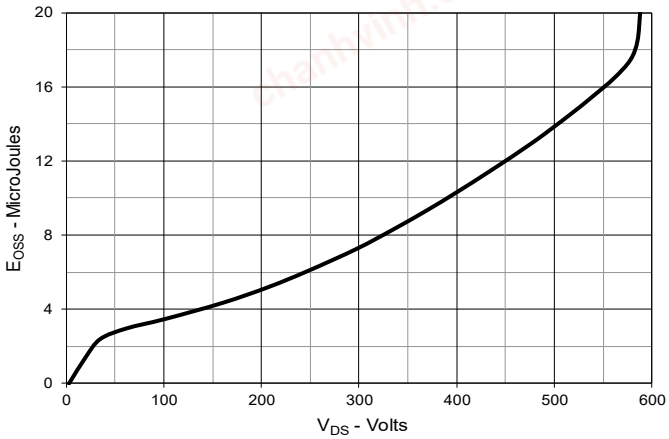


Fig. 14. Forward-Bias Safe Operating Area

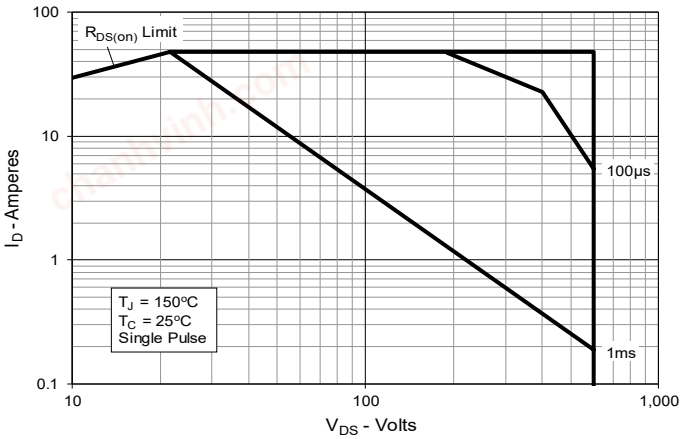
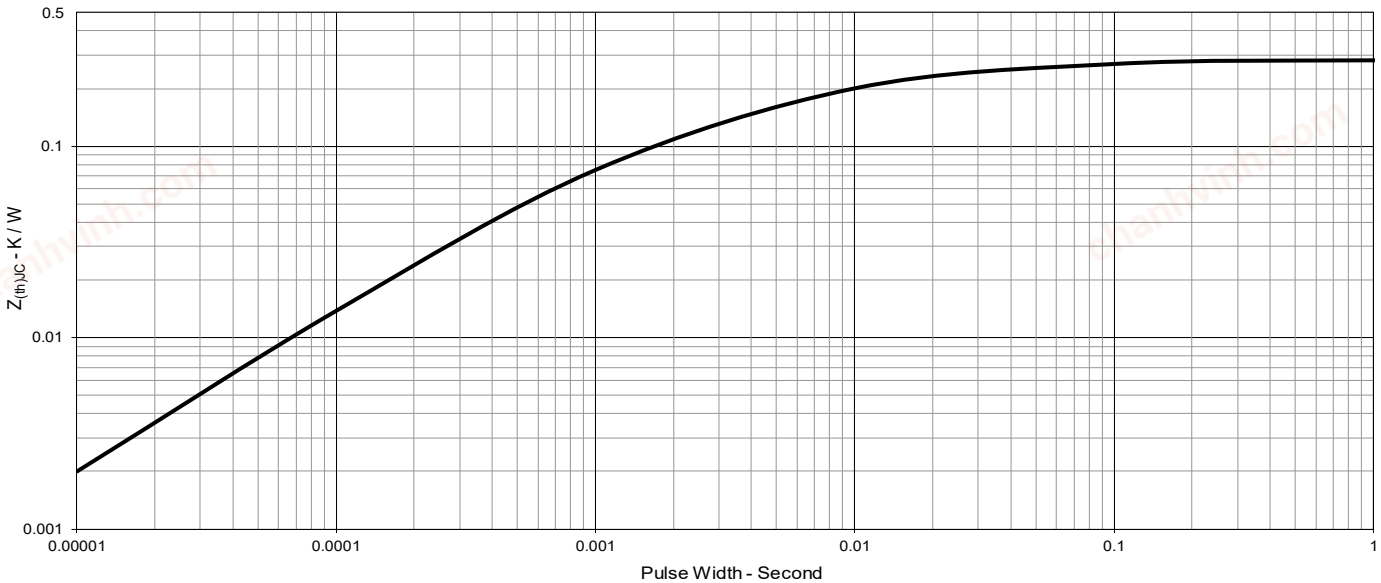


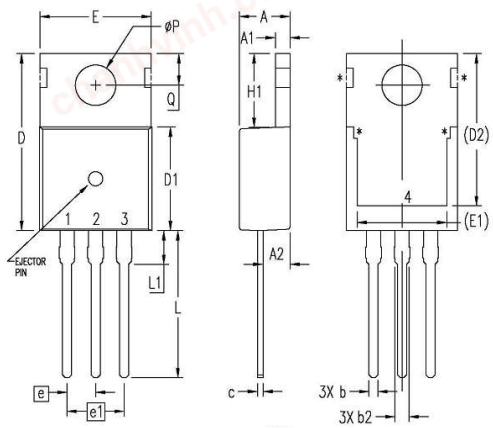
Fig. 15. Maximum Transient Thermal Impedance

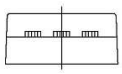


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TO-220 Outline





1 - Gate
2,4 - Drain
3 - Source

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.169	.185	4.30	4.70
A1	.047	.055	1.20	1.40
A2	.079	.106	2.00	2.70
b	.024	.039	0.60	1.00
b2	.045	.057	1.15	1.45
c	.014	.026	0.35	0.65
D	.587	.626	14.90	15.90
D1	.335	.370	8.50	9.40
(D2)	.500	.531	12.70	13.50
E	.382	.406	9.70	10.30
(E1)	.283	.323	7.20	8.20
e	.100 BSC		2.54 BSC	
e1	.200 BSC		5.08 BSC	
H1	.244	.268	6.20	6.80
L	.492	.547	12.50	13.90
L1	.110	.154	2.80	3.90
øP	.134	.150	3.40	3.80
Q	.106	.126	2.70	3.20

NOTE:
1. These dimensions do not inclue mold protusion.
2. Metal finish – Matte pure tin plating except trim area.
3. Pin call out: 1 – GATE 3 – SOURCE (EMITTER for IGBT)
   2 – DRAIN (COLLECTOR for IGBT) 4 – DRAIN (Connected with #2 internally)
4. Ejector pin location & diameter will vary depending on packaging suppliers.
5. * marked area will vary depending on packaging suppliers.

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