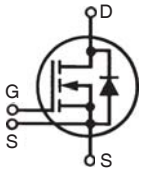
IXYS

X4-Class Power MOSFET™

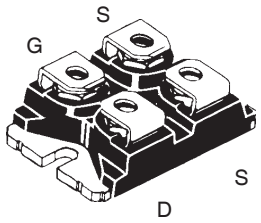
IXTN400N15X4

V_{DSS} = 150V
I_{D25} = 400A
$R_{DS(on)}$ ≤ 2.35mΩ

N-Channel Enhancement Mode
Avalanche Rated



miniBLOC, SOT-227
E153432



G = Gate D = Drain
S = Source

Symbol	Test Conditions		Maximum Ratings	
V_{DSS}	T_J = 25°C to 175°C		150	V
V_{DGR}	T_J = 25°C to 175°C, R_{GS} = 1MΩ		150	V
V_{GSS}	Continuous		± 20	V
V_{GSM}	Transient		± 30	V
I_{D25}	T_C = 25°C (Chip Capability)		400	A
$I_{L(RMS)}$	External Lead Current Limit		200	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}		900	A
I_A	T_C = 25°C		200	A
E_{AS}	T_C = 25°C		3	J
P_D	T_C = 25°C		830	W
dv/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$		50	V/ns
T_J			-55 ... +175	°C
T_{JM}			175	°C
T_{stg}			-55 ... +175	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 minute	2500	V~
	$I_{ISOL} \le$ 1mA	t = 1 second	3000	V~
M_d	Mounting Torque		1.5/13	Nm/lb.in
	Terminal Connection Torque		1.3/11.5	Nm/lb.in
Weight			30	g

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 1mA	150			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 1mA	2.5		4.5	V
I_{GSS}	V_{GS} = ± 20V, V_{DS} = 0V			± 200	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0V			25	μA
	T_J = 150°C			2	mA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 100A, Note 1			2.35	mΩ

Features

- International Standard Package
- miniBLOC, with Aluminium Nitride Isolation
- Isolation Voltage 2500 V~
- High Current Handling Capability
- Low 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°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max	
g_{fs}	V_{DS} = 10V, I_D = 60A, Note 1	100	170		S
R_{Gi}	Gate Input Resistance		1.2		Ω
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		14.5		nF
C_{oss}			3.1		nF
C_{rss}			8.0		pF
	Effective Output Capacitance				
$C_{o(er)}$	Energy related; V_{GS} = 0V, V_{DS} = 0.8 • V_{DSS}		2500		pF
$C_{o(tr)}$	Time related; V_{GS} = 0V, V_{DS} = 0.8 • V_{DSS}		9400		pF
$t_{d(on)}$	**Resistive Switching Times**		40		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		22		ns
$t_{d(off)}$	R_G = 1Ω (External)		180		ns
t_f			8		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		430		nC
Q_{gs}			100		nC
Q_{gd}			100		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			400	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			1600	A
V_{SD}	I_F = 100A , V_{GS} = 0V, Note 1			1.4	V
t_{rr}	I_F = 150A, -di/dt = 100A/µs		175		ns
Q_{RM}	V_R = 100V, V_{GS} = 0V		1.1		µC
I_{RM}			12.3		A

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

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

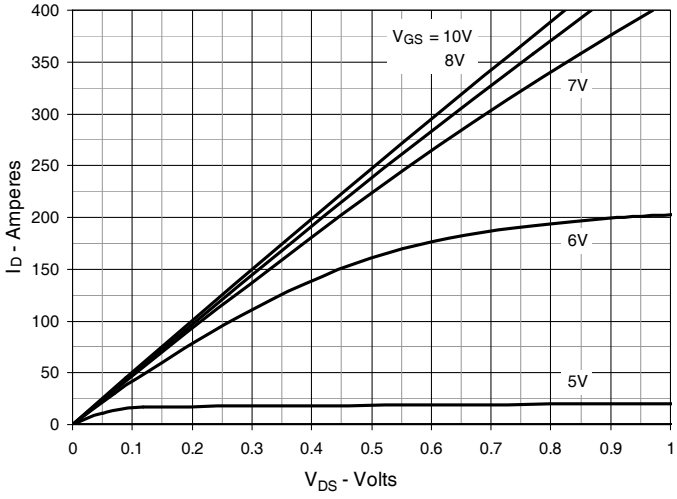


Fig. 2. Extended Output Characteristics @ T_J = 25°C

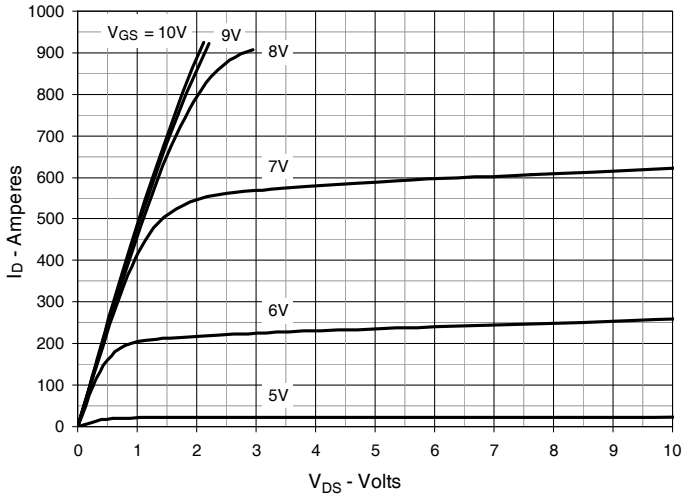


Fig. 3. Output Characteristics @ T_J = 150°C

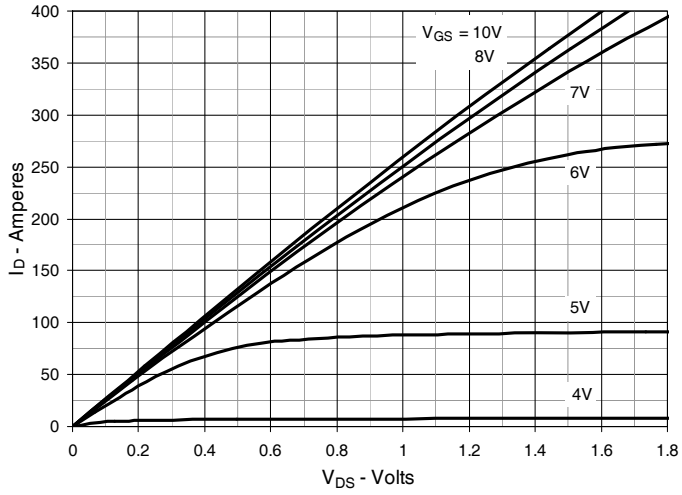


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 200A Value vs. Junction Temperature

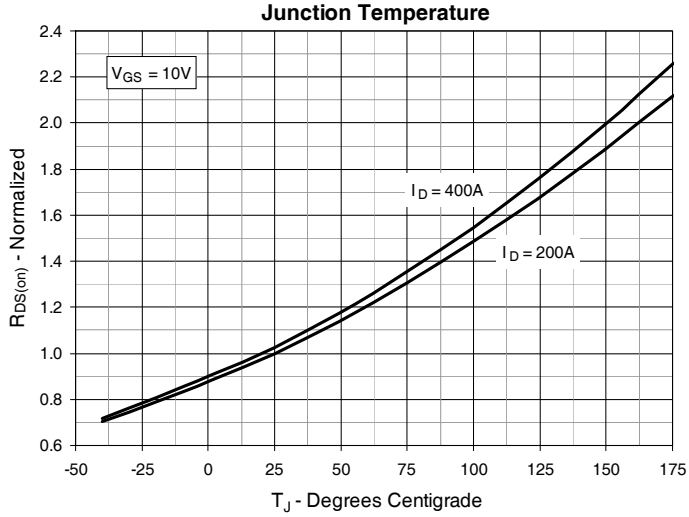


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 200A Value vs. Drain Current

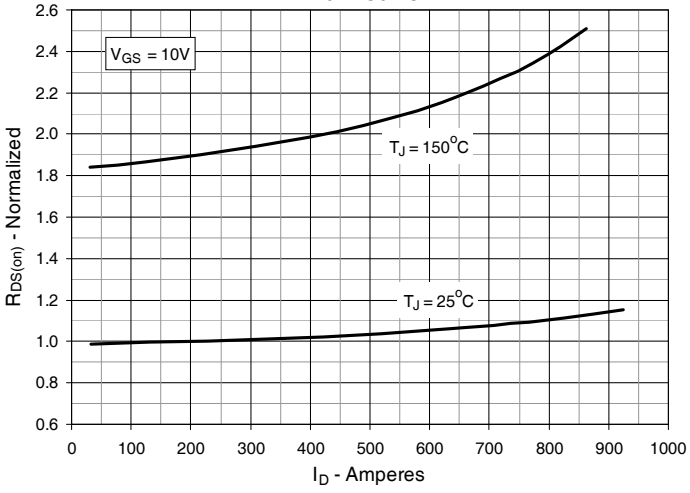


Fig. 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature

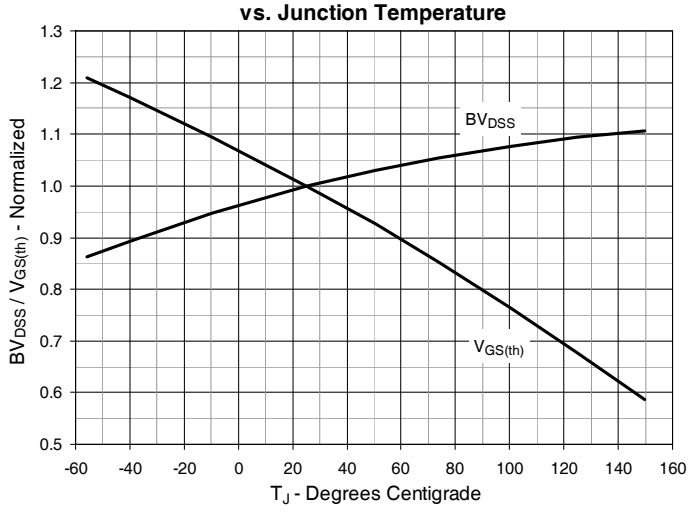


Fig. 7. Maximum Drain Current vs. Case Temperature

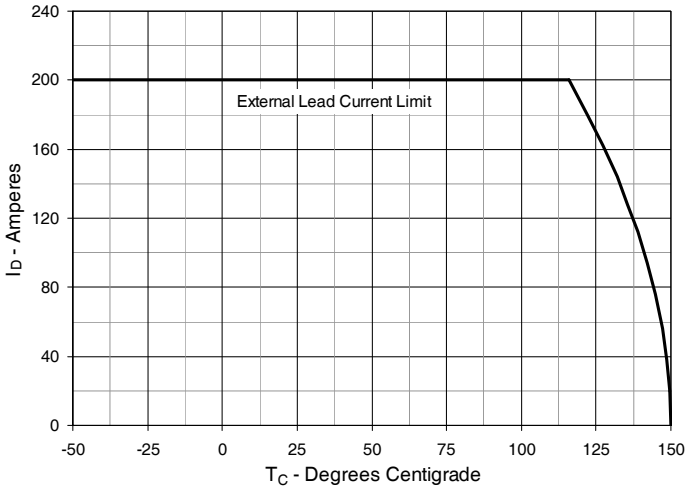


Fig. 8. Input Admittance

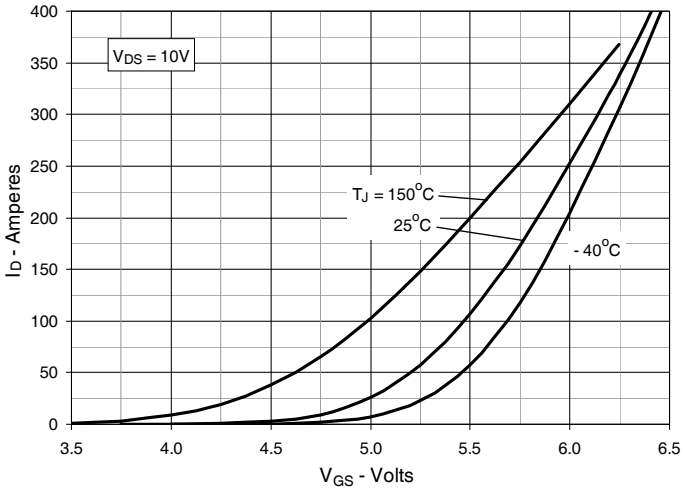


Fig. 9. Transconductance

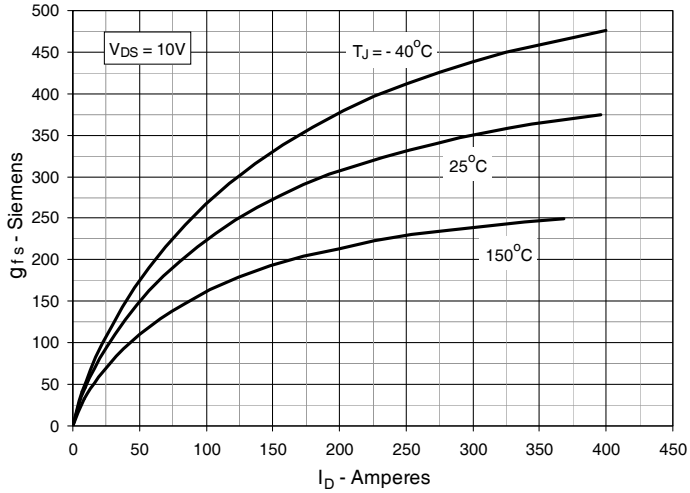


Fig. 10. Forward Voltage Drop of Intrinsic Diode

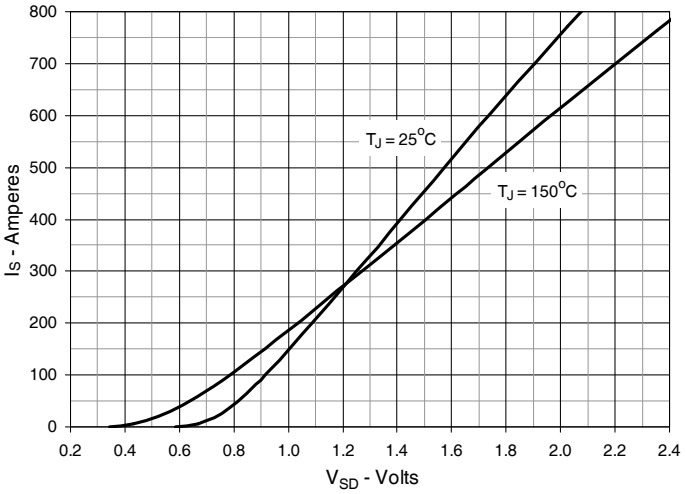


Fig. 11. Gate Charge

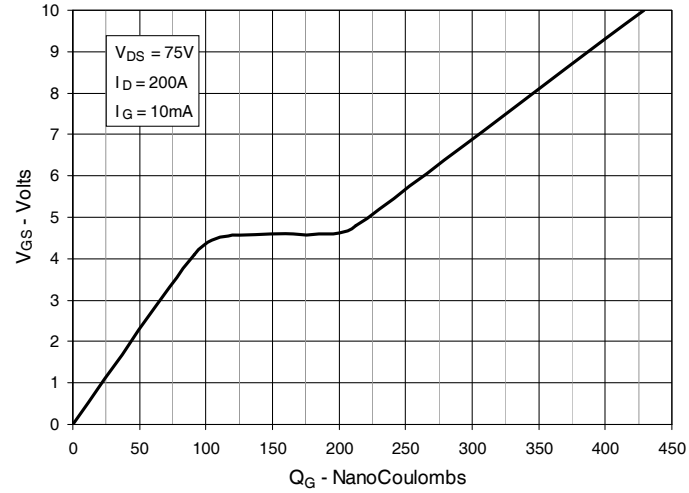


Fig. 12. Capacitance

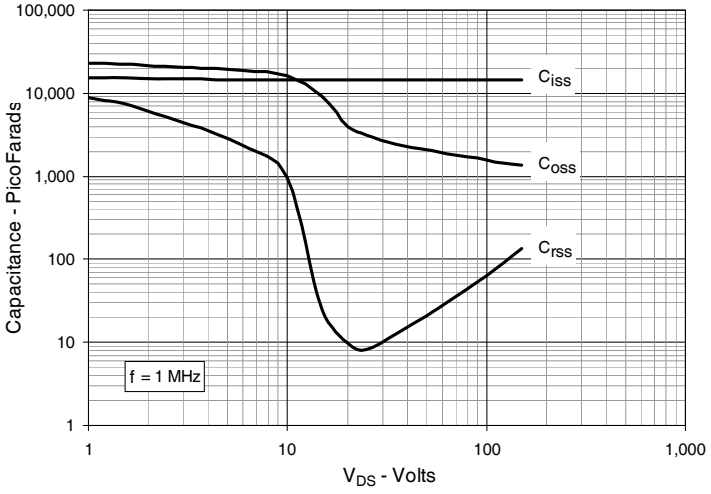


Fig. 13. Output Capacitance Stored Energy

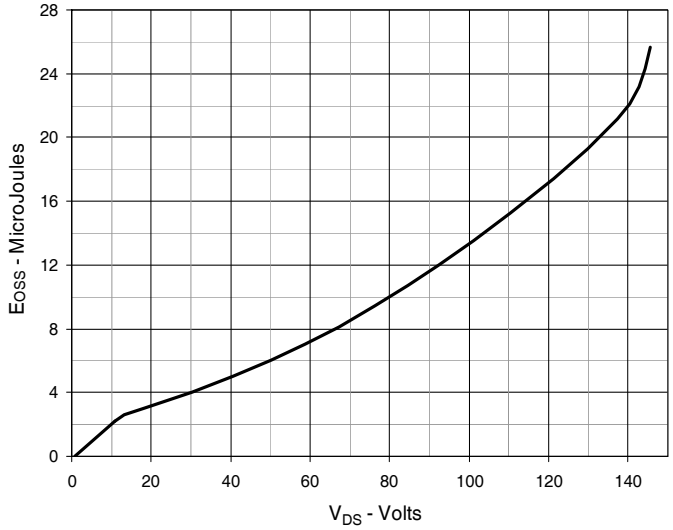


Fig. 14. Forward-Bias Safe Operating Area

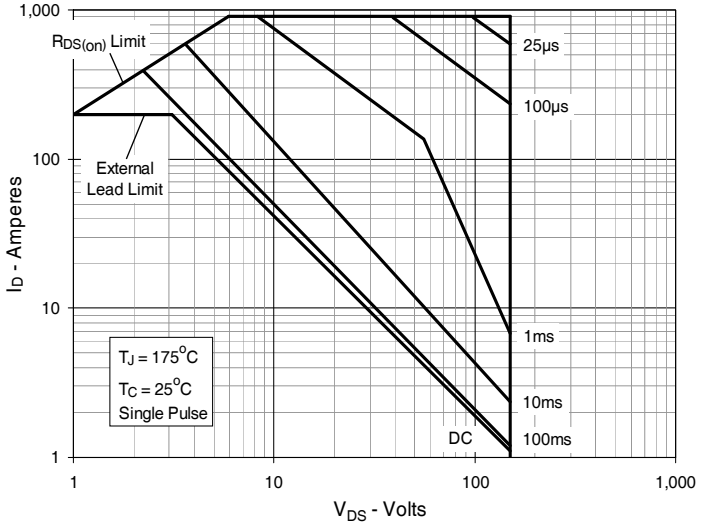
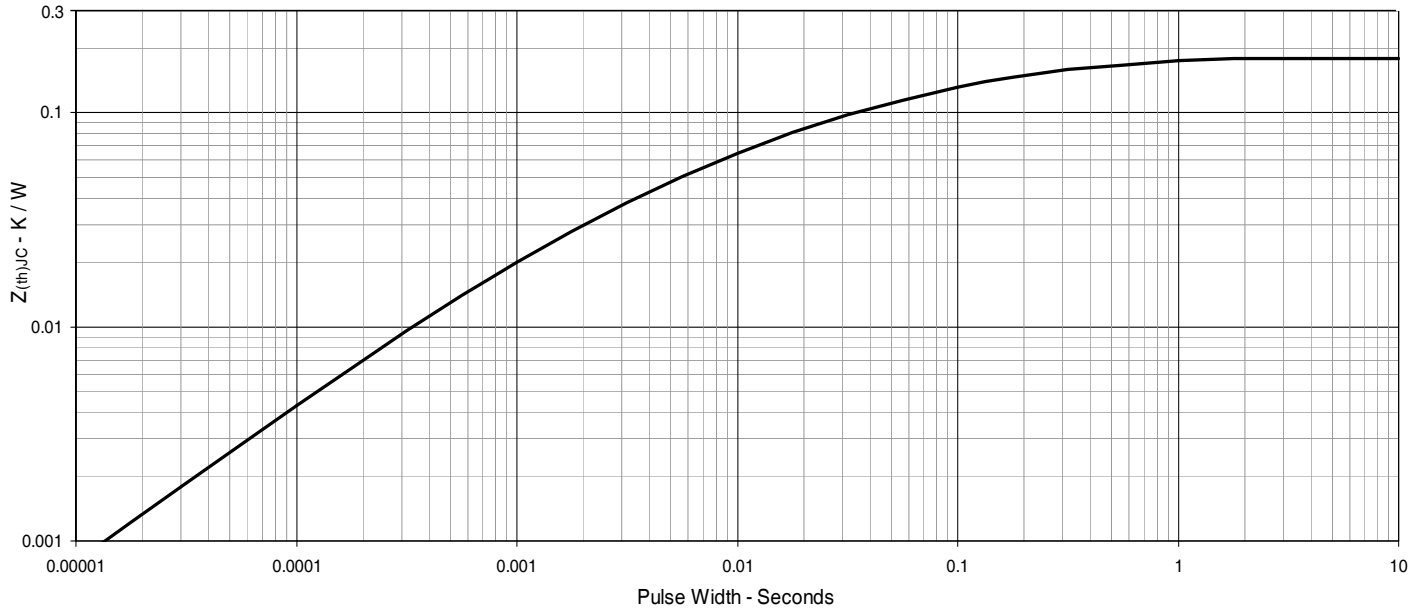
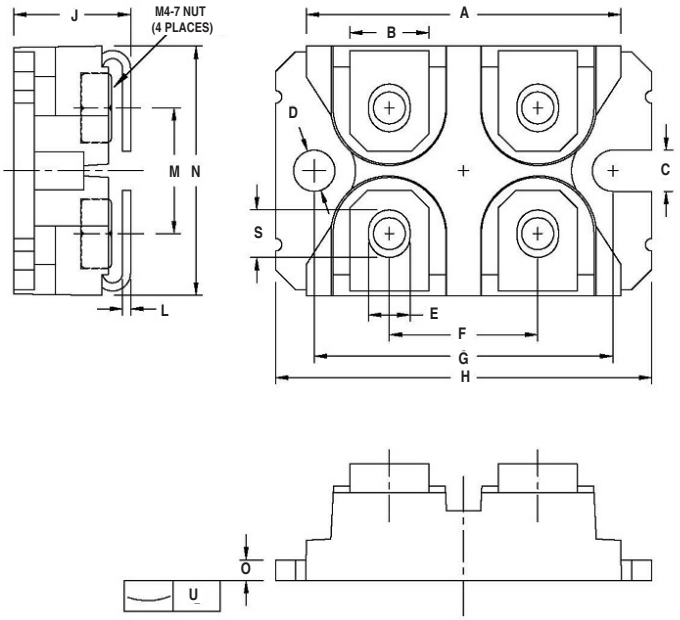


Fig. 15. Maximum Transient Thermal Impedance



SOT-227 Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.224	1.260	31.10	32.00
B	.303	.327	7.70	8.30
C	.161	.173	4.10	4.40
D	.161	.173	4.10	4.40
E	.161	.173	4.10	4.40
F	.587	.598	14.90	15.20
G	1.181	1.201	30.00	30.50
H	1.488	1.508	37.80	38.30
J	.461	.484	11.70	12.30
L	.030	.033	0.75	0.85
M	.492	.512	12.50	13.00
N	.984	1.004	25.00	25.50
O	.075	.087	1.90	2.20
S	.181	.193	4.60	4.90
U	.000	.005	0.00	0.13

1. NUT MATERIAL:
   STANDARD – Low carbon steel with Ni plating.
   OPTIONAL: – Brass Nut is available.
   PART NUMBER–BN
2. ALL METAL SURFACE ARE PRE NI PLATED EXCEPT TRIM AREA.