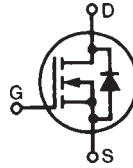


X-Class HiPerFET™ Power MOSFET

IXFT30N60X
IXFQ30N60X
IXFH30N60X

$V_{DSS} = 600V$
 $I_{D25} = 30A$
 $R_{DS(on)} \leq 155m\Omega$

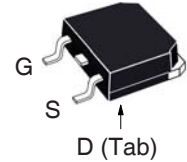
N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



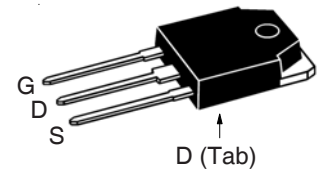
Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ C$ to $150^\circ C$	600	V
V_{DGR}	$T_J = 25^\circ C$ to $150^\circ C$, $R_{GS} = 1M\Omega$	600	V
V_{GSS}	Continuous	± 30	V
V_{GSM}	Transient	± 40	V
I_{D25}	$T_C = 25^\circ C$	30	A
I_{DM}	$T_C = 25^\circ C$, Pulse Width Limited by T_{JM}	60	A
I_A	$T_C = 25^\circ C$	10	A
E_{AS}	$T_C = 25^\circ C$	1	J
dv/dt	$I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ C$	50	V/ns
P_D	$T_C = 25^\circ C$	500	W
T_J		-55 ... +150	$^\circ C$
T_{JM}		150	$^\circ C$
T_{stg}		-55 ... +150	$^\circ C$
T_L	Maximum Lead Temperature for Soldering	300	$^\circ C$
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	$^\circ C$
M_d	Mounting Torque (TO-247 & TO-3P)	1.13 / 10	Nm/lb.in
Weight	TO-268	4.0	g
	TO-3P	5.5	g
	TO-247	6.0	g

Symbol	Test Conditions ($T_J = 25^\circ C$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSS}	$V_{GS} = 0V$, $I_D = 1mA$	600		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 4mA$	2.5		4.5 V
I_{GSS}	$V_{GS} = \pm 30V$, $V_{DS} = 0V$			± 100 nA
I_{DSS}	$V_{DS} = V_{DSS}$, $V_{GS} = 0V$ $T_J = 125^\circ C$			25 μA 750 μA
$R_{DS(on)}$	$V_{GS} = 10V$, $I_D = 0.5 \cdot I_{D25}$, Note 1			155 m Ω

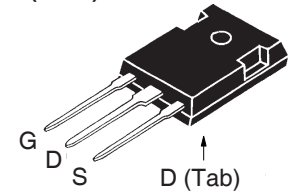
TO-268 (IXFT)



TO-3P (IXFQ)



TO-247 (IXFH)



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

Features

- International Standard Packages
- 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°C, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max
g_{fs}	V _{DS} = 10V, I _D = 0.5 • I _{D25} , Note 1	10	17	S
R_{Gi}	Gate Input Resistance		2.6	Ω
C_{iss}	V _{GS} = 0V, V _{DS} = 25V, f = 1MHz		2270	pF
C_{oss}			1610	pF
C_{rss}			14	pF
Effective Output Capacitance				
C_{o(er)}	Energy related	V _{GS} = 0V V _{DS} = 0.8 • V _{DSS}	120	pF
C_{o(tr)}	Time related		375	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)		21	ns
t_r			43	ns
t_{d(off)}			58	ns
t_f			33	ns
Q_{g(on)}	V _{GS} = 10V, V _{DS} = 0.5 • V _{DSS} , I _D = 0.5 • I _{D25}		56	nC
Q_{gs}			12	nC
Q_{gd}			28	nC
R_{thJC}	TO-247 & TO-3P			0.25 °C/W
R_{thCS}			0.25	°C/W

Source-Drain Diode

Symbol	Test Conditions ($T_J = 25^{\circ}\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max
I_S	$V_{GS} = 0\text{V}$			30 A
I_{SM}	Repetitive, pulse Width Limited by T_{JM}			120 A
V_{SD}	$I_F = I_S$, $V_{GS} = 0\text{V}$, Note 1			1.4 V
t_{rr}	$I_F = 15\text{A}$, $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}$		145	ns
Q_{RM}			860	nC
I_{RM}			12	A

Note 1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.

PRELIMINARY 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	6,404,065B1	6,683,344	6,727,585	7,005,734B2	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	6,306,728B1	6,583,505	6,710,463	6,771,478B2	7,071,537	

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

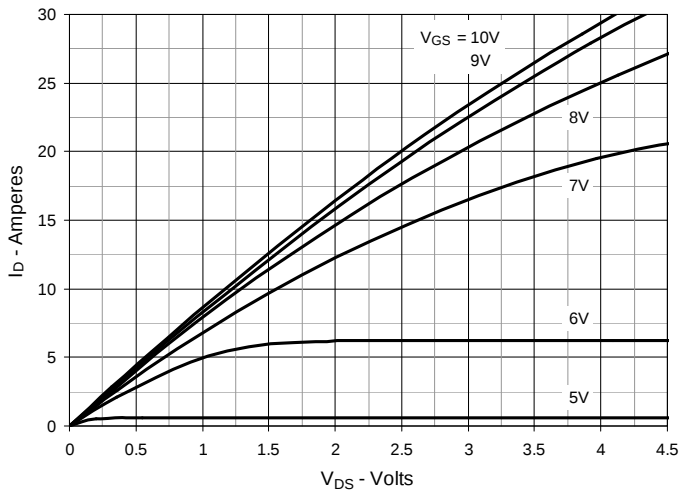


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

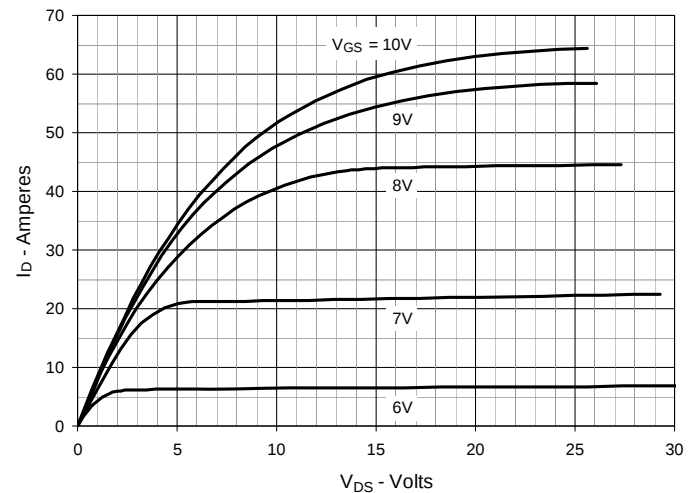


Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

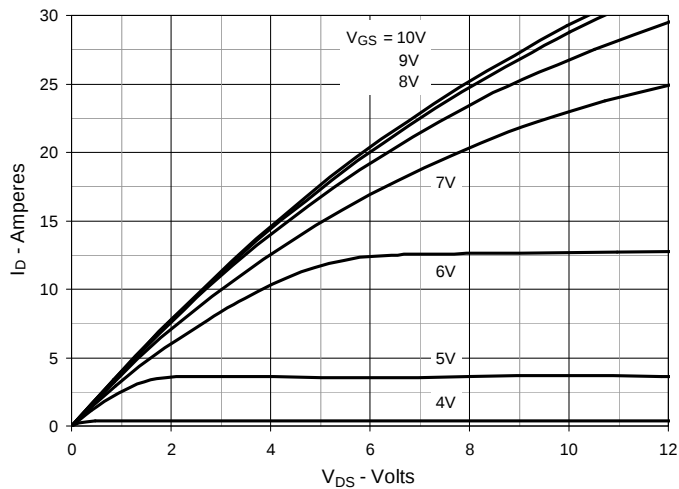


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 15A$ Value vs. Junction Temperature

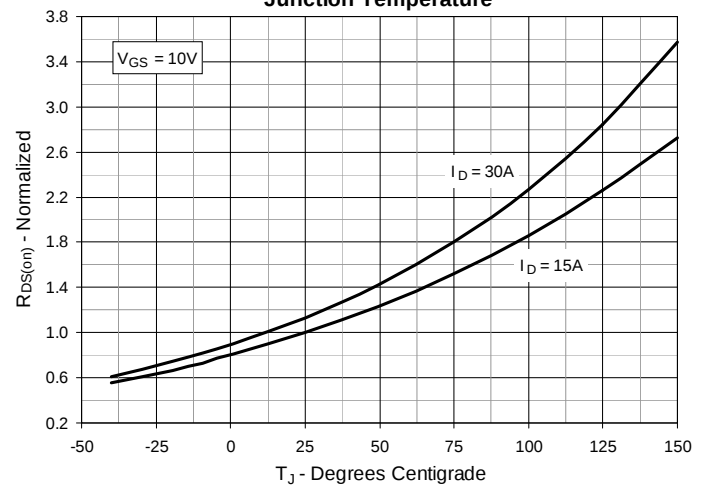


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 15A$ Value vs. Drain Current

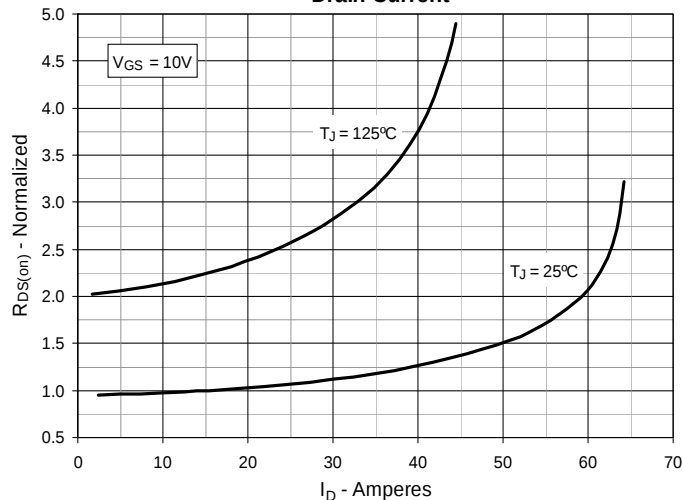


Fig. 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature

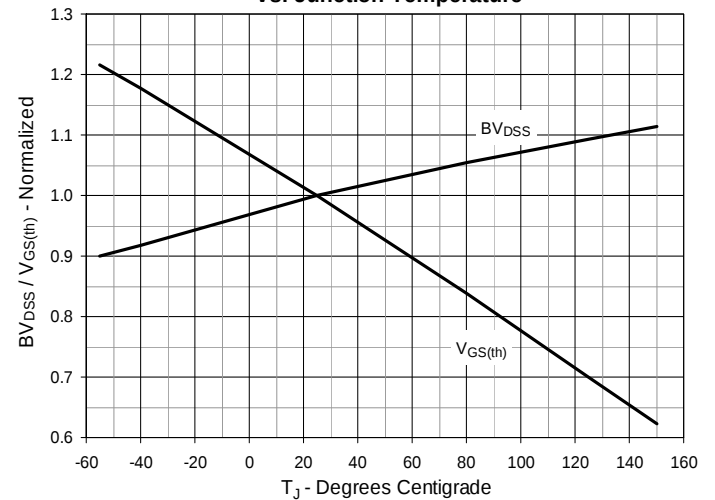


Fig. 7. Maximum Drain Current vs.
Case Temperature

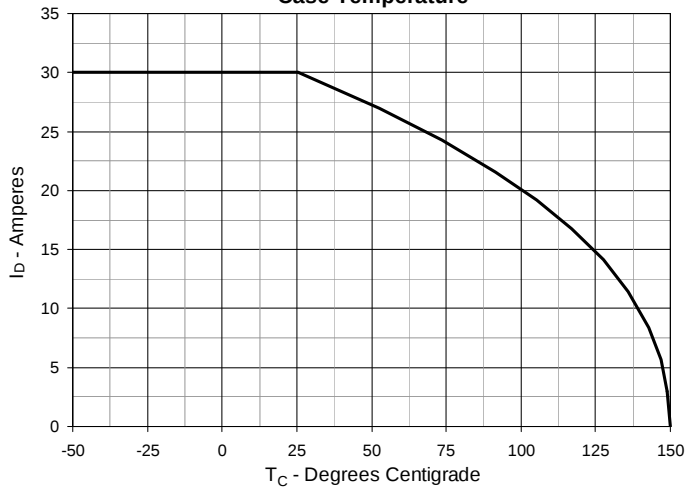


Fig. 8. Input Admittance

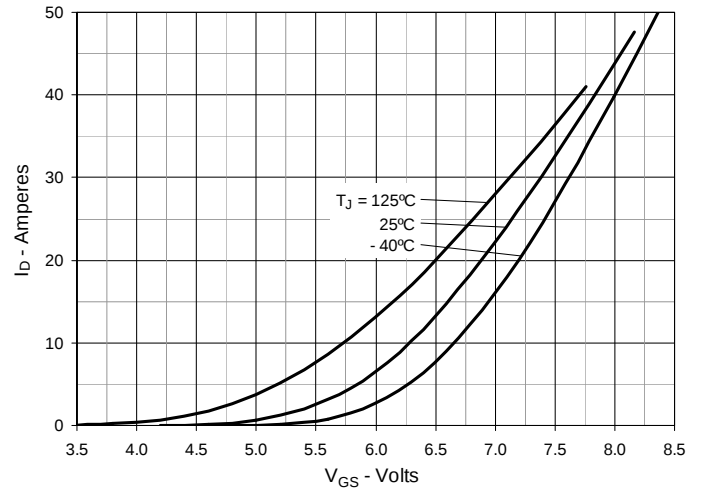


Fig. 9. Transconductance

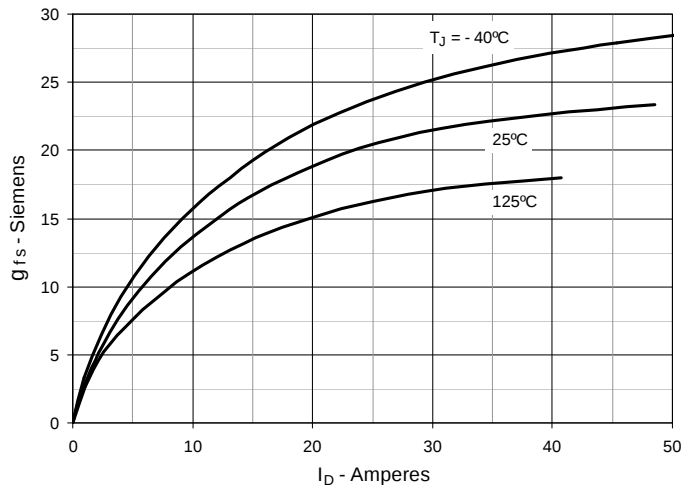


Fig. 10. Forward Voltage Drop of Intrinsic Diode

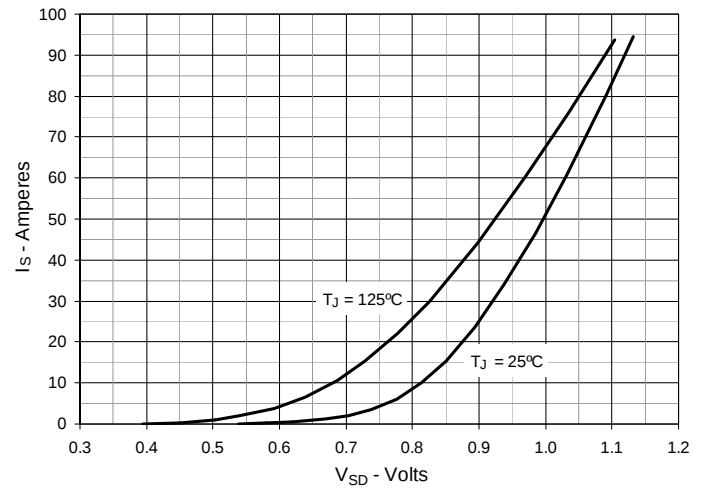


Fig. 11. Gate Charge

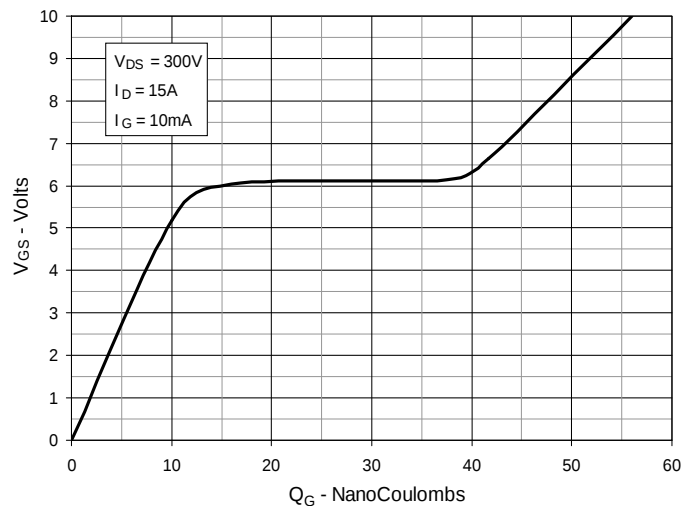


Fig. 12. Capacitance

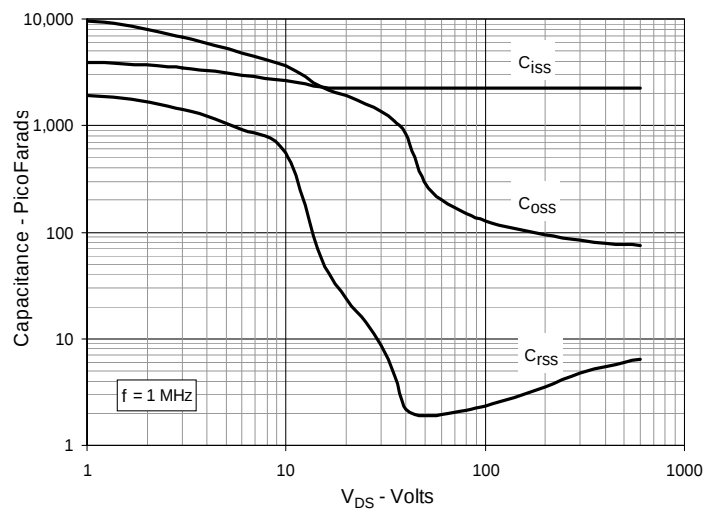


Fig. 13. Output Capacitance Stored Energy

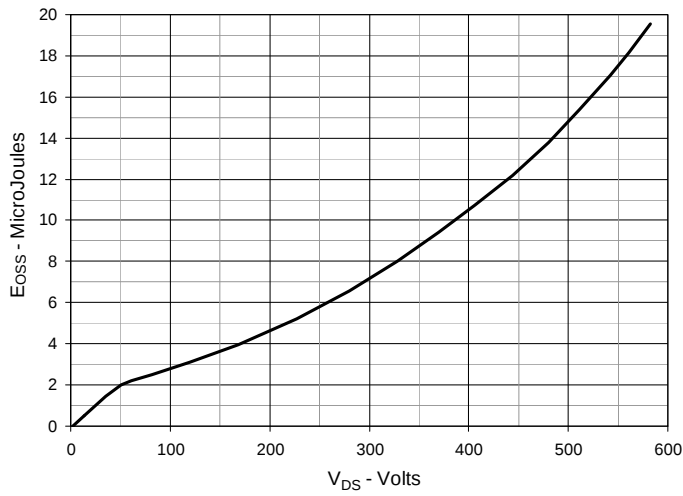


Fig. 14. Forward-Bias Safe Operating Area

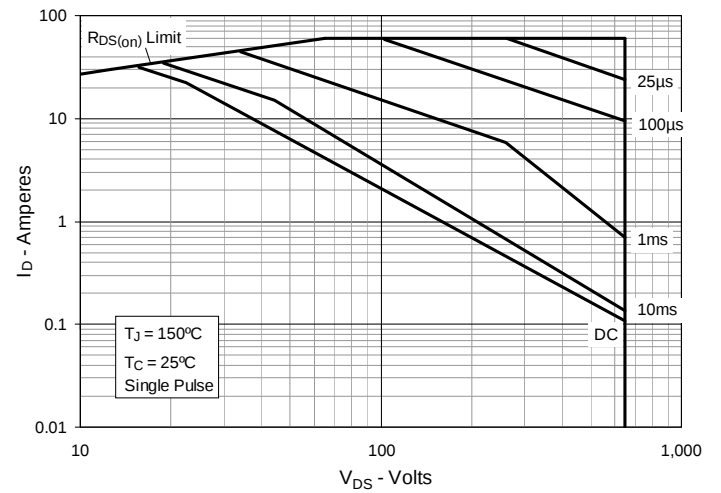
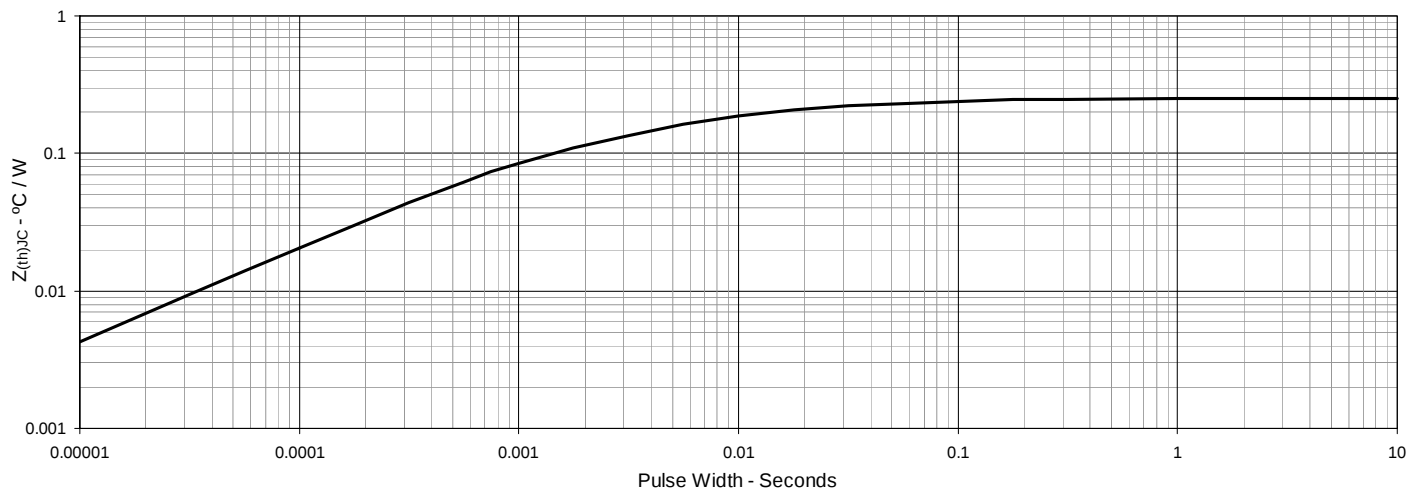


Fig. 15. Maximum Transient Thermal Impedance



Technical drawings of the T1000 unit showing front, side, and rear views with dimensions:

- Front View:** Shows a rectangular unit with a top flange of width E and height $L2$. The main body has a height D . The base has a width $L1$ and a central section of width $b2$. There are two circular features on the front face, labeled 1 and 3. A dimension $L4$ is indicated at the bottom right.
- Side View:** Shows the unit's profile with a total height H and a base width C . The top flange has a height A and a width $A1$. The main body has a width $C2$.
- Rear View:** Shows the back of the unit with a width $E1$ and a height $D1$. It features a central rectangular opening labeled 4. The base has a width b .
- Bottom View:** Shows the unit from below with a width $L3$ and a depth $A2$. It includes a cable or hose connection on the right side.

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
B	.045	.057	1.15	1.45
B2	.075	.083	1.91	2.10
C	.016	.026	0.40	0.65
C2	.057	.066	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.630	15.85	16.05
E1	.594	.595	13.30	13.60
ø	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.193	4.70	4.90
A1	.051	.059	1.30	1.50
A2	.057	.065	1.45	1.65
b	.035	.045	0.90	1.15
b2	.075	.087	1.90	2.20
b4	.114	.126	2.90	3.20
c	.022	.031	0.55	0.80
D	.780	.799	19.80	20.30
D1	.665	.677	16.90	17.20
E	.610	.622	15.50	15.80
E1	.531	.539	13.50	13.70
e	.215 BSC		5.45 BSC	
L	.779	.795	19.80	20.20
L1	.134	.142	3.40	3.60
ØP	.126	.134	3.20	3.40
ØP1	.272	.280	6.90	7.10
S	.193	.201	4.90	5.10

The drawing includes the following dimensions and labels:

- Side View (Left):** Dimensions A, A/2, A1, and c.
- Top View (Middle):** Dimensions E, B, D, D2, L1, b, b/2, and b/2. It also shows a "pins option" for pins 1, 2, and 3.
- Pin Detail View (Right):** Dimensions A, D, D2, E1, and $\phi P1$. It shows pin configurations for pins 1, 2, 3, and 4.

PINS:

- 1 - Gate
- 2 4 - Drain

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b2	.075	.087	1.91	2.20
b4	.115	.126	2.92	3.20
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
D1	.650	.690	16.51	17.53
D2	.035	.050	0.89	1.27
E	.620	.635	15.75	16.13
E1	.545	.565	13.84	14.35
e	.215 BSC		5.45 BSC	
J	--	.010	--	0.25
K	--	.025	--	0.64
L	.780	.810	19.81	20.57
L1	.150	.170	3.81	4.32
øP	.140	.144	3.55	3.65
øP1	.275	.290	6.99	7.37
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83
S	.242 BSC		6.15 BSC	



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