IXYS

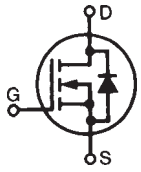
Advance Technical Information

TrenchT4™ Power MOSFET

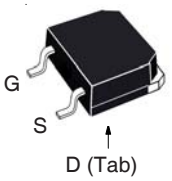
IXTT440N04T4HV

V_{DSS} = 40V
I_{D25} = 440A
$R_{DS(on)}$ ≤ 1.25mΩ

N-Channel Enhancement Mode
Avalanche Rated



TO-268HV



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 175°C	40	V
V_{DGR}	T_J = 25°C to 175°C, R_{GS} = 1MΩ	40	V
V_{GSM}	Transient	±15	V
I_{D25}	T_C = 25°C	440	A
I_{LRMS}	Lead Current Limit, RMS	160	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	1200	A
I_A	T_C = 25°C	440	A
E_{AS}	T_C = 25°C	1.5	J
P_D	T_C = 25°C	940	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	°C
Weight		4	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°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 250μA	40			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250μA	2.0		4.0	V
I_{GSS}	V_{GS} = ±15V, V_{DS} = 0V			±200	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0V			10	μA
	T_J = 125°C			1	mA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 100A, Note 1			1.25	mΩ

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	110	180		S
R_{Gi}	Gate Input Resistance		1.1		Ω
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		26		nF
C_{oss}			3570		pF
C_{rss}			235		pF
$t_{d(on)}$	**Resistive Switching Times**		44		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		250		ns
$t_{d(off)}$	R_G = 2Ω (External)		120		ns
t_f			74		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		480		nC
Q_{gs}			136		nC
Q_{gd}			162		nC
R_{thJC}				0.16	°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			440	A
I_{SM}	Repetitive, pulse Width Limited by T_{JM}			1760	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.4	V
t_{rr}	I_F = 150A, -di/dt = 100A/μs		72		ns
Q_{RM}	V_R = 30V		110		nC
I_{RM}			3		A

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

ADVANCE 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.

Fig. 1. Output Characteristics @ T_J = 25ºC

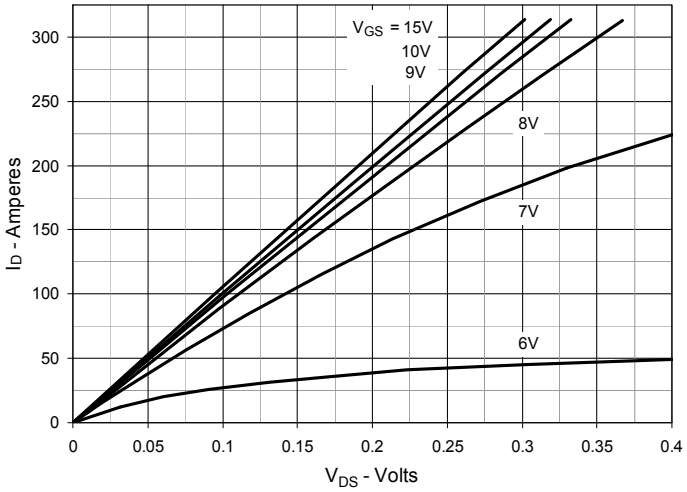


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

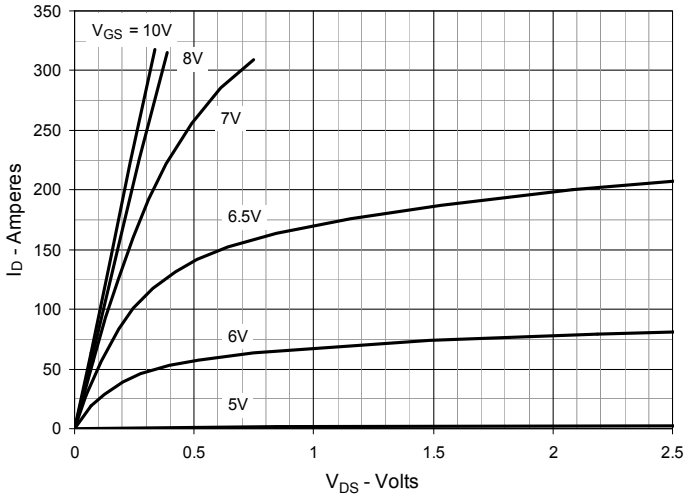


Fig. 3. Output Characteristics @ T_J = 150ºC

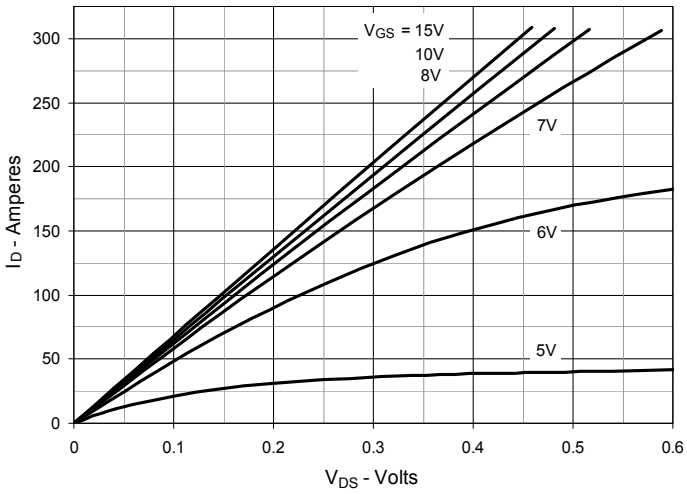


Fig. 4. Normalized $R_{DS(on)}$ to I_D = 100A Value vs. Junction Temperature

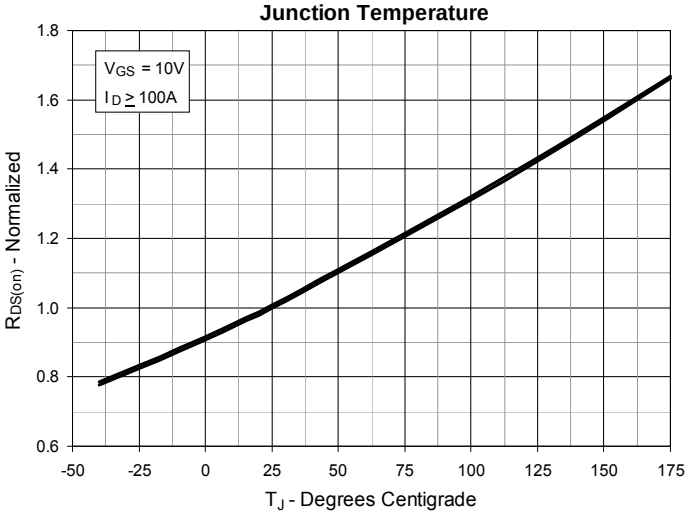


Fig. 5. Normalized $R_{DS(on)}$ to I_D = 100A vs. Drain Current

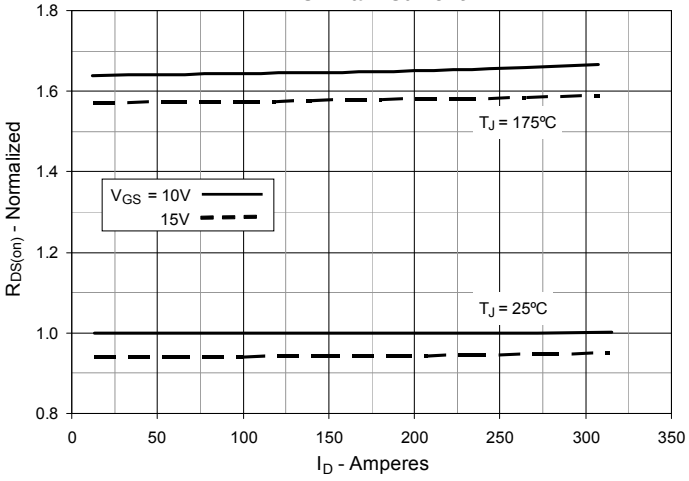


Fig. 6. Drain Current vs. Case Temperature

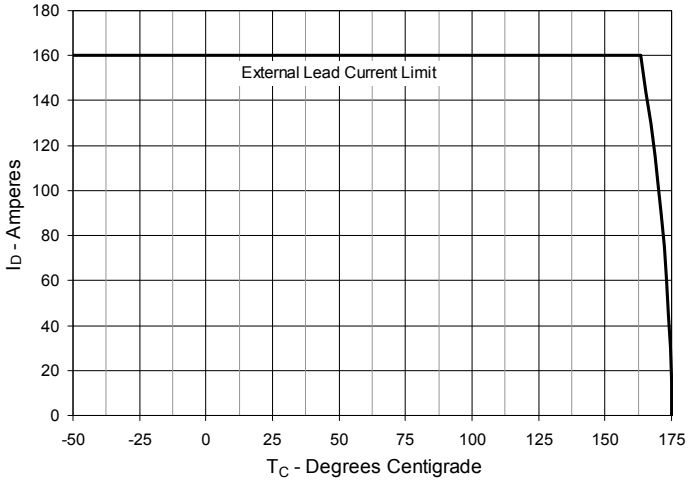


Fig. 7. Input Admittance

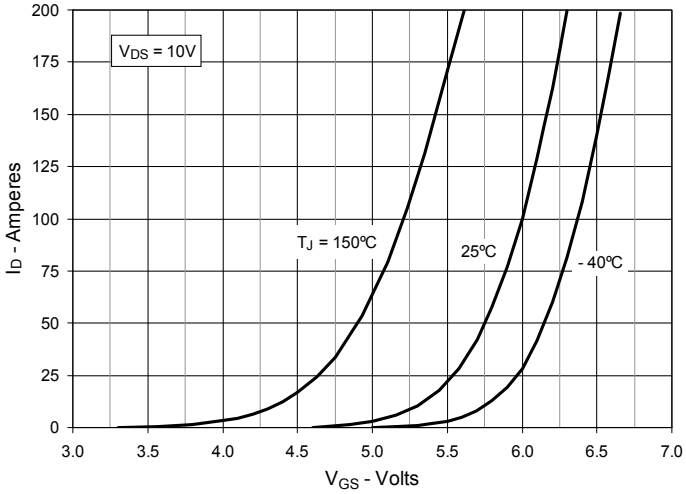


Fig. 8. Transconductance

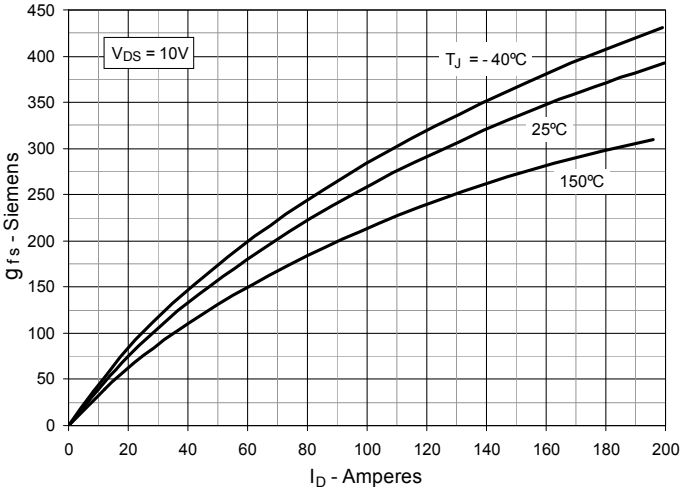


Fig. 9. Forward Voltage Drop of Intrinsic Diode

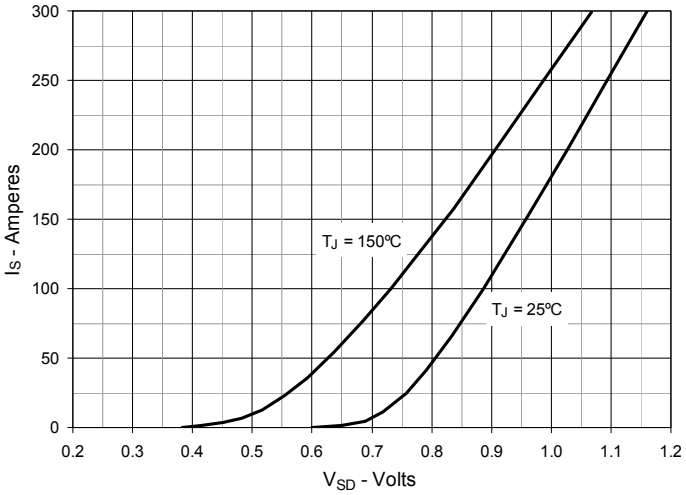


Fig. 10. Gate Charge

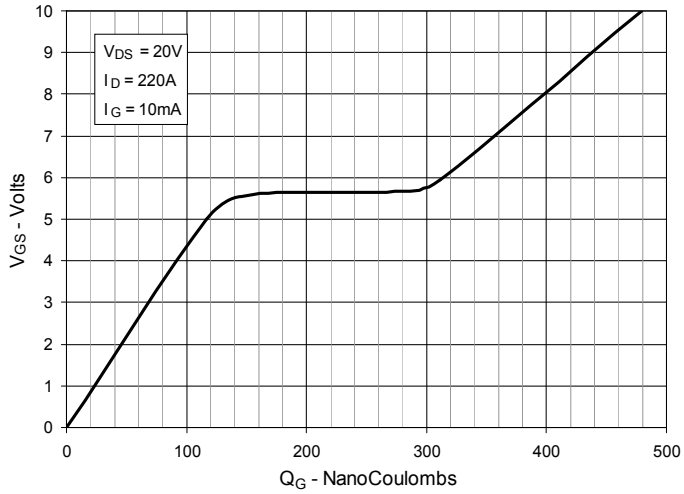


Fig. 11. Capacitance

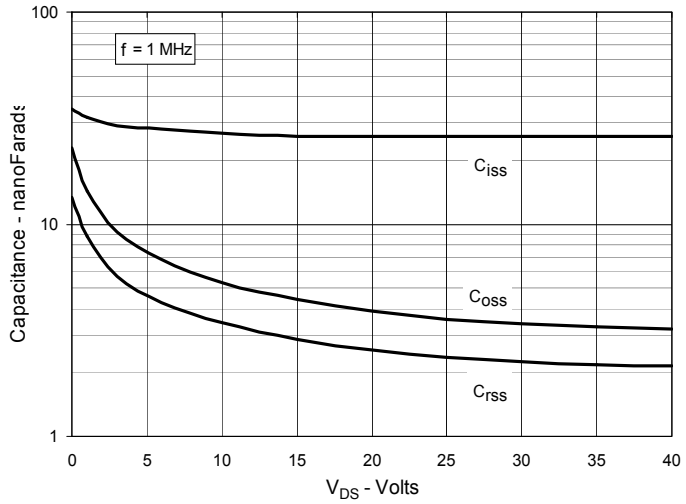


Fig. 12. Forward-Bias Safe Operating Area

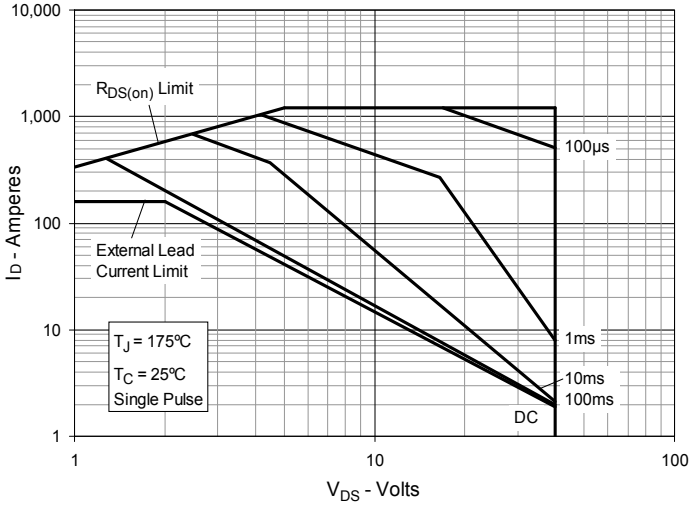


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

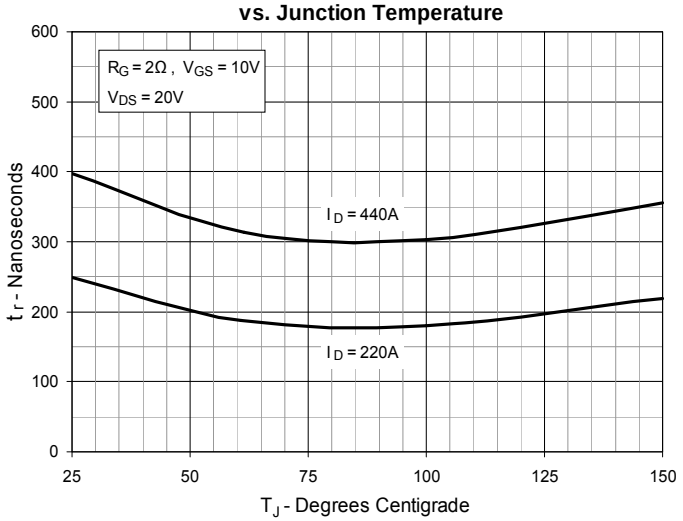


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

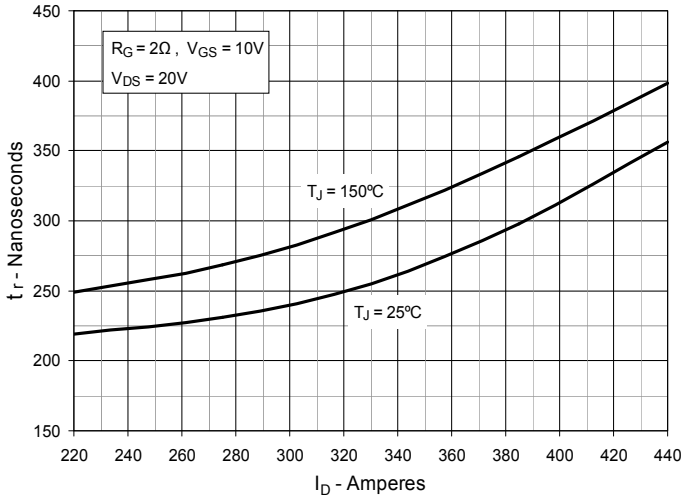


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

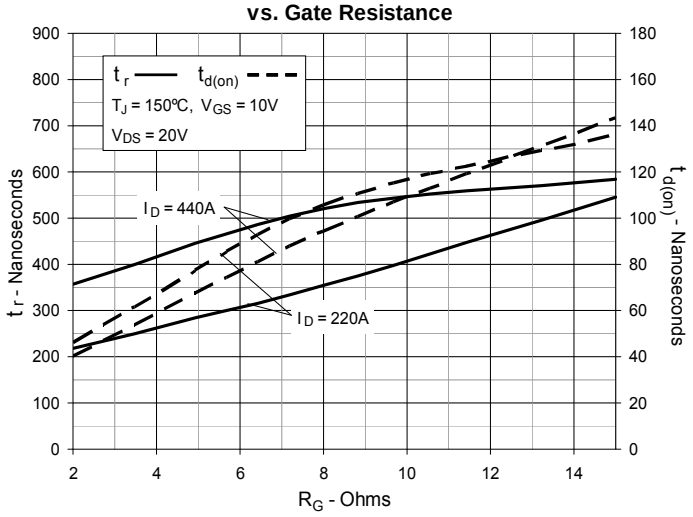


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

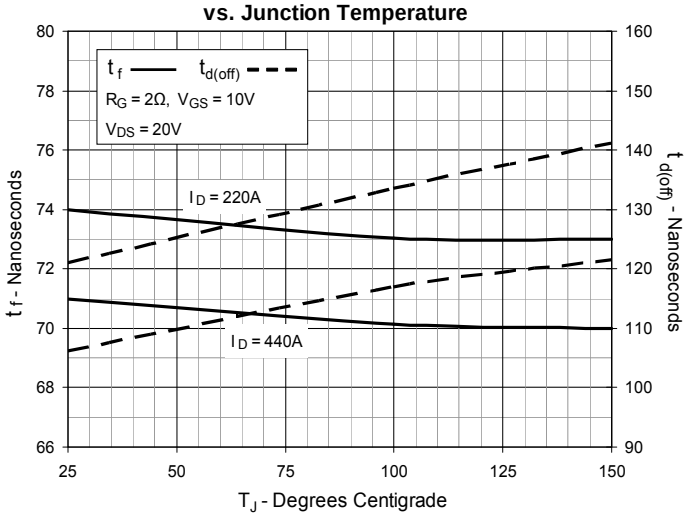


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

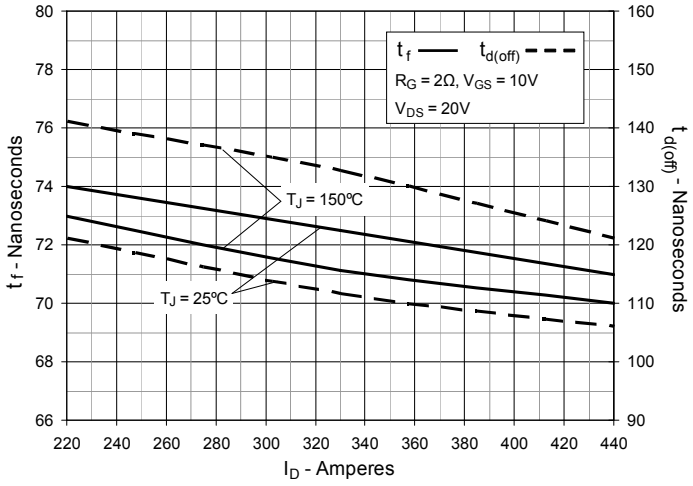


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

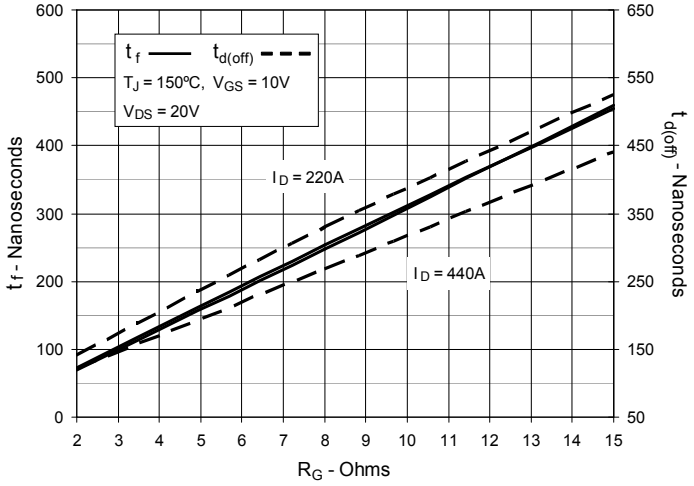
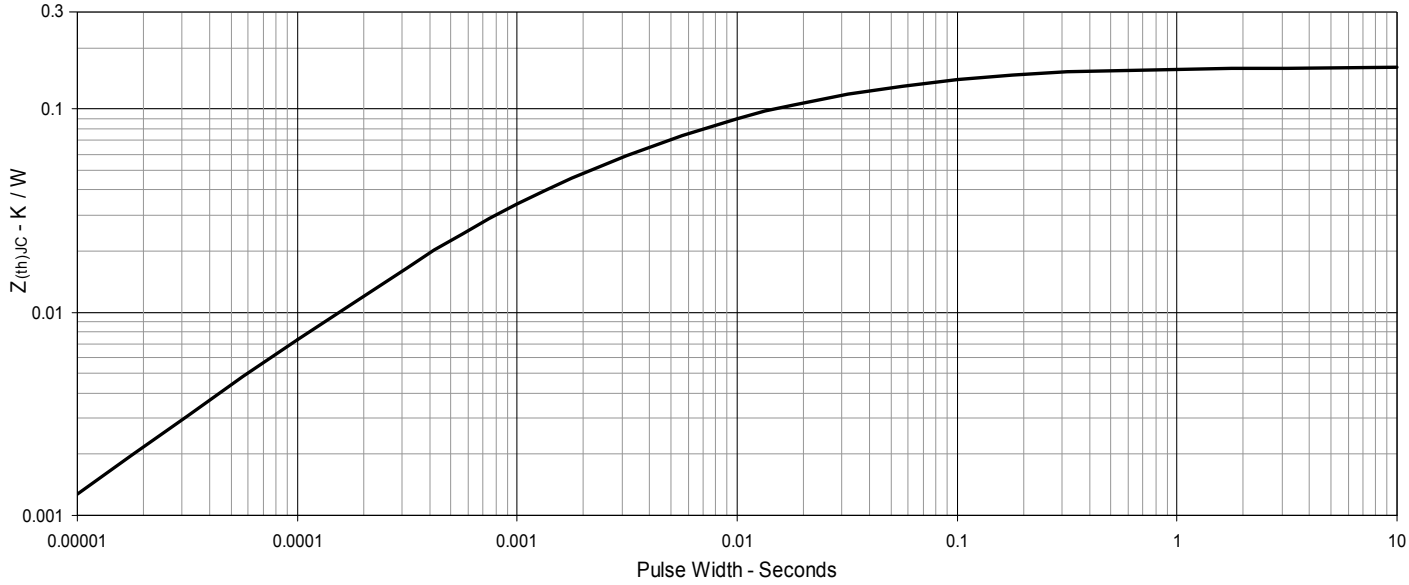
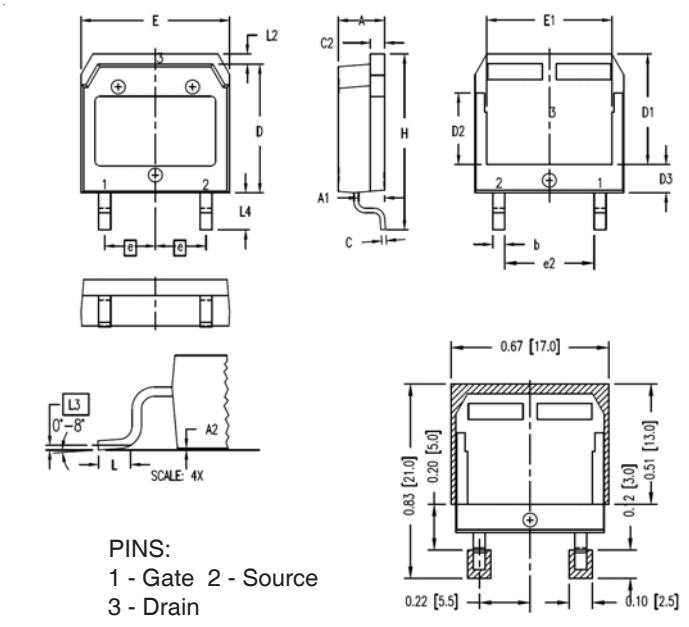


Fig. 19. Maximum Transient Thermal Impedance



TO-268HV Outline



PINS:
1 - Gate 2 - Source
3 - Drain

SYM	INCHES		MILLIMETER	
	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
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.465	.476	11.80	12.10
D2	.295	.307	7.50	7.80
D3	.114	.126	2.90	3.20
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
(e2)	.374	.386	9.50	9.80
H	.736	.752	18.70	19.10
L	.067	.079	1.70	2.00
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10