

**TrenchT4™**  
**Power MOSFET**
**IXTT440N04T4HV**

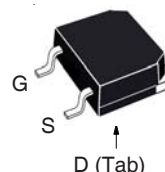
$$V_{DSS} = 40V$$

$$I_{D25} = 440A$$

$$R_{DS(on)} \leq 1.25m\Omega$$

 N-Channel Enhancement Mode  
 Avalanche Rated


TO-268HV


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

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

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max
$g_{fs}$	$V_{DS} = 10\text{V}$ , $I_D = 60\text{A}$ , Note 1	110	180	S
$R_{Gi}$	Gate Input Resistance		1.1	$\Omega$
$C_{iss}$	$V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$		26	nF
$C_{oss}$			3570	pF
$C_{rss}$			235	pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$ $R_G = 2\Omega$ (External)		44	ns
$t_r$			250	ns
$t_{d(off)}$			120	ns
$t_f$			74	ns
$Q_{g(on)}$	$V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$		480	nC
$Q_{gs}$			136	nC
$Q_{gd}$			162	nC
$R_{thJC}$				0.16 $^\circ\text{C/W}$

**Source-Drain Diode**

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max
$I_S$	$V_{GS} = 0\text{V}$			440 A
$I_{SM}$	Repetitive, pulse Width Limited by $T_{JM}$			1760 A
$V_{SD}$	$I_F = I_S$ , $V_{GS} = 0\text{V}$ , Note 1			1.4 V
$t_{rr}$	$I_F = 150\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 30\text{V}$		72	ns
$Q_{RM}$			110	nC
$I_{RM}$			3	A

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

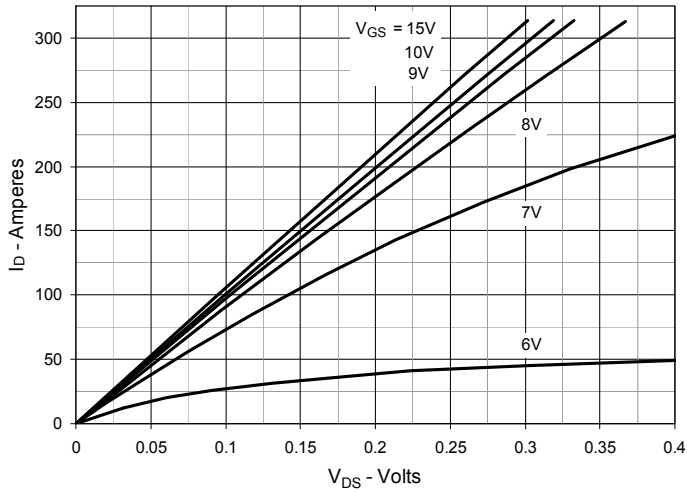
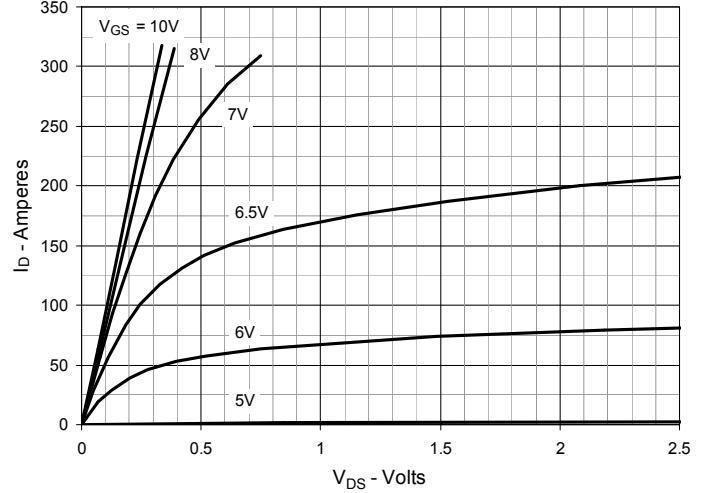
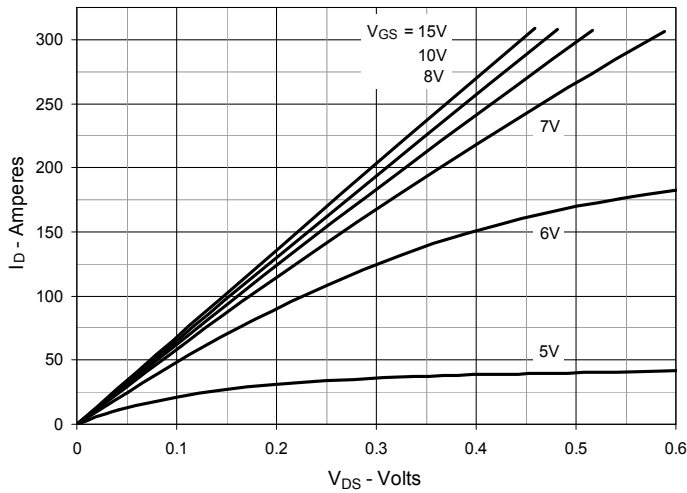
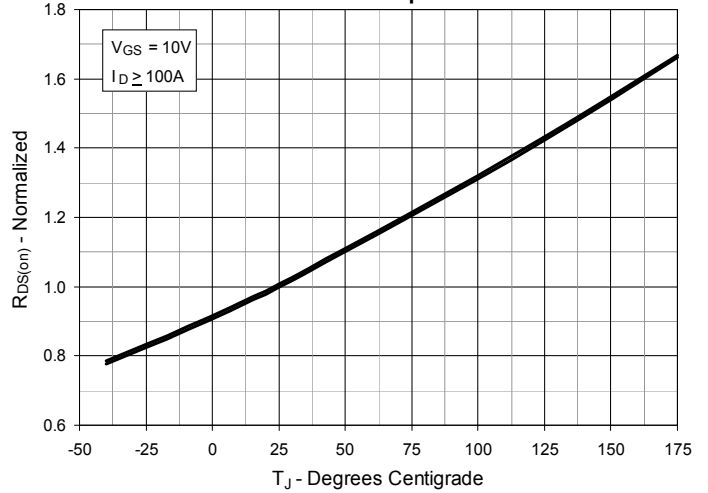
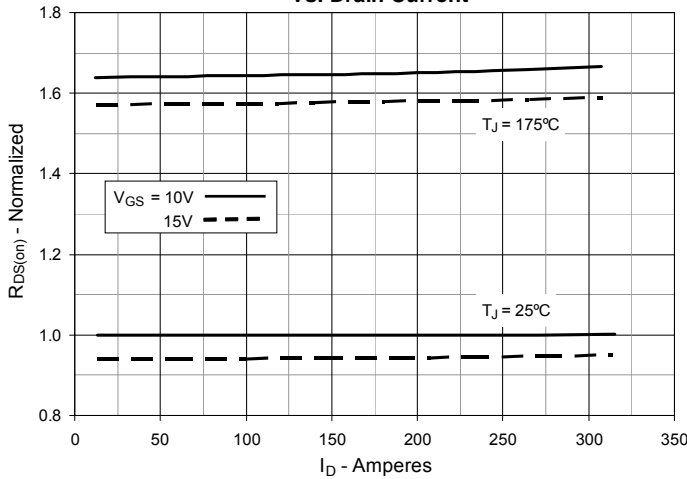
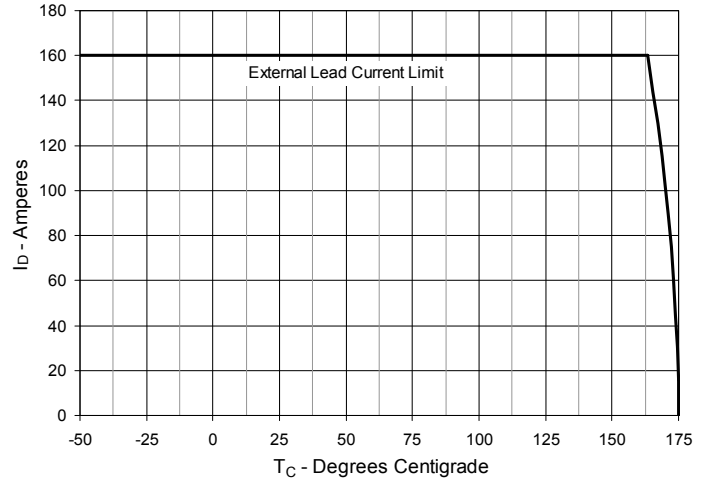
**ADVANCE TECHNICAL INFORMATION**

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.

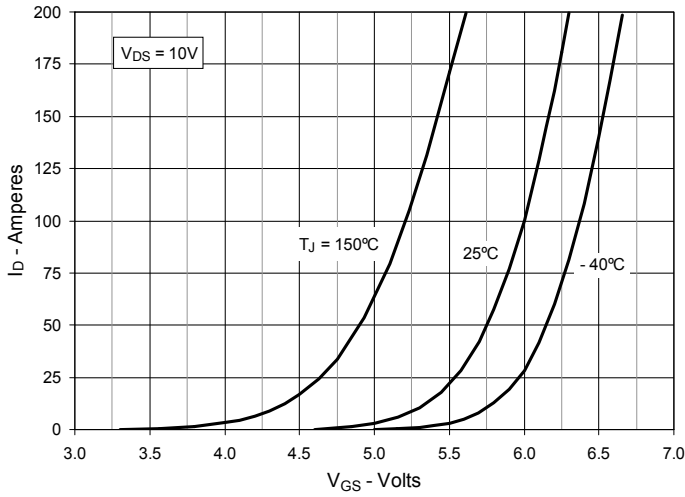
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IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

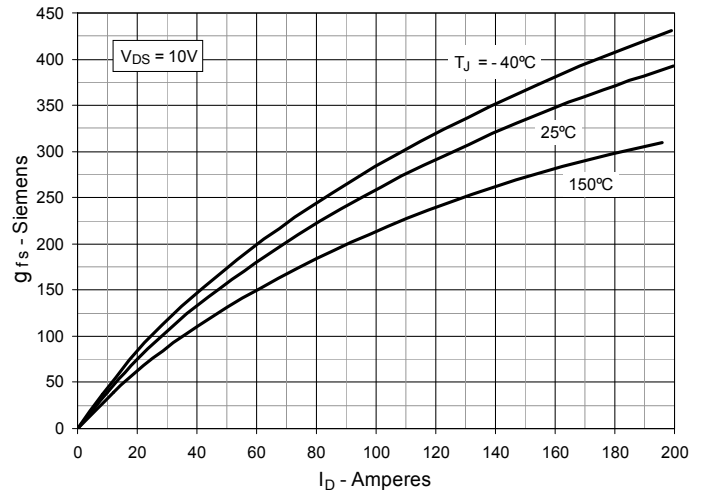
4,835,592	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065 B1	6,683,344	6,727,585	7,005,734 B2	7,157,338B2
4,860,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692	7,063,975 B2	
4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	6,771,478 B2	7,071,537	

**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. Normalized  $R_{DS(on)}$  to  $I_D = 100\text{A}$  Value vs. Junction Temperature**

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

**Fig. 6. Drain Current vs. Case Temperature**


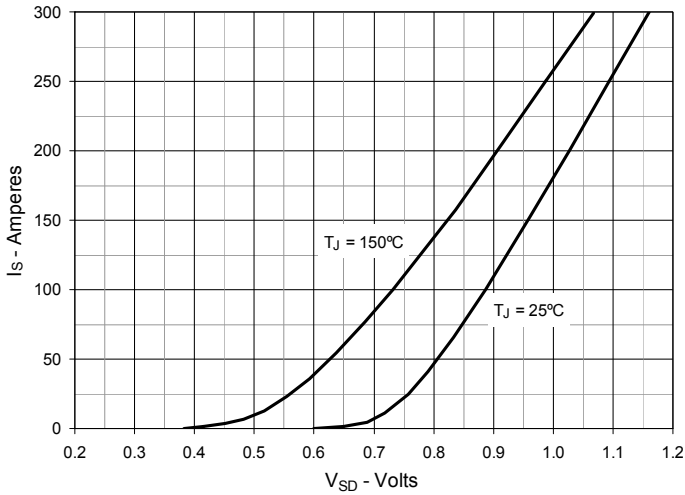
**Fig. 7. Input Admittance**



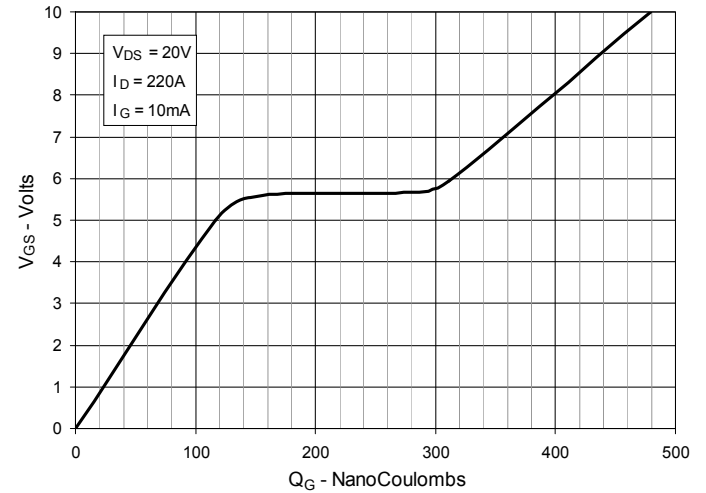
**Fig. 8. Transconductance**



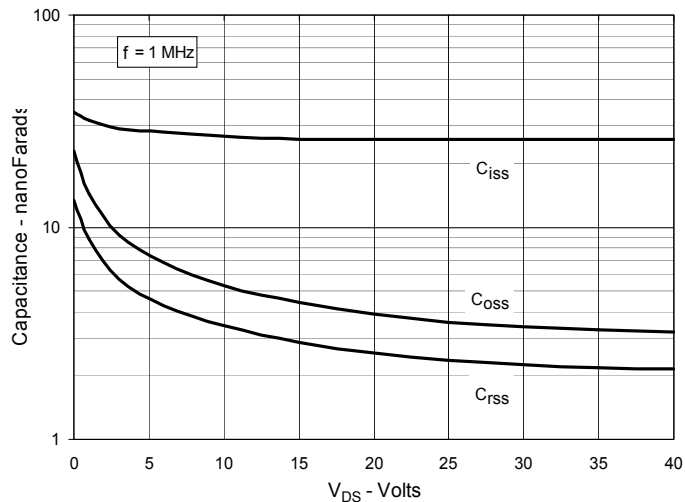
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



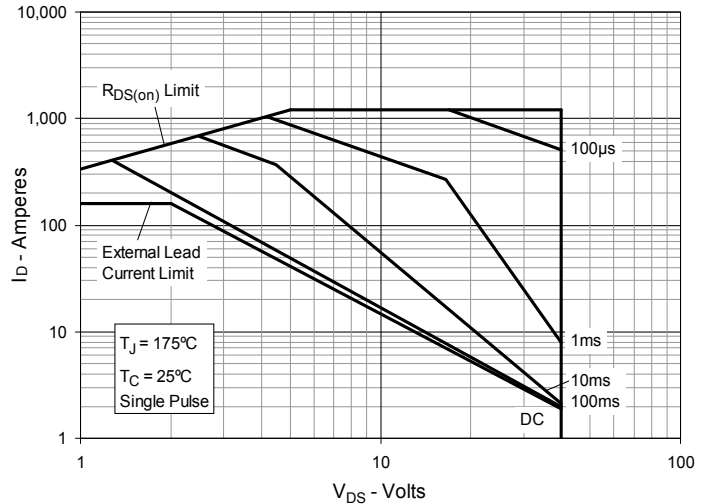
**Fig. 10. Gate Charge**

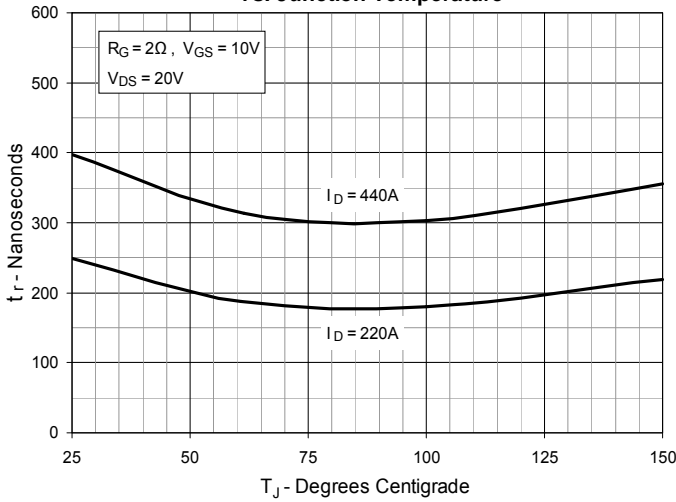
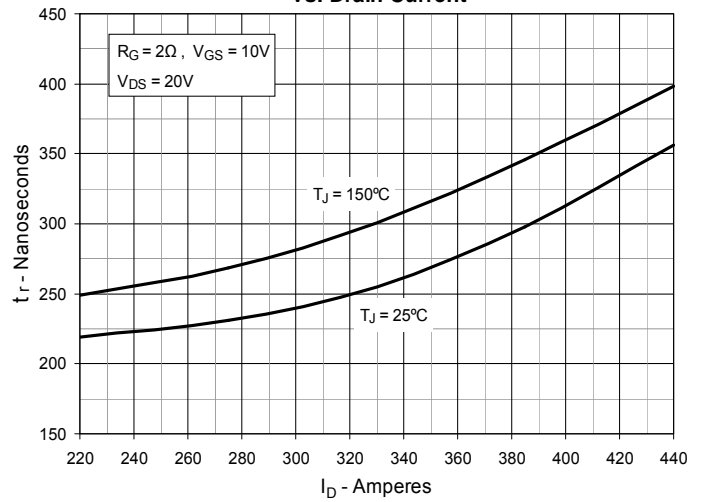
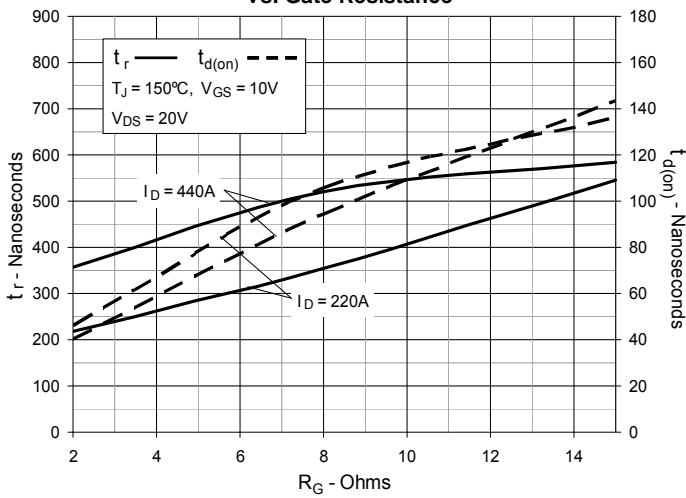
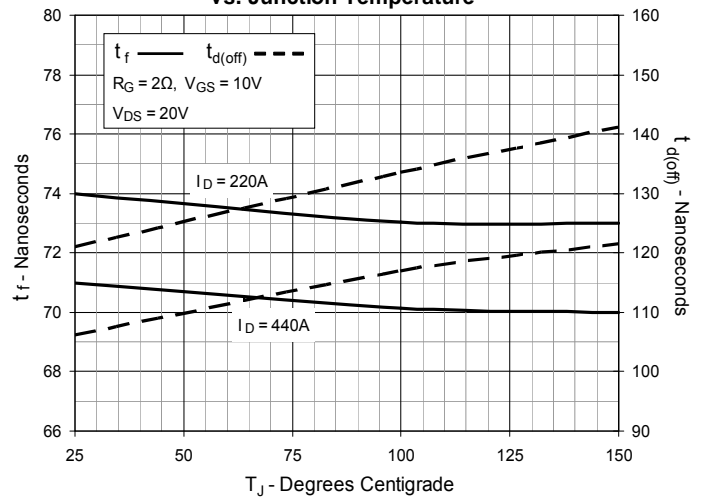
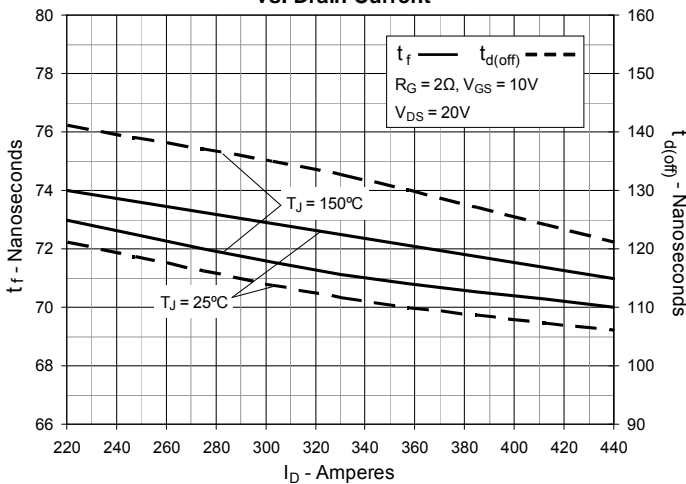
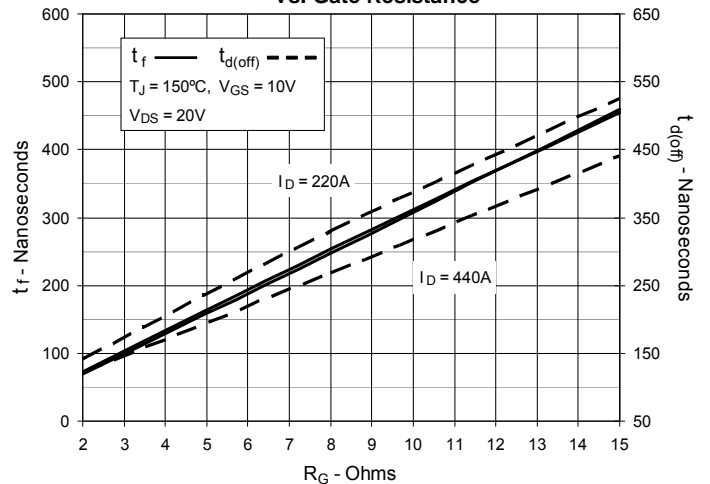


**Fig. 11. Capacitance**

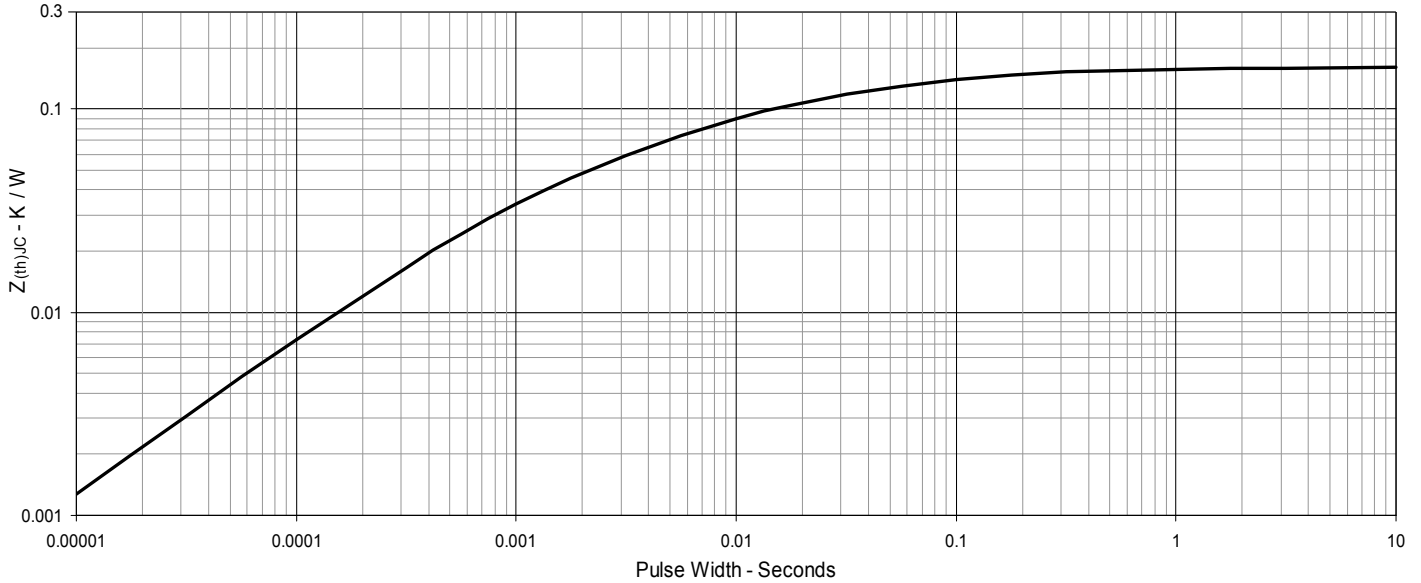


**Fig. 12. Forward-Bias Safe Operating Area**

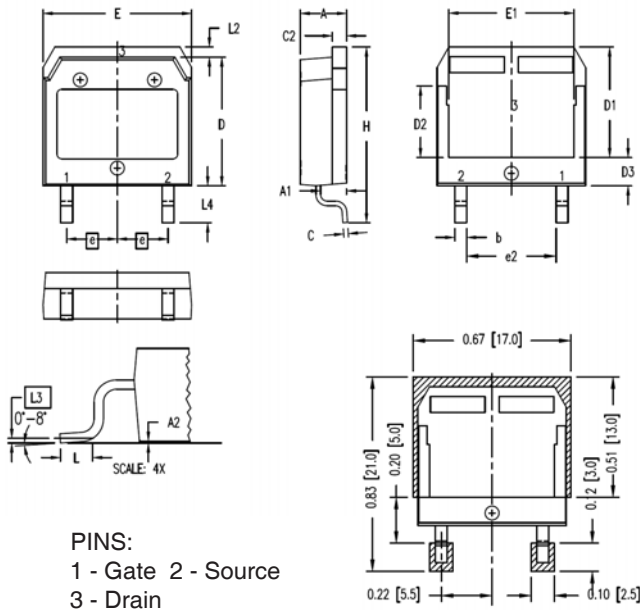


**Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature**

**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

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