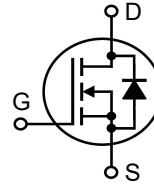


GigaMOS™ TrenchT2 HyperFET™ Power MOSFET

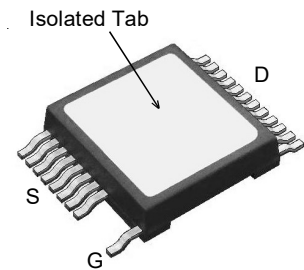
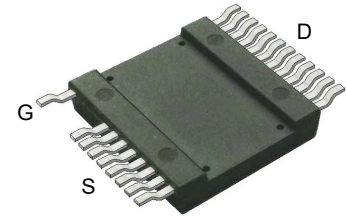
MMIX1F360N15T2

(Electrically Isolated Tab)

N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



$$\begin{aligned} V_{DSS} &= 150V \\ I_{D25} &= 235A \\ R_{DS(on)} &\leq 4.4m\Omega \\ t_{rr} &\leq 150ns \end{aligned}$$



G = Gate D = Drain
S = Source

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ\text{C to } 175^\circ\text{C}$	150	V
V_{DGR}	$T_J = 25^\circ\text{C to } 175^\circ\text{C}, R_{GS} = 1M\Omega$	150	V
V_{GSS}	Continuous	± 20	V
V_{GSM}	Transient	± 30	V
I_{D25}	$T_C = 25^\circ\text{C}$	235	A
I_{DM}	$T_C = 25^\circ\text{C}$, Pulse Width Limited by T_{JM}	900	A
I_A	$T_C = 25^\circ\text{C}$	100	A
E_{AS}	$T_C = 25^\circ\text{C}$	2.5	J
P_D	$T_C = 25^\circ\text{C}$	680	W
dv/dt	$I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 175^\circ\text{C}$	20	V/ns
T_J		-55 ... +175	$^\circ\text{C}$
T_{JM}		175	$^\circ\text{C}$
T_{stg}		-55 ... +175	$^\circ\text{C}$
T_{SOLD}	Plastic Body for 10s	260	$^\circ\text{C}$
V_{ISOL}	50/60 Hz, 1 Minute	2500	V~
F_C	Mounting Force	50..200 / 11..45	N/lb.
Weight		8	g

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSS}	$V_{GS} = 0V$, $I_D = 3mA$	150		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 8mA$	2.5		5.0 V
I_{GSS}	$V_{GS} = \pm 20V$, $V_{DS} = 0V$			± 200 nA
I_{DSS}	$V_{DS} = V_{DSS}$, $V_{GS} = 0V$ Note 2, $T_J = 150^\circ\text{C}$			50 μA 5 mA
$R_{DS(on)}$	$V_{GS} = 10V$, $I_D = 100A$, Note 1			4.4 m Ω

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Substrate
 - Excellent Thermal Transfer
 - Increased Temperature and Power Cycling Capability
 - High Isolation Voltage (2500V~)
- 175°C Operating Temperature
- Very High Current Handling Capability
- Fast Intrinsic Diode
- Avalanche Rated
- Very Low $R_{DS(on)}$

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- DC-DC Converters and Off-Line UPS
- Primary-Side Switch
- High Speed Power Switching Applications

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	140	230	S
C_{iss}	$V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$		47.5	nF
C_{oss}			3060	pF
C_{rss}			665	pF
R_{GI}	Gate Input Resistance		2.7	Ω
$t_{d(on)}$	Resistive Switching Times $V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 100\text{A}$ $R_G = 1\Omega$ (External)		50	ns
t_r			170	ns
$t_{d(off)}$			115	ns
t_f			265	ns
$Q_{g(on)}$	$V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 180\text{A}$		715	nC
Q_{gs}			185	nC
Q_{gd}			200	nC
R_{thJC}			0.05	$^\circ\text{C/W}$
R_{thCS}			30	$^\circ\text{C/W}$
R_{thJA}				$^\circ\text{C/W}$

Source-Drain Diode

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
I_S	$V_{GS} = 0\text{V}$			360 A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			1440 A
V_{SD}	$I_F = 60\text{A}$, $V_{GS} = 0\text{V}$, Note 1			1.2 V
t_{rr}	$I_F = 160\text{A}$, $V_{GS} = 0\text{V}$ $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 60\text{V}$			150 ns
I_{RM}			9	A
Q_{RM}			500	nC

Notes:

1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.
2. Part must be heatsunk for high-temp I_{CS} measurement.

Littelfuse reserves the right to change limits, test conditions, and dimensions.

LF 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	7,157,338 B2
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 @ $T_J = 25^\circ\text{C}$

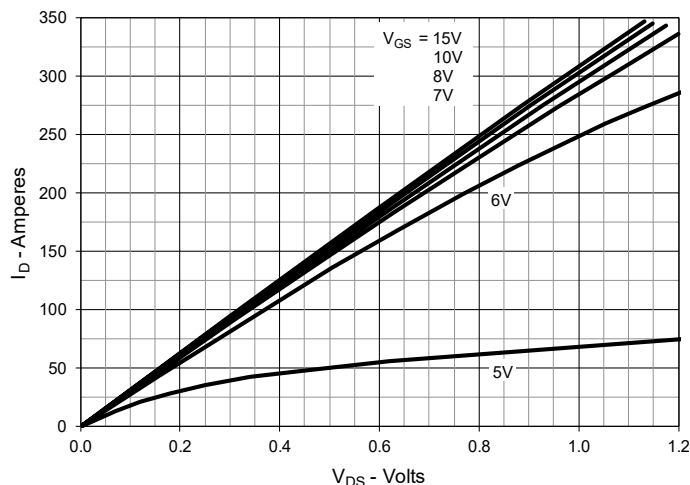


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

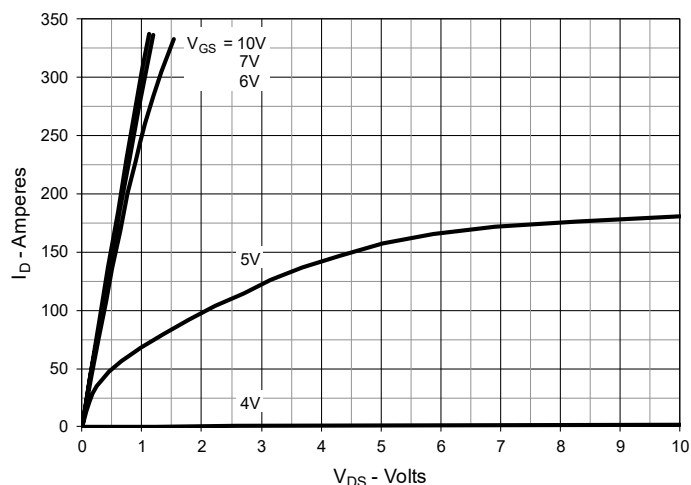


Fig. 3. Output Characteristics @ $T_J = 150^\circ\text{C}$

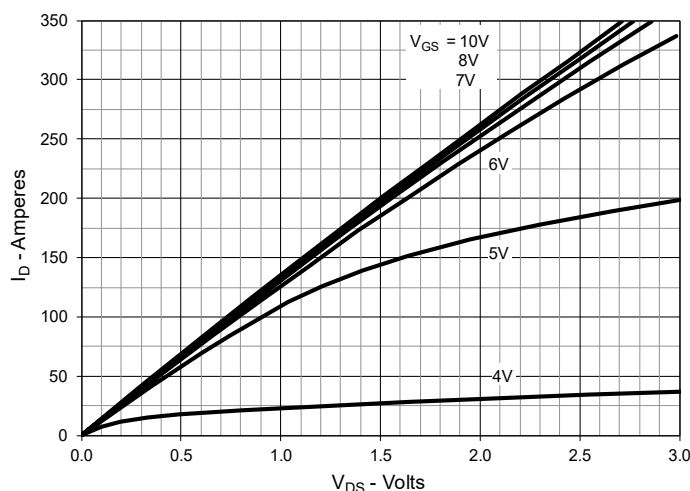


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 180\text{A}$ Value vs. Junction Temperature

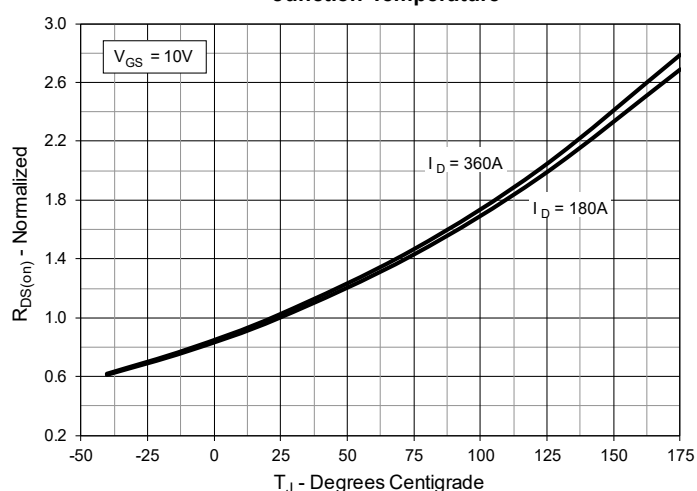


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 180\text{A}$ Value vs. Drain Current

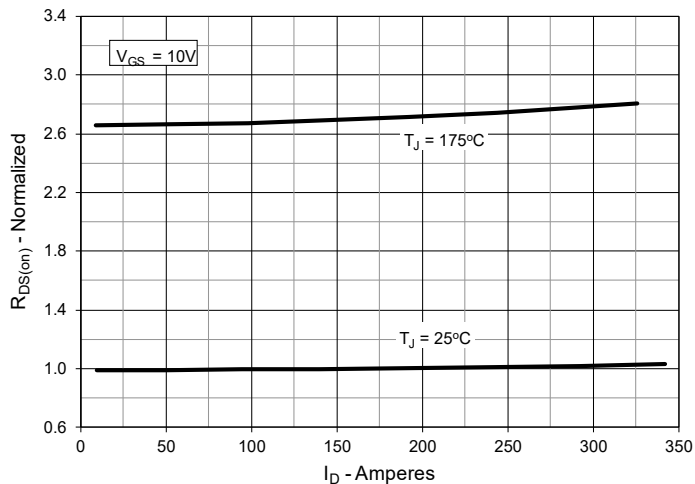


Fig. 6. Drain Current vs. Case Temperature

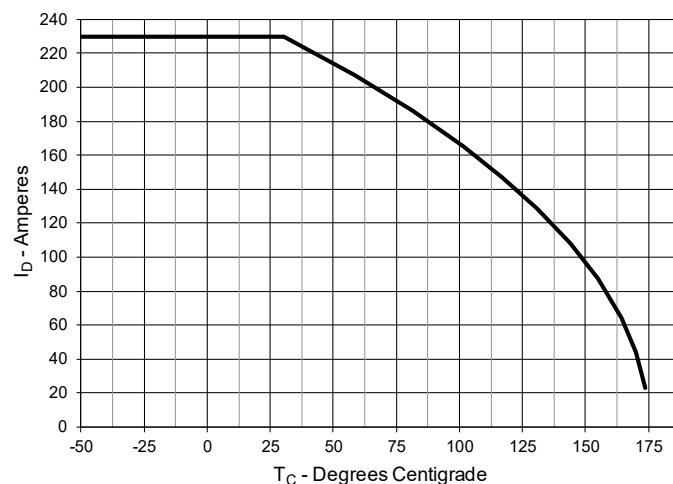


Fig. 7. Input Admittance

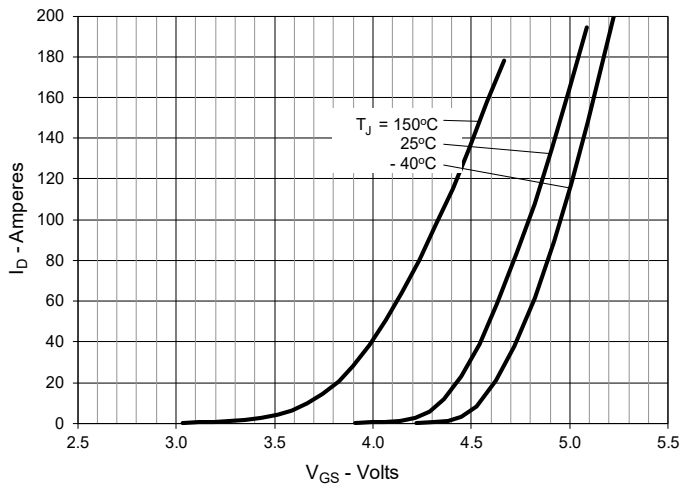


Fig. 8. Transconductance

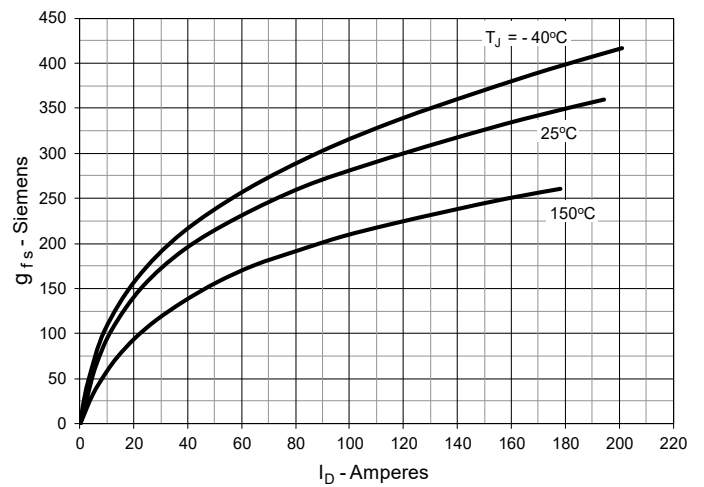


Fig. 9. Forward Voltage Drop of Intrinsic Diode

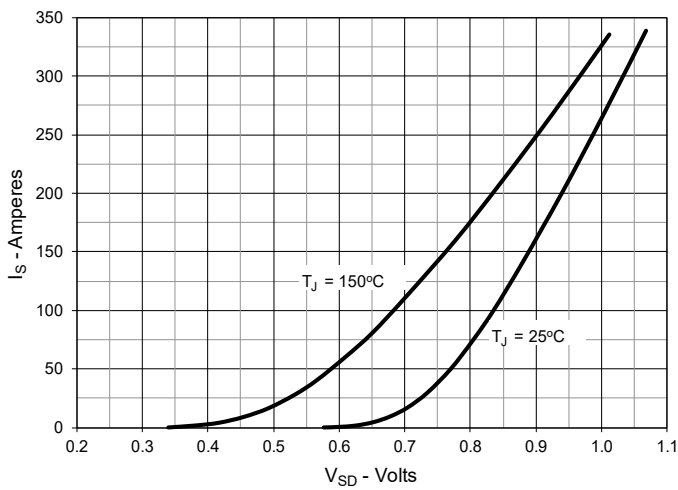


Fig. 10. Gate Charge

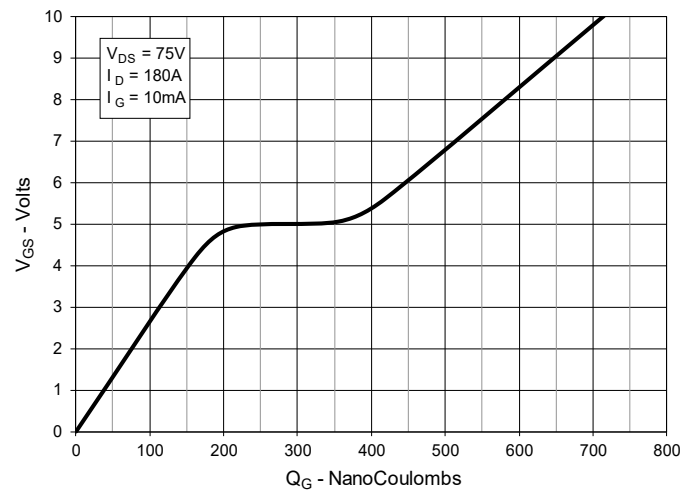


Fig. 11. Capacitance

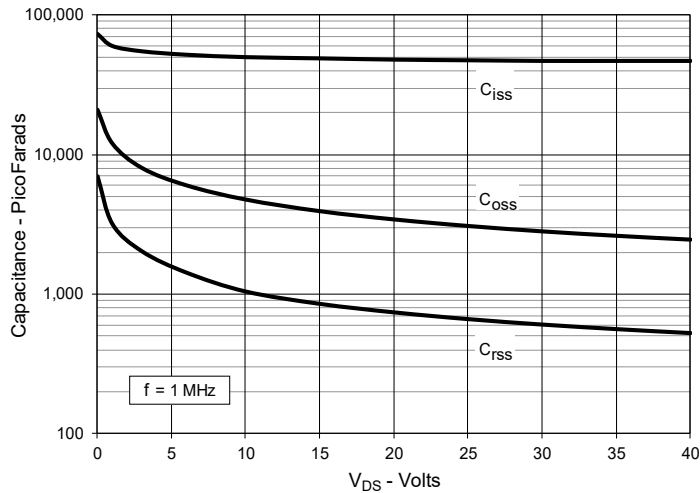
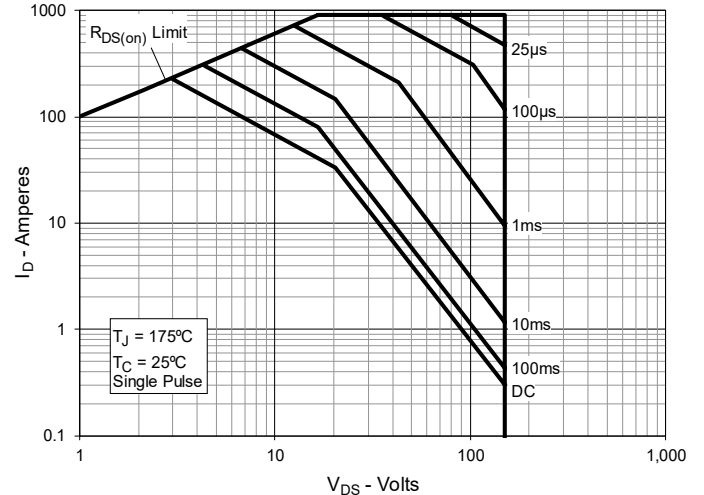
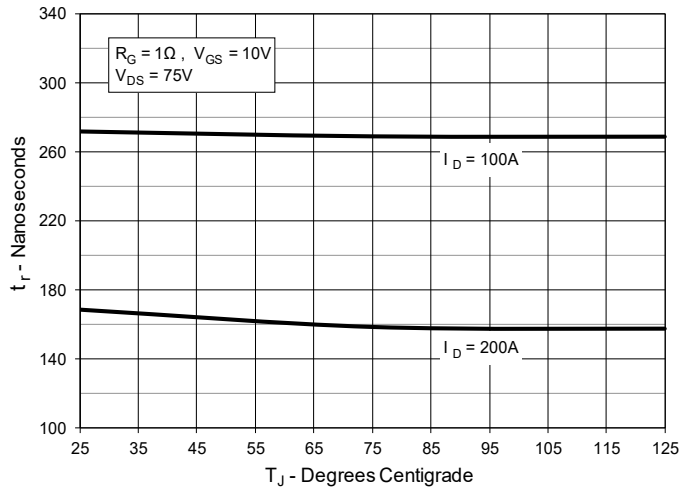


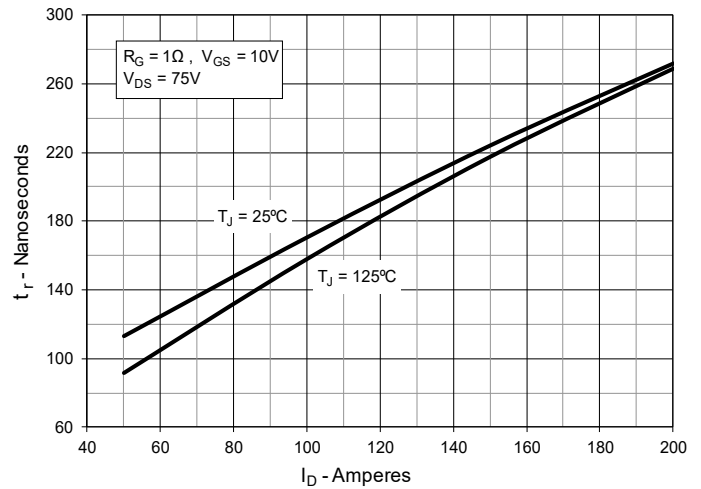
Fig. 12. Forward-Bias Safe Operating Area



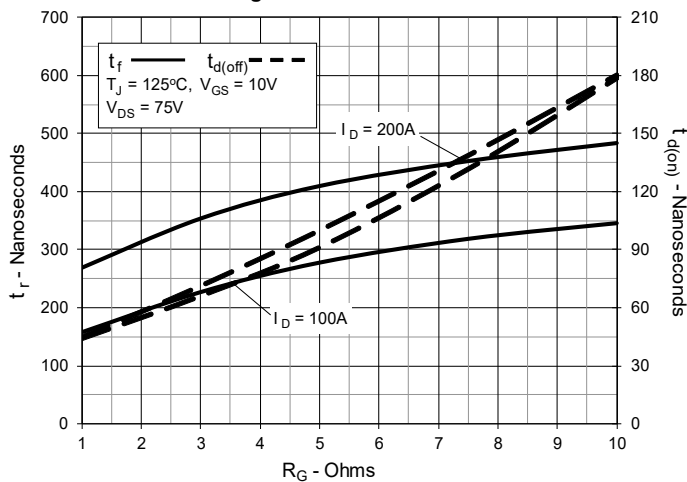
**Fig. 13. Resistive Turn-on
Rise Time vs. Junction Temperature**



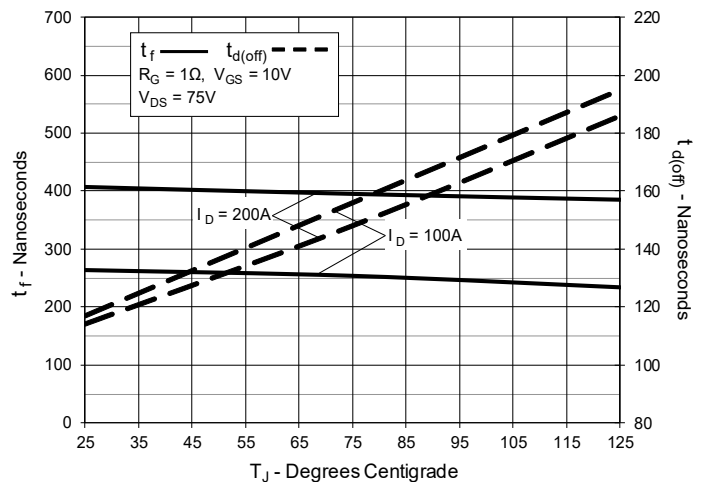
**Fig. 14. Resistive Turn-on
Rise Time vs. Drain Current**



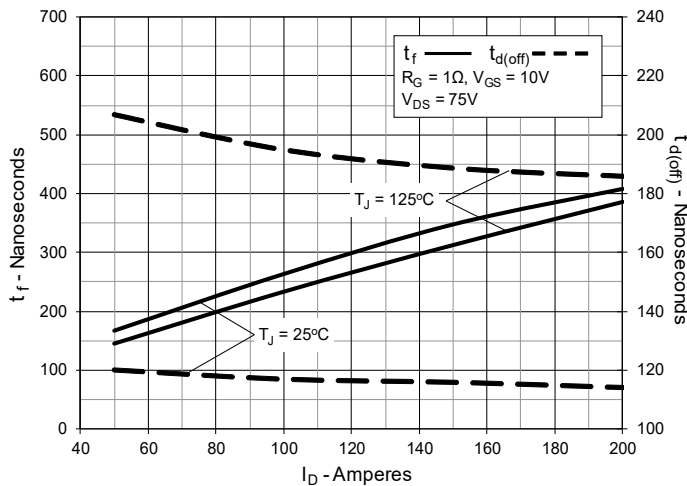
**Fig. 15. Resistive Turn-on
Switching Times vs. Gate Resistance**



**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**

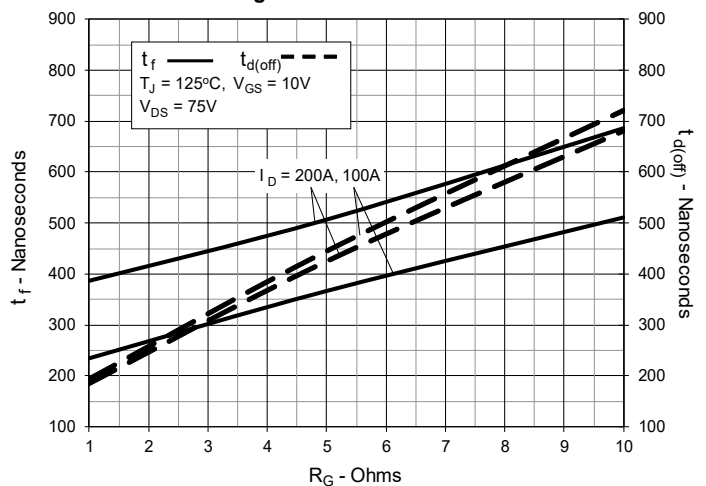
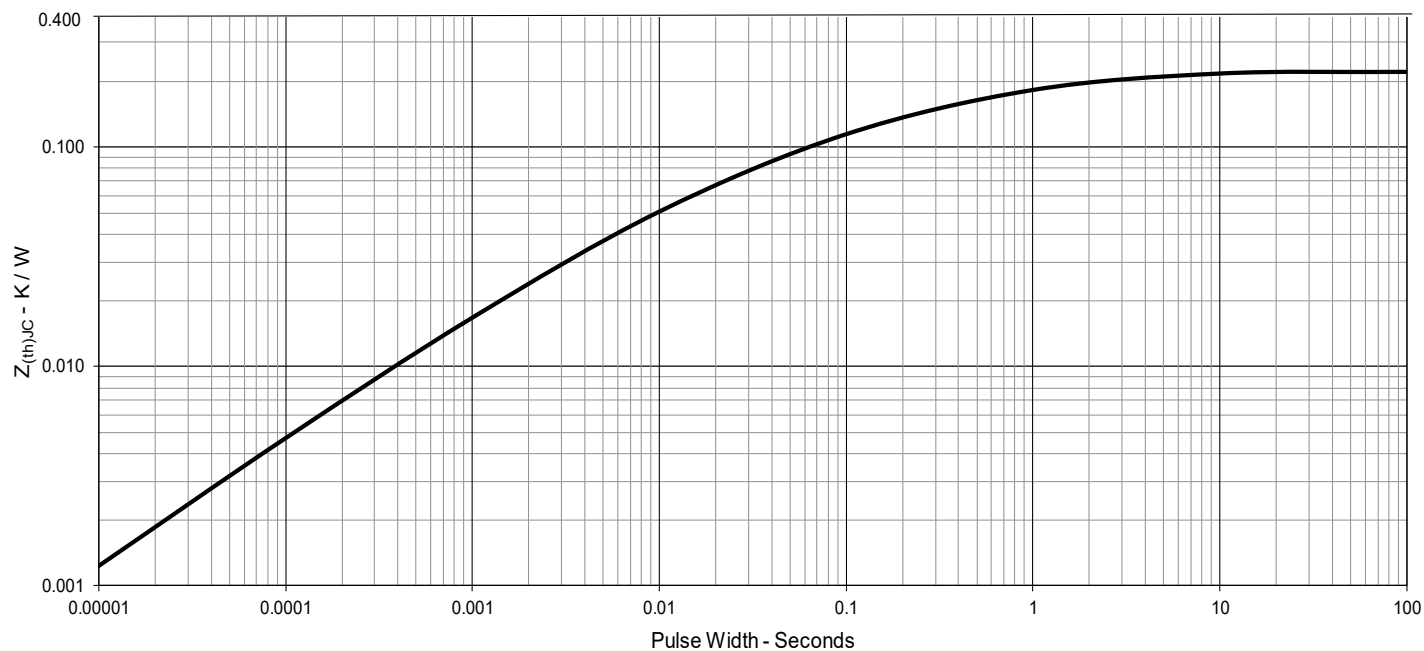
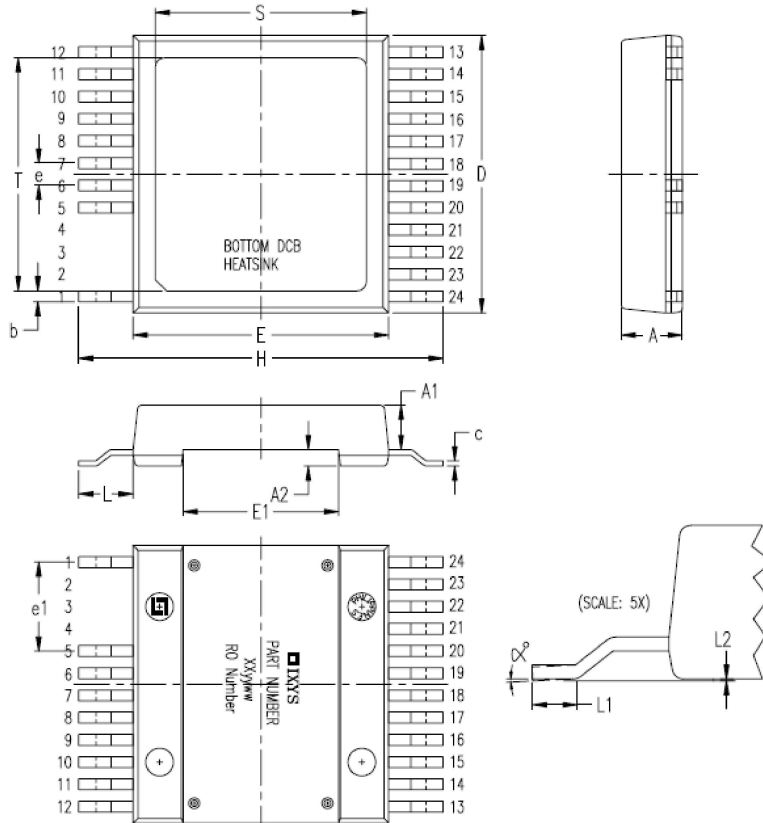


Fig. 19. Maximum Transient Thermal Impedance



Package Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.209	.224	5.30	5.70
A1	.154	.161	3.90	4.10
A2	.055	.063	1.40	1.60
b	.035	.045	0.90	1.15
c	.018	.026	0.45	0.65
D	.976	.994	24.80	25.25
E	.898	.915	22.80	23.25
E1	.543	.559	13.80	14.20
e	.079 BSC		2.00 BSC	
e1	.315 BSC		8.00 BSC	
H	1.272	1.311	32.30	33.30
L	.181	.209	4.60	5.30
L1	.051	.067	1.30	1.70
L2	.000	.006	0.00	0.15
S	.736	.760	18.70	19.30
T	.815	.839	20.70	21.30
α	0	4°	0	4°

PIN: 1 = Gate
5-12 = Source
13-24 = Drain