IXYS

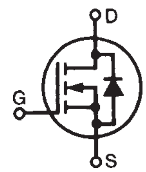
Preliminary Technical Information

GigaMOS™ Trench™ HiperFET™ Power MOSFET

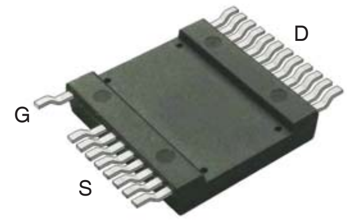
MMIX1F180N25T

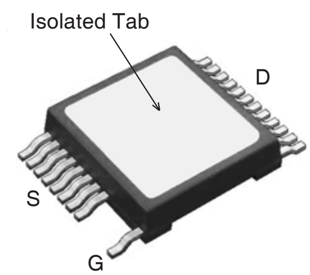
V_{DSS} = 250V
I_{D25} = 132A
$R_{DS(on)}$ ≤ 13mΩ
t_{rr} ≤ 200ns

(Electrically Isolated Tab)



N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode





G = Gate D = Drain
S = Source

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	250	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	250	V
V_{GSS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C	132	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	500	A
I_A	T_C = 25°C	90	A
E_{AS}	T_C = 25°C	5	J
P_D	T_C = 25°C	570	W
dv/dt	$I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150°C$	20	V/ns
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	Plastic Body for 10s	260	°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°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 3mA	250			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 8mA	3.0		5.0	V
I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±200	nA
I_{DSS}	V_{DS} = V_{DSS}, V_{GS} = 0V			50	µA
	Note 2, T_J = 125°C			2.5	mA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 90A, Note 1			13	mΩ

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Substrate
  - Excellent Thermal Transfer
  - Increased Temperature and Power Cycling Capability
  - High Isolation Voltage (2500V~)
- 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°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 10V, I_D = 60A, Note 1	90	150		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		23.8		nF
C_{oss}			2070		pF
C_{rss}			47		pF
R_{GI}	Gate Input Resistance		1.1		Ω
$t_{d(on)}$	**Resistive Switching Times** V_{GS} = 15V, V_{DS} = 0.5 • V_{DSS}, I_D = 90A R_G = 1Ω (External)		35		ns
t_r			52		ns
$t_{d(off)}$			88		ns
t_f			20		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 90A		364		nC
Q_{gs}			137		nC
Q_{gd}			60		nC
R_{thJC}				0.22	°C/W
R_{thCS}			0.05		°C/W
R_{thJA}			30		°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			180	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			720	A
V_{SD}	I_F = 60A, V_{GS} = 0V, Note 1			1.3	V
t_{rr}	I_F = 90A, V_{GS} = 0V -di/dt = 100A/µs V_R = 75V			200	ns
I_{RM}			11		A
Q_{RM}			0.77		µC

Notes:
1. Pulse test, t ≤ 300µs, duty cycle, d ≤ 2%.
2. Part must be heatsunk for high-temp I_{DSS} measurement.

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.

Fig. 1. Output Characteristics @ T_J = 25ºC

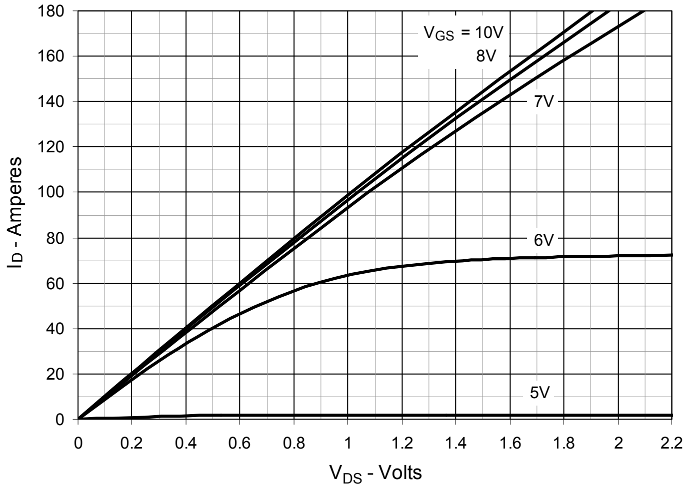


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

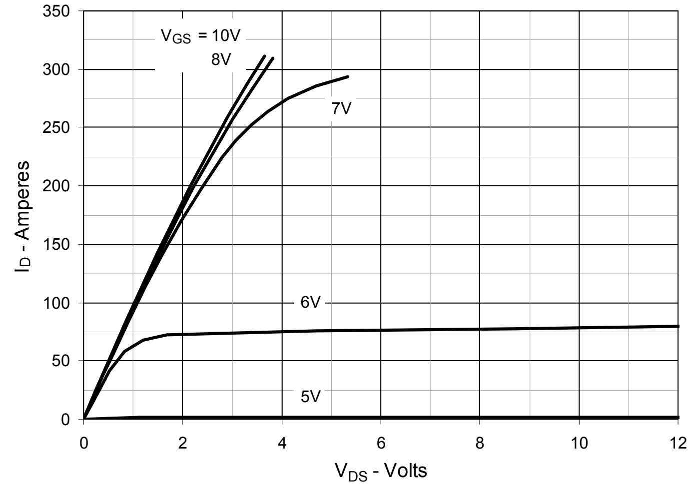


Fig. 3. Output Characteristics @ T_J = 125ºC

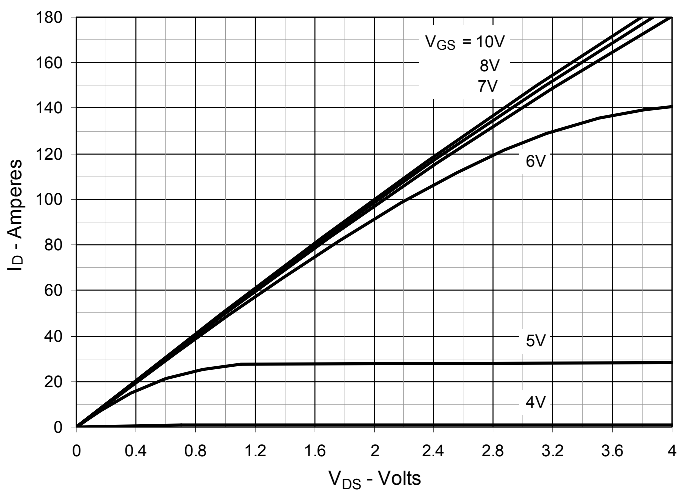


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 90A Value vs. Junction Temperature

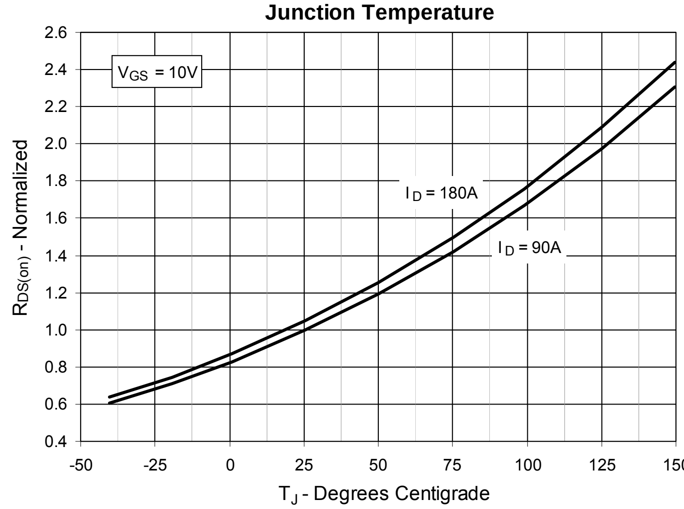


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 90A Value vs. Drain Current

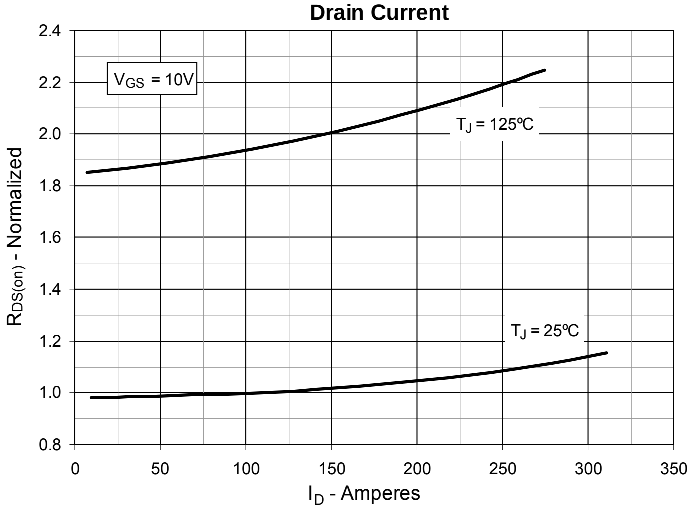


Fig. 6. Maximum Drain Current vs. Case Temperature

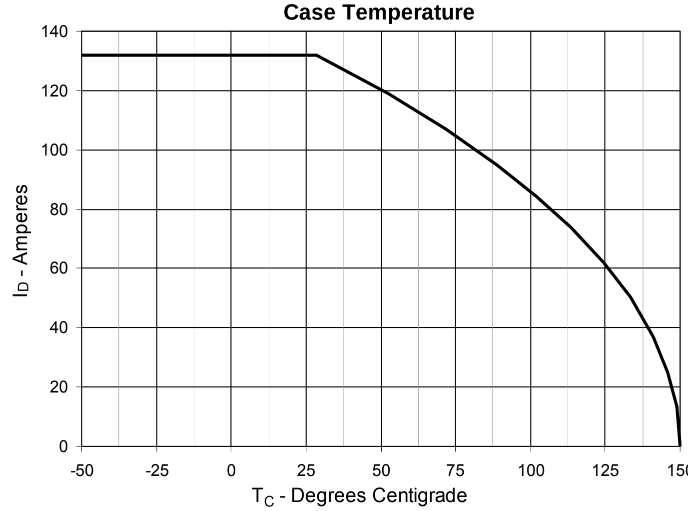


Fig. 7. Input Admittance

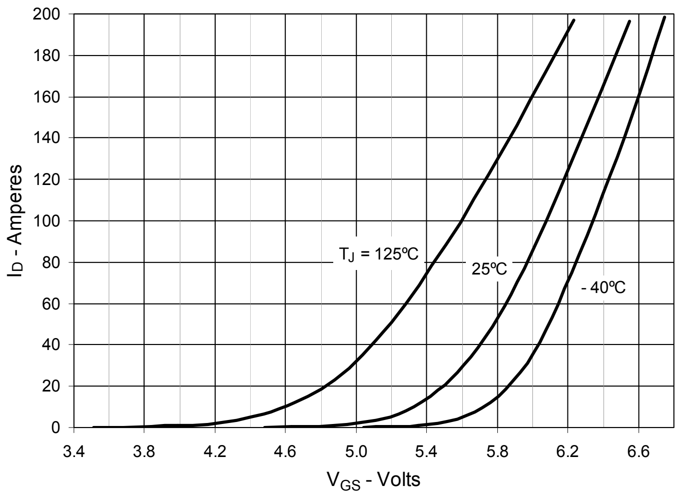


Fig. 8. Transconductance

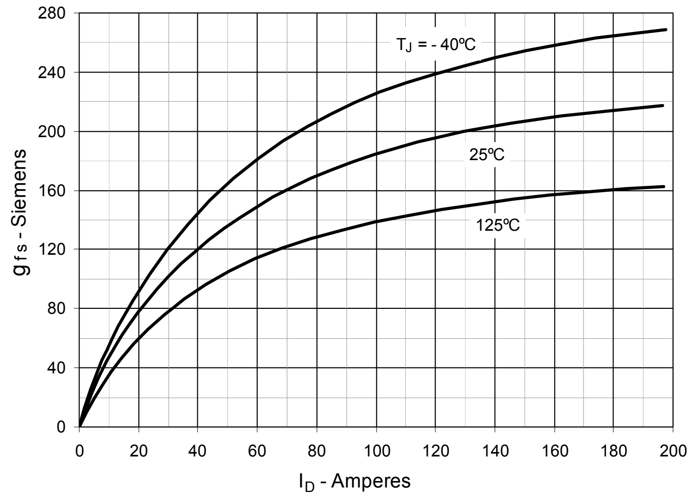


Fig. 9. Forward Voltage Drop of Intrinsic Diode

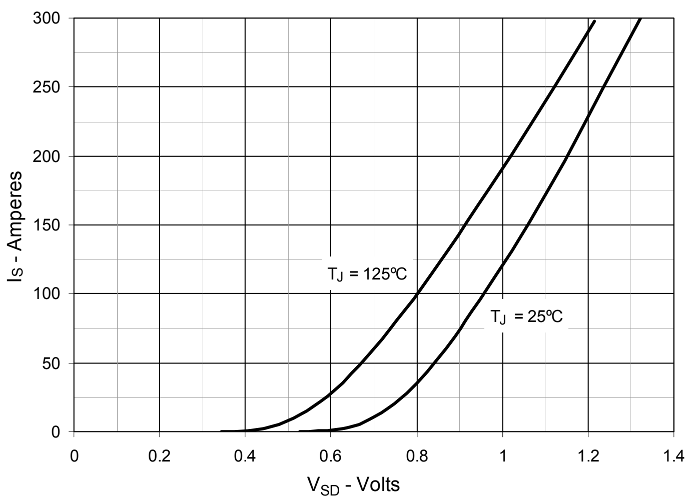


Fig. 10. Gate Charge

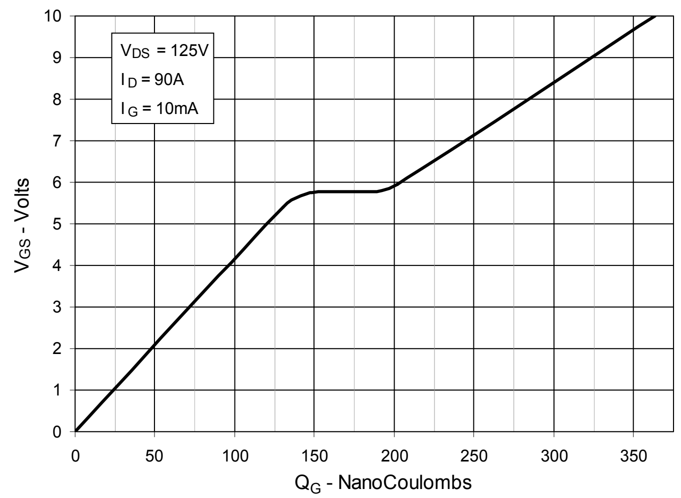


Fig. 11. Capacitance

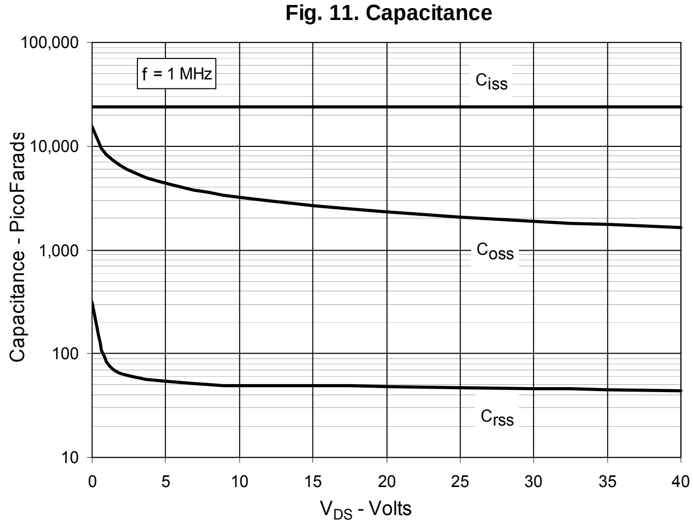


Fig. 12. Forward-Bias Safe Operating Area

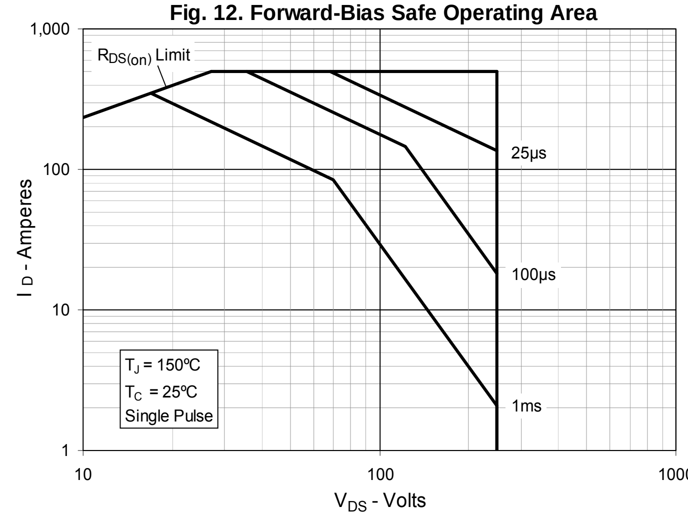


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

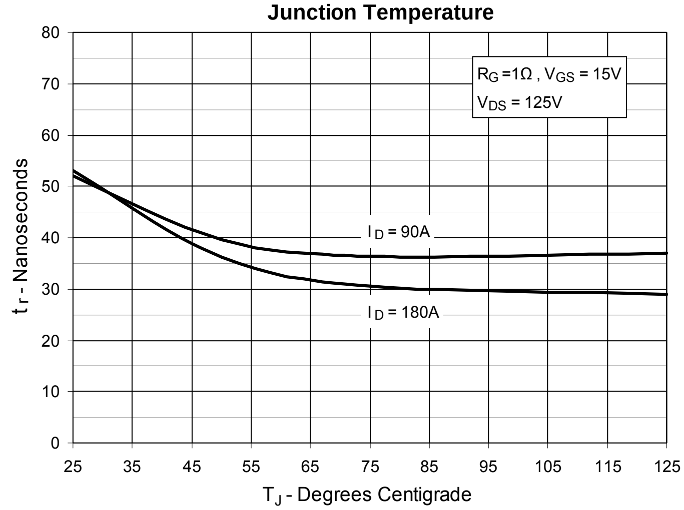


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

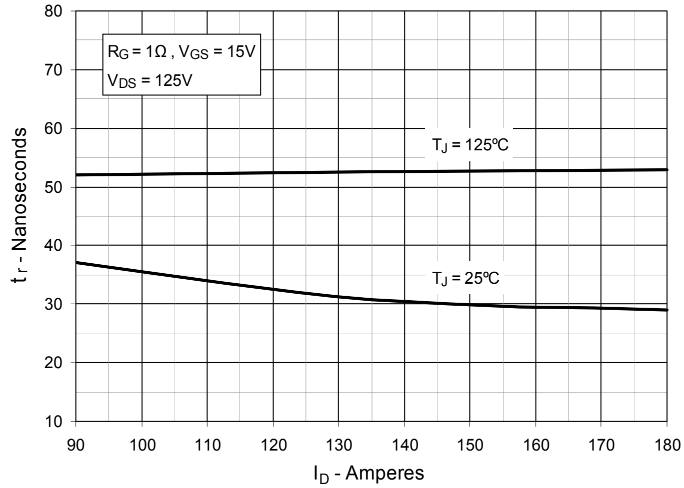


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

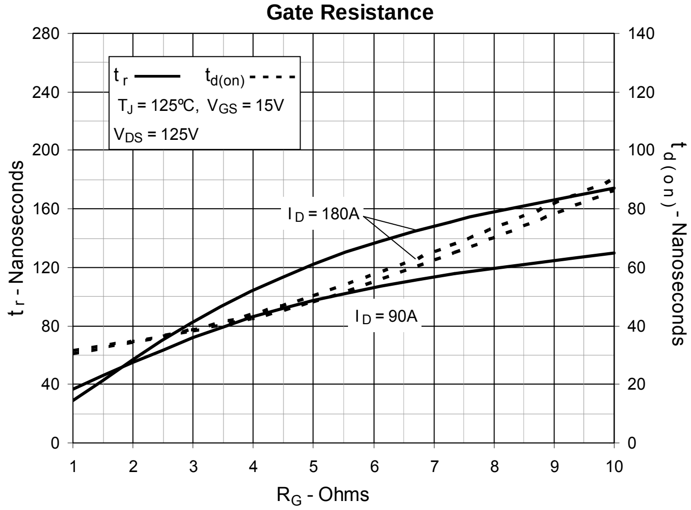


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

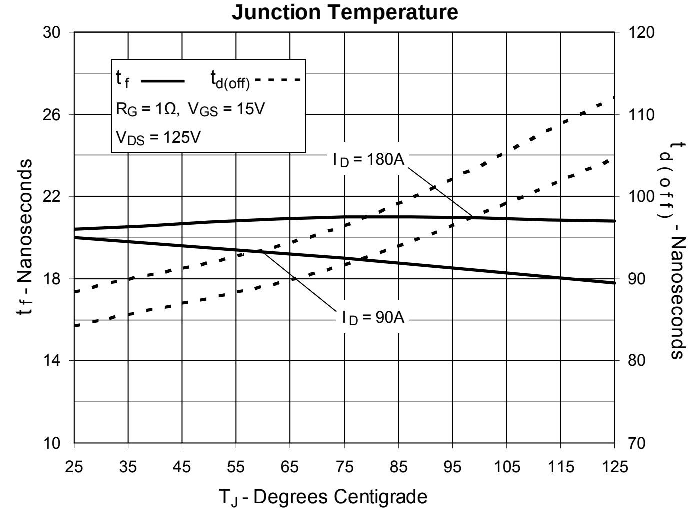


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

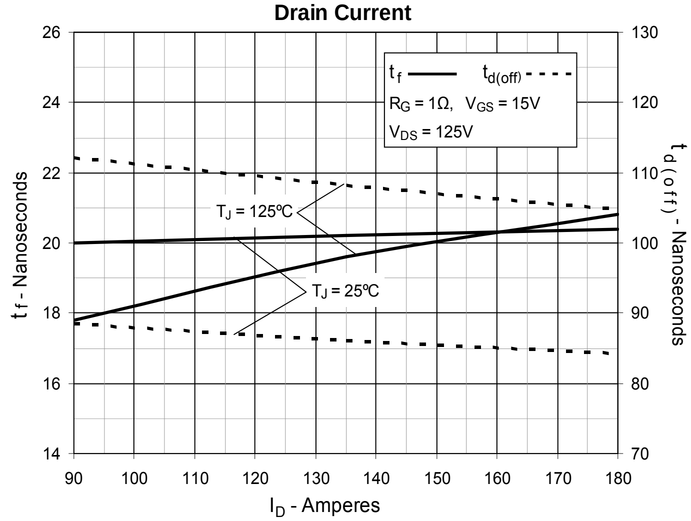
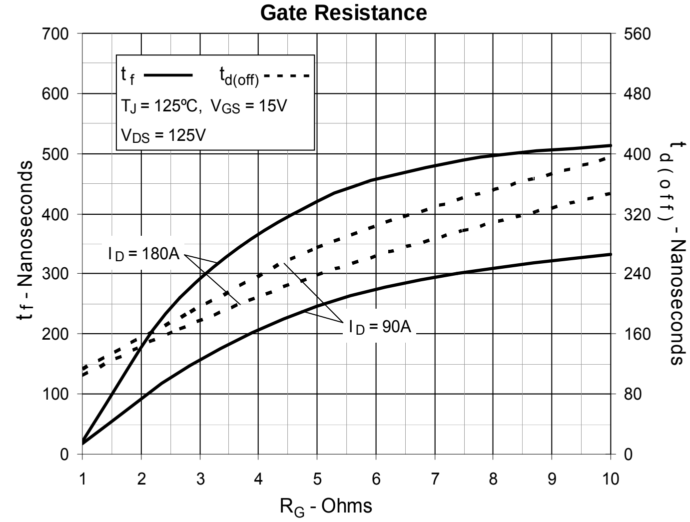


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance



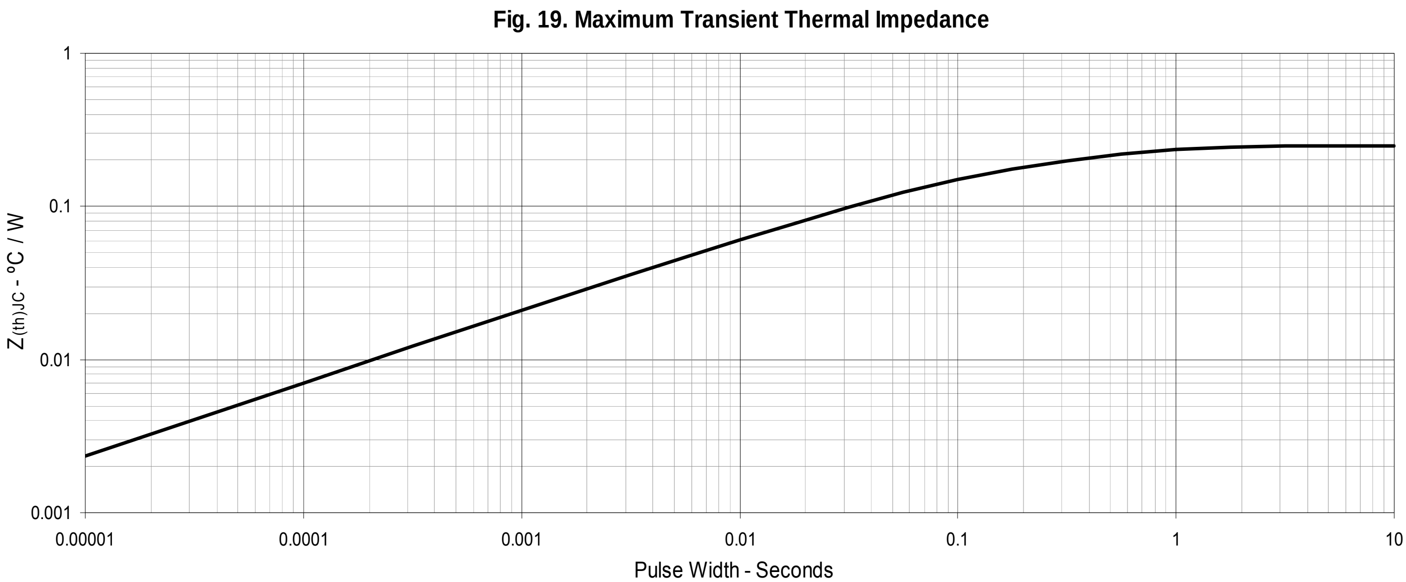
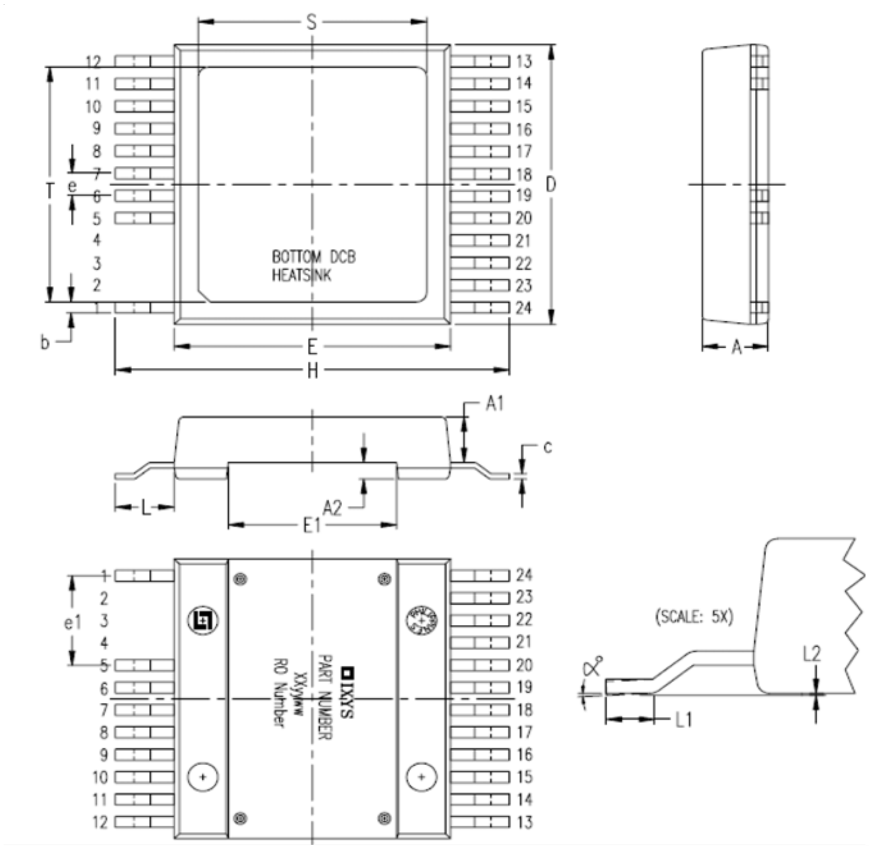


Fig. 19. Maximum Transient Thermal Impedance
1
0.1
0.01
0.001
Z(th)JC - ºC / W
0.00001
0.0001
0.001
0.01
0.1
1
10
Pulse Width - Seconds

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

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A Littelfuse Technology