

Depletion Mode MOSFETs

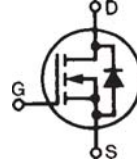
IXTH16N50D2 IXTT16N50D2

$$V_{DSX} = 500V$$

$$I_{D(on)} \geq 16A$$

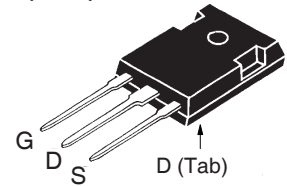
$$R_{DS(on)} \leq 300m\Omega$$

N-Channel

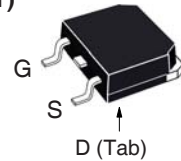


Symbol	Test Conditions	Maximum Ratings	
V_{DSX}	$T_J = 25^\circ C$ to $150^\circ C$	500	V
V_{DGX}	$T_J = 25^\circ C$ to $150^\circ C$, $R_{GS} = 1M\Omega$	500	V
V_{GSX}	Continuous	± 20	V
V_{GSM}	Transient	± 30	V
P_D	$T_C = 25^\circ C$	695	W
T_J		- 55 ... +150	$^\circ C$
T_{JM}		150	$^\circ C$
T_{stg}		- 55 ... +150	$^\circ C$
T_L	1.6mm (0.062 in.) from Case for 10s	300	$^\circ C$
T_{SOLD}	Plastic Body for 10s	260	$^\circ C$
M_d	Mounting Torque (TO-247)	1.13 / 10	Nm/lb.in.
Weight	TO-247	6	g
	TO-268	4	g

TO-247 (IXTH)



TO-268 (IXTT)



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

Symbol	Test Conditions ($T_J = 25^\circ C$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSX}	$V_{GS} = -5V$, $I_D = 250\mu A$	500		V
$V_{GS(off)}$	$V_{DS} = 25V$, $I_D = 4mA$	- 2.0		V
I_{GSX}	$V_{GS} = \pm 20V$, $V_{DS} = 0V$			± 100 nA
$I_{DSX(off)}$	$V_{DS} = V_{DSX}$, $V_{GS} = -5V$ $T_J = 125^\circ C$			10 μA 150 μA
$R_{DS(on)}$	$V_{GS} = 0V$, $I_D = 8A$, Note 1			300 m Ω
$I_{D(on)}$	$V_{GS} = 0V$, $V_{DS} = 25V$, Note 1	16		A

Features

- Normally ON Mode
- International Standard Packages
- Molding Epoxies Meet UL94V-0 Flammability Classification

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- Audio Amplifiers
- Start-up Circuits
- Protection Circuits
- Ramp Generators
- Current Regulators
- Active Loads

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$V_{DS} = 30\text{V}$, $I_D = 8\text{A}$, Note 1	7	12	S
C_{iss}	$V_{GS} = -10\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$		5250	pF
C_{oss}			515	pF
C_{rss}			130	pF
$t_{d(on)}$	Resistive Switching Times $V_{GS} = \pm 5\text{V}$, $V_{DS} = 250\text{V}$, $I_D = 8\text{A}$ $R_G = 3.3\Omega$ (External)		50	ns
t_r			173	ns
$t_{d(off)}$			203	ns
t_f			220	ns
$Q_{g(on)}$	$V_{GS} = \pm 5\text{V}$, $V_{DS} = 250\text{V}$, $I_D = 8\text{A}$		199	nC
Q_{gs}			18	nC
Q_{gd}			100	nC
R_{thJC}	TO-247			0.18 $^\circ\text{C/W}$
R_{thCS}			0.21	$^\circ\text{C/W}$

Safe-Operating-Area Specification

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
SOA	$V_{DS} = 500\text{V}$, $I_D = 0.5\text{A}$, $T_C = 75^\circ\text{C}$, $t_p = 5\text{s}$	250		W

Source-Drain Diode

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
V_{SD}	$I_F = 16\text{A}$, $V_{GS} = -10\text{V}$, Note 1		0.8	1.3 V
t_{rr}	$I_F = 8\text{A}$, $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}$, $V_{GS} = -10\text{V}$		695	ns
I_{RM}			20	A
Q_{RM}			7	μC

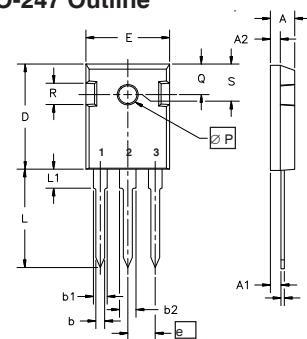
Note 1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.

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	6,404,065 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	

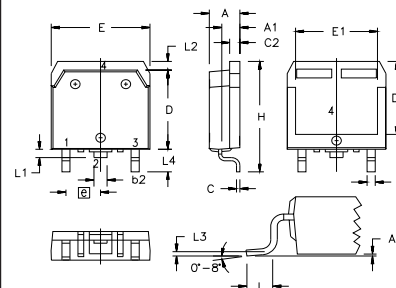
TO-247 Outline



Terminals: 1 - Gate
2 - Drain
3 - Source

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A ₁	2.2	2.54	.087	.102
A ₂	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b ₁	1.65	2.13	.065	.084
b ₂	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L ₁		4.50		.177
∅P	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15	BSC	.242	BSC

TO-268 Outline



Terminals: 1 - Gate
2 - Drain
3 - Source
Tab - Drain

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A ₁	.106	.114	2.70	2.90
A ₂	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b ₂	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C ₂	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D ₁	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E ₁	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L ₁	.047	.055	1.20	1.40
L ₂	.039	.045	1.00	1.15
L ₃	.010 BSC		0.25 BSC	
L ₄	.150	.161	3.80	4.10

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

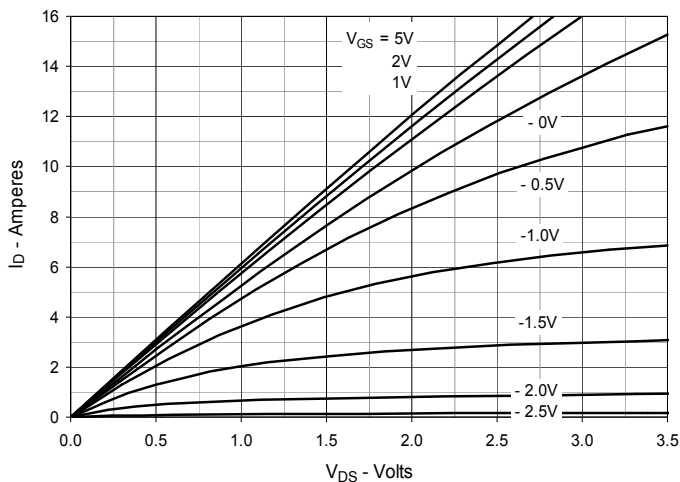


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

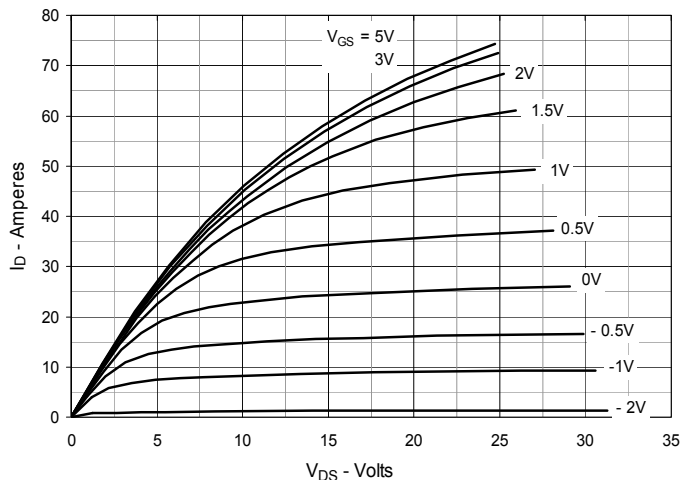


Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

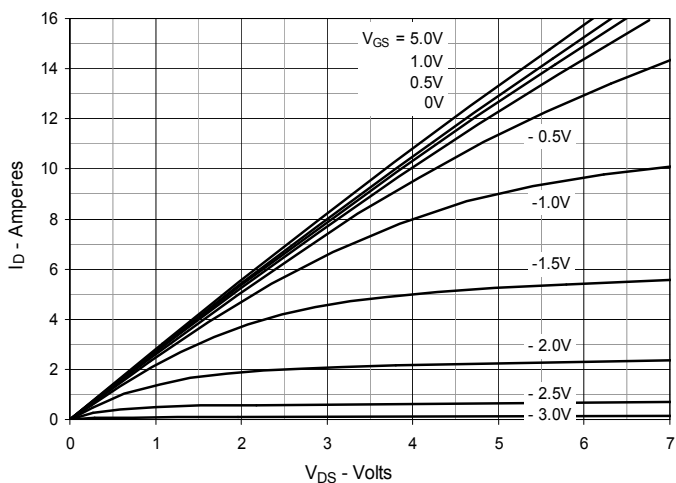


Fig. 4. Drain Current @ $T_J = 25^\circ\text{C}$

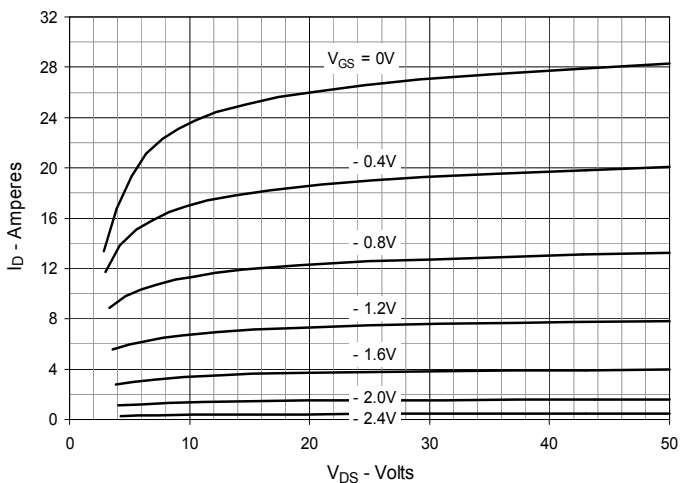


Fig. 5. Drain Current @ $T_J = 100^\circ\text{C}$

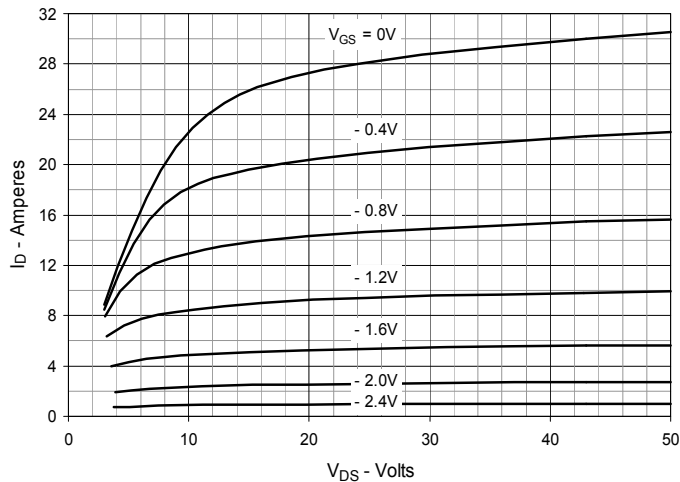


Fig. 6. Dynamic Resistance vs. Gate Voltage

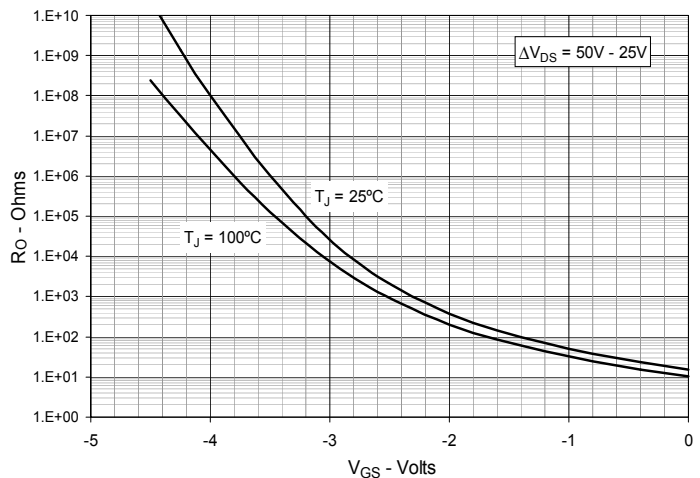


Fig. 7. Normalized $R_{DS(on)}$ vs. Junction Temperature

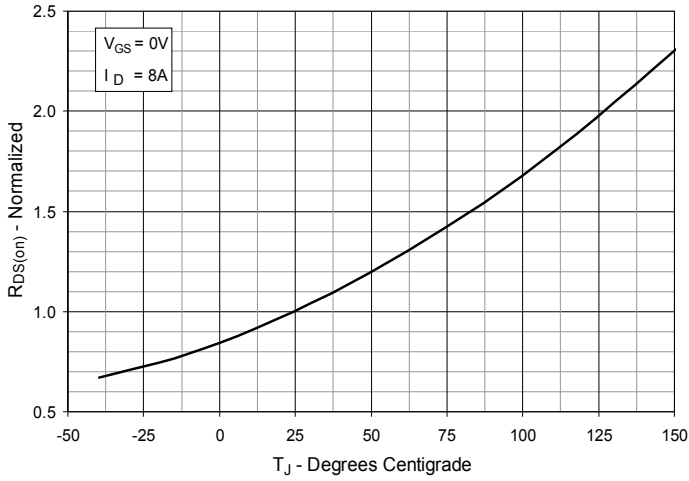


Fig. 8. $R_{DS(on)}$ Normalized to $I_D = 8A$ Value vs. Drain Current

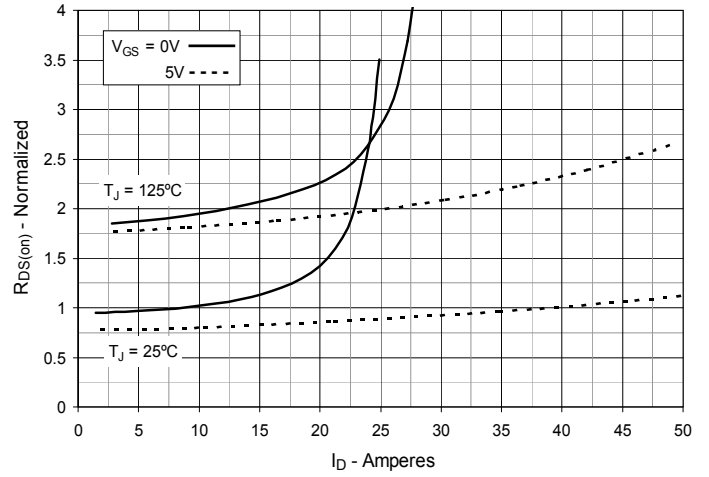


Fig. 9. Input Admittance

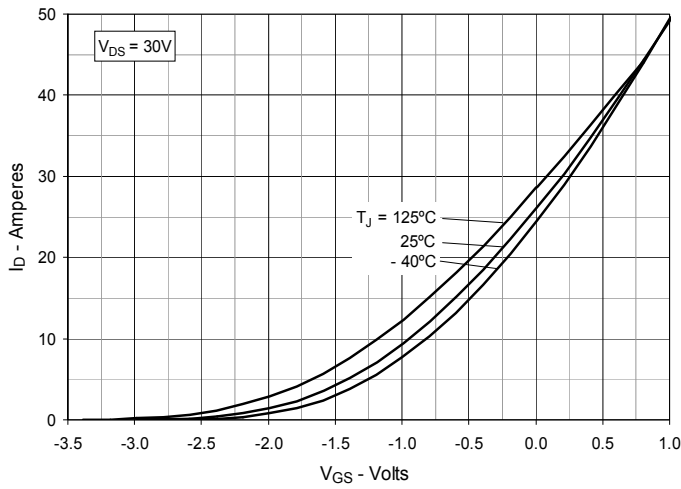


Fig. 10. Transconductance

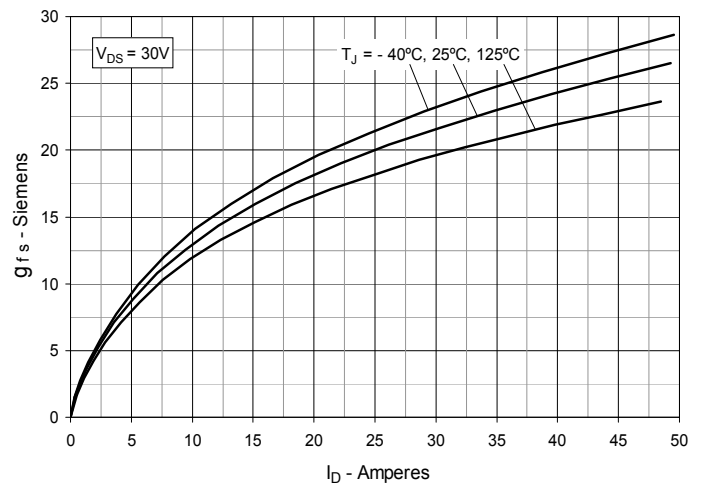


Fig. 11. Breakdown and Threshold Voltages vs. Junction Temperature

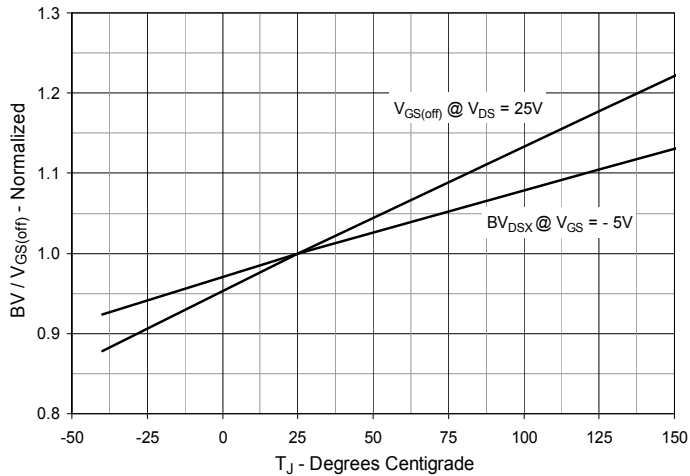


Fig. 12. Forward Voltage Drop of Intrinsic Diode

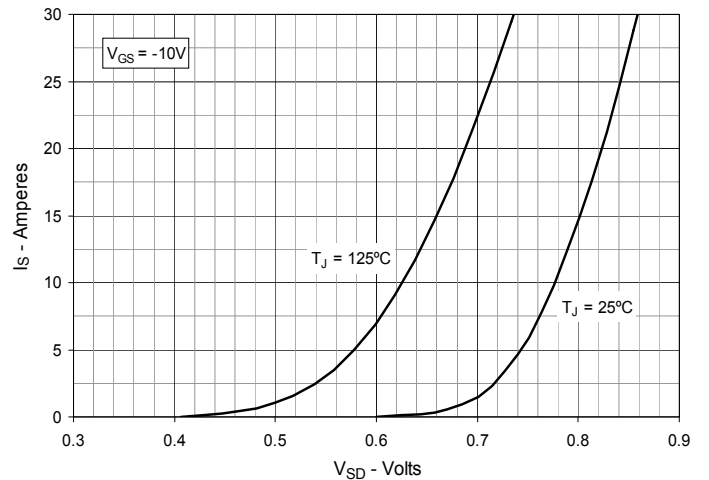


Fig. 13. Capacitance

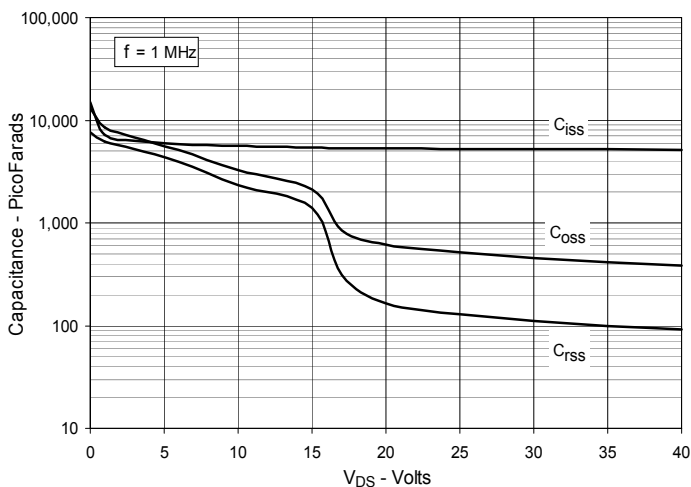
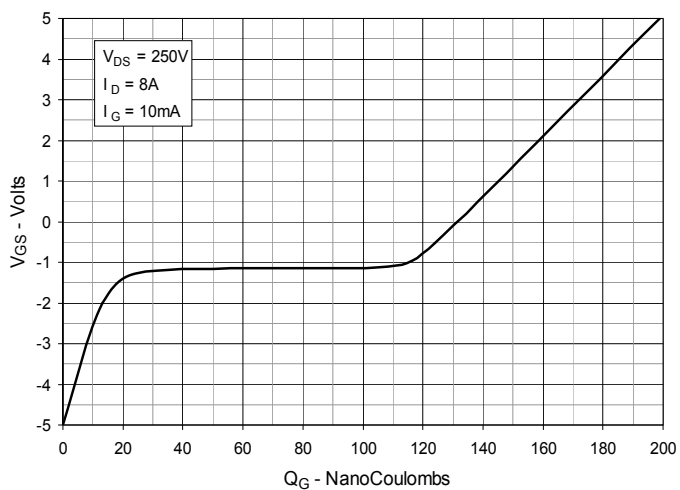
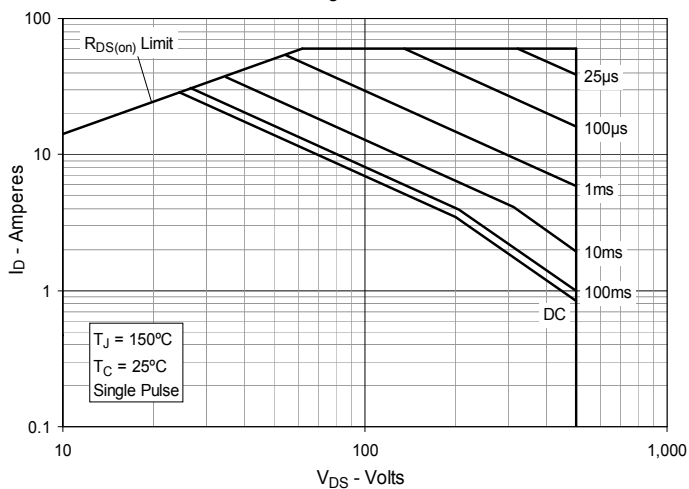


Fig. 14. Gate Charge



**Fig. 15. Forward-Bias Safe Operating Area
@ T_C = 25°C**



**Fig. 16. Forward-Bias Safe Operating Area
@ T_C = 75°C**

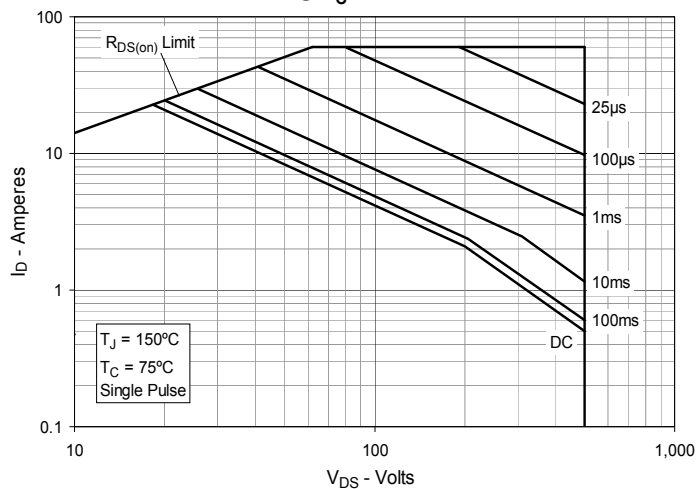
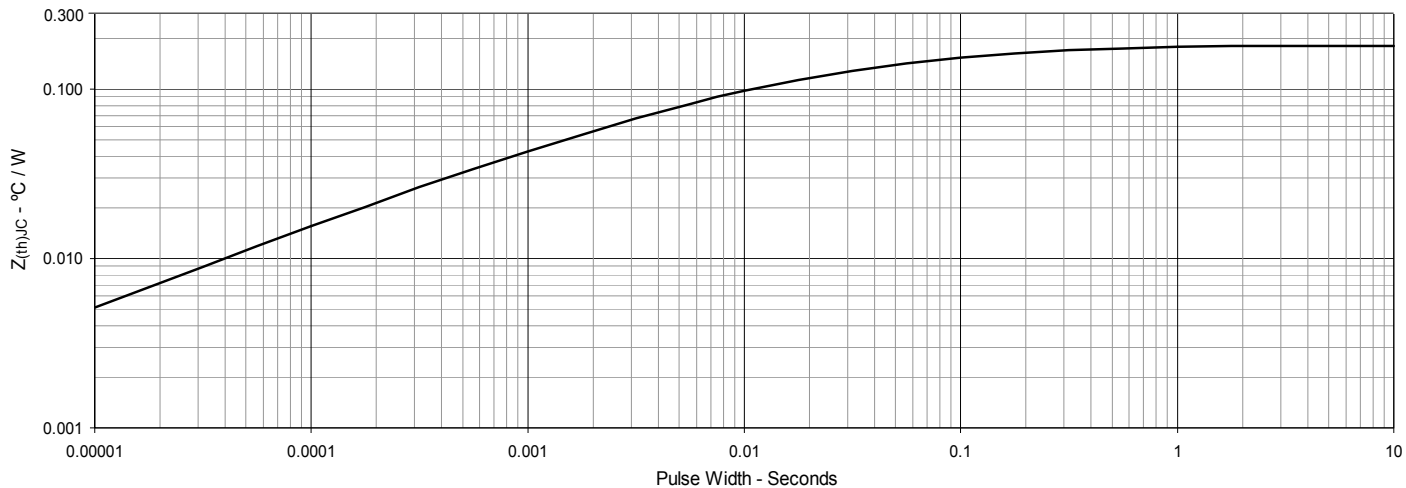


Fig. 17. Maximum Transient Thermal Impedance



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