

# High Voltage Depletion Mode MOSFET

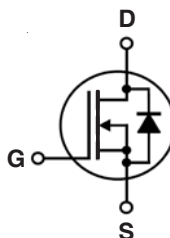
## IXTA3N100D2HV

$$V_{DSX} = 1000V$$

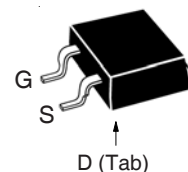
$$I_{D(on)} \geq 3A$$

$$R_{DS(on)} \leq 6\Omega$$

N-Channel



TO-263HV



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

Symbol	Test Conditions	Maximum Ratings	
$V_{DSX}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	1000	V
$V_{GSX}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$P_D$	$T_C = 25^\circ\text{C}$	125	W
$T_J$		- 55 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		- 55 ... +150	$^\circ\text{C}$
$T_L$	Maximum Lead Temperature for Soldering	300	$^\circ\text{C}$
$T_{SOLD}$	1.6 mm (0.062in.) from Case for 10s	260	$^\circ\text{C}$
$M_d$	Mounting Force	10..65 / 2.2..14.6	N/lb
Weight		2.5	g

### Features

- High Blocking Voltage
- Normally ON Mode
- High Voltage package

### 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.
$BV_{DSX}$	$V_{GS} = -5V, I_D = 250\mu\text{A}$	1000		V
$V_{GS(off)}$	$V_{DS} = 25V, I_D = 250\mu\text{A}$	- 2.5		V
$I_{GSX}$	$V_{GS} = \pm 20V, V_{DS} = 0V$			$\pm 100$ nA
$I_{DSX(off)}$	$V_{DS} = V_{DSX}, V_{GS} = -5V$ $T_J = 125^\circ\text{C}$			5 $\mu\text{A}$ 50 $\mu\text{A}$
$R_{DS(on)}$	$V_{GS} = 0V, I_D = 1.5A, \text{ Note 1}$			6 $\Omega$
$I_{D(on)}$	$V_{GS} = 0V, V_{DS} = 50V, \text{ Note 1}$	3		A

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 30\text{V}$ , $I_D = 1.5\text{A}$ , Note 1	1.2	2.0	S
$C_{iss}$	$V_{GS} = -10\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$		1020	pF
$C_{oss}$			68	pF
$C_{rss}$			17	pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = \pm 5\text{V}$ , $V_{DS} = 500\text{V}$ , $I_D = 1.5\text{A}$ $R_G = 3.3\Omega$ (External)		27	ns
$t_r$			67	ns
$t_{d(off)}$			34	ns
$t_f$			40	ns
$Q_{g(on)}$	$V_{GS} = 5\text{V}$ , $V_{DS} = 500\text{V}$ , $I_D = 1.5\text{A}$		37.5	nC
$Q_{gs}$			4.4	nC
$Q_{gd}$			21.2	nC
$R_{thJC}$				1.0 $^\circ\text{C}/\text{W}$

### Safe-Operating-Area Specification

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
SOA	$V_{DS} = 800\text{V}$ , $I_D = 94\text{mA}$ , $T_C = 75^\circ\text{C}$ , $T_p = 5\text{s}$	75		W

### Source-Drain Diode

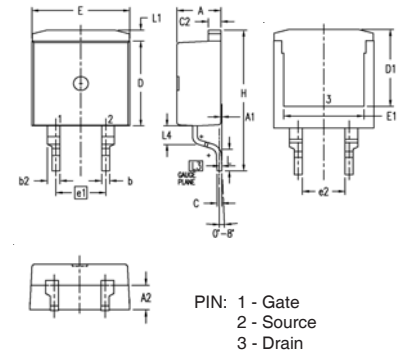
Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$V_{SD}$	$I_F = 3\text{A}$ , $V_{GS} = -10\text{V}$ , Note 1		0.8	1.3 V
$t_{rr}$	$I_F = 3\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}$ , $V_{GS} = -10\text{V}$		970	ns
$I_{RM}$			12.7	A
$Q_{RM}$			6.16	$\mu\text{C}$

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

### 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.

### TO-263HV Outline

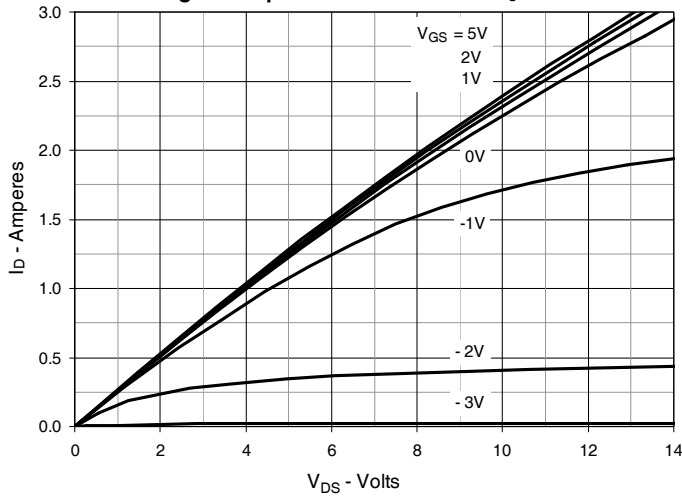
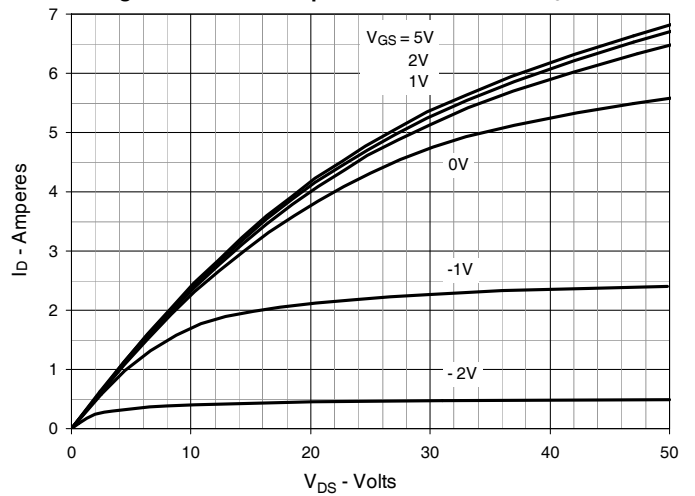
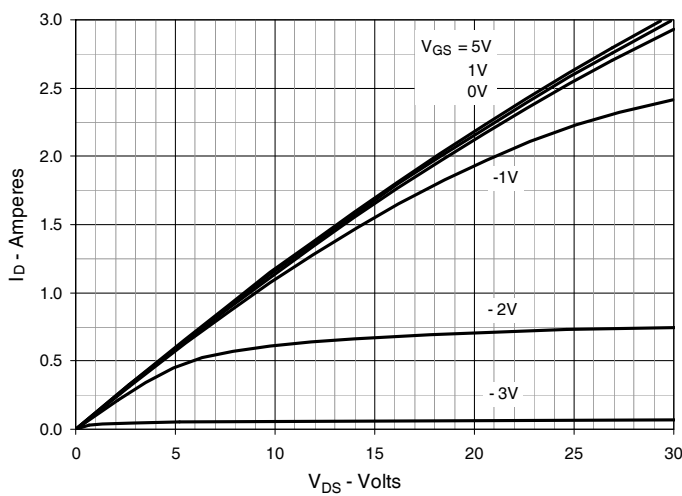
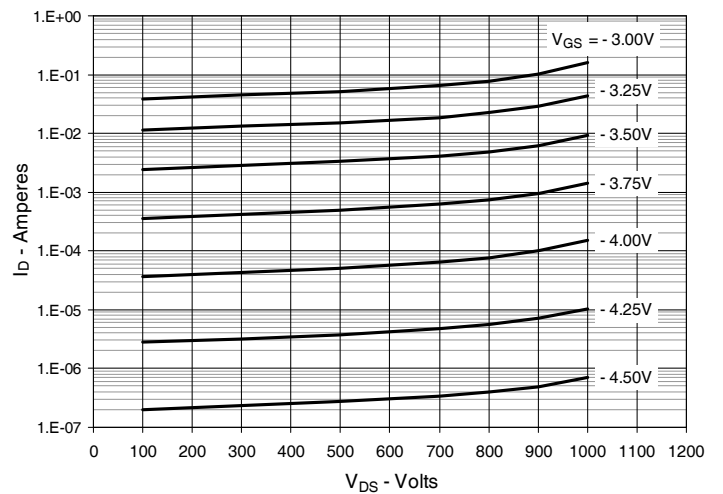
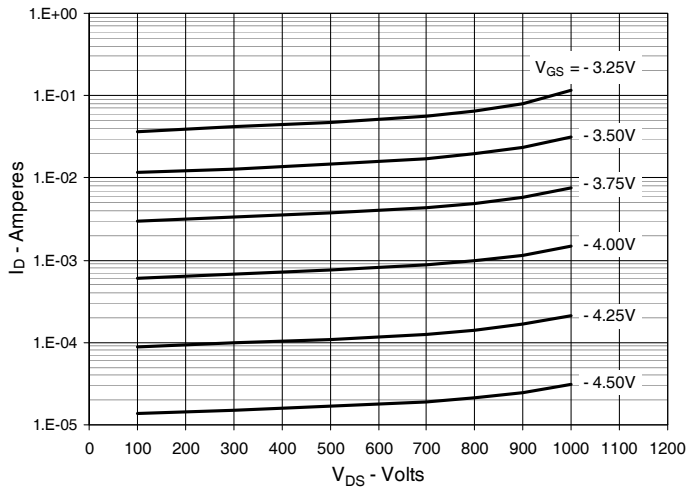
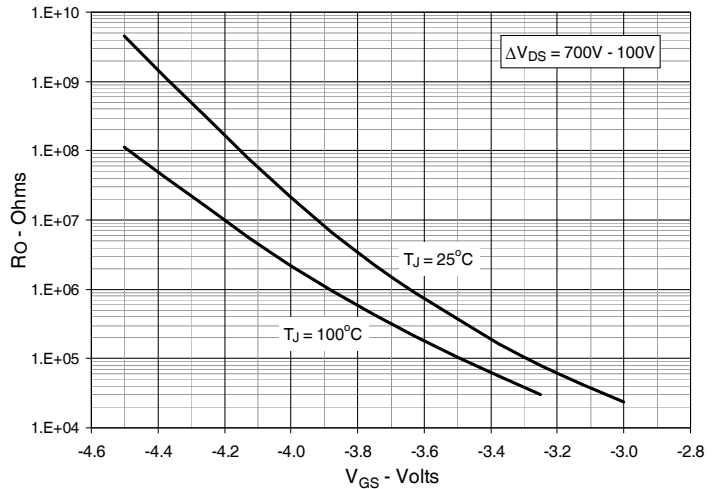


SYM	INCHES		MILLIMETER	
	MIN	MAX	MIN	MAX
A	.170	.185	4.30	4.70
A1	.000	.008	0.00	0.20
A2	.091	.098	2.30	2.50
b	.028	.035	0.70	0.90
b2	.046	.054	1.18	1.38
C	.018	.024	0.45	0.60
C2	.049	.055	1.25	1.40
D	.354	.370	9.00	9.40
D1	.311	.327	7.90	8.30
E	.386	.402	9.80	10.20
E1	.307	.323	7.80	8.20
e1	.200 BSC		5.08 BSC	
(e2)	.163	.174	4.13	4.43
H	.591	.614	15.00	15.60
L	.079	.102	2.00	2.60
L1	.039	.055	1.00	1.40
L3	.010 BSC		0.254 BSC	
(L4)	.071	.087	1.80	2.20

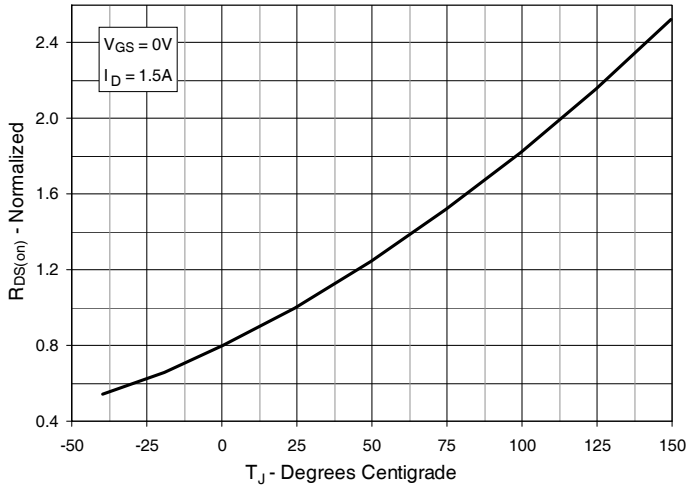
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

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

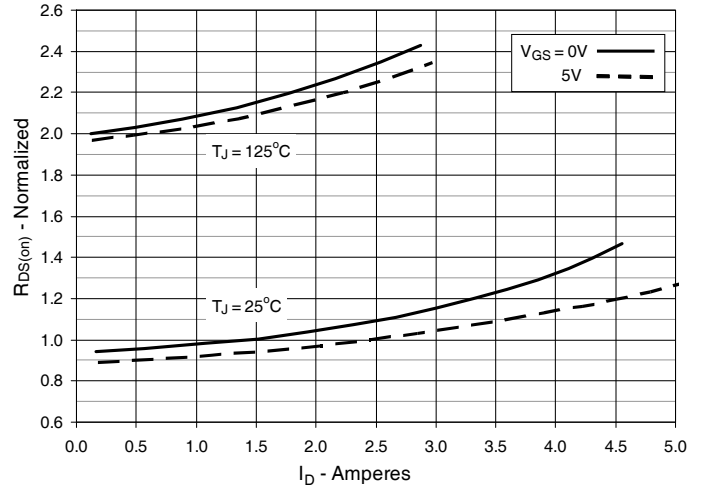
4,835,592	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065 B1	6,683,344	6,727,585	7,005,734 B2	7,157,338B2
4,860,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692	7,063,975 B2	
4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	6,771,478 B2	7,071,537	

**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**


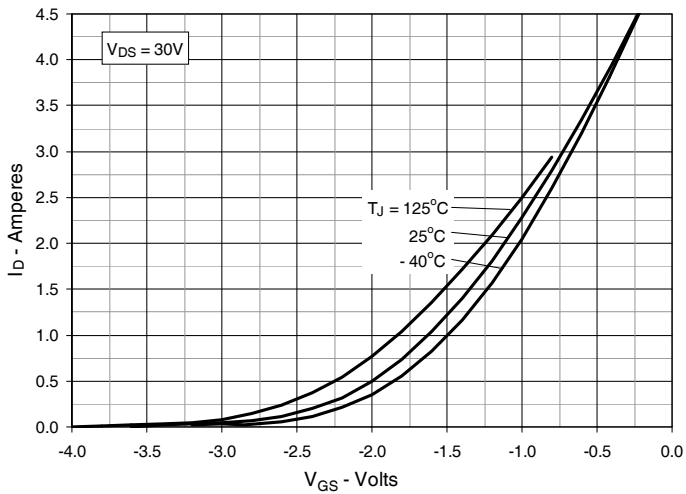
**Fig. 7. Normalized  $R_{DS(on)}$  vs. Junction Temperature**



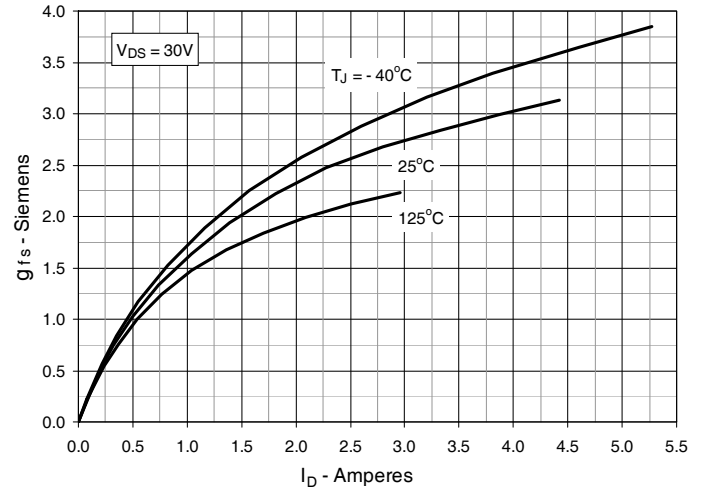
**Fig. 8.  $R_{DS(on)}$  Normalized to  $I_D = 1.5A$  Value vs. Drain Current**



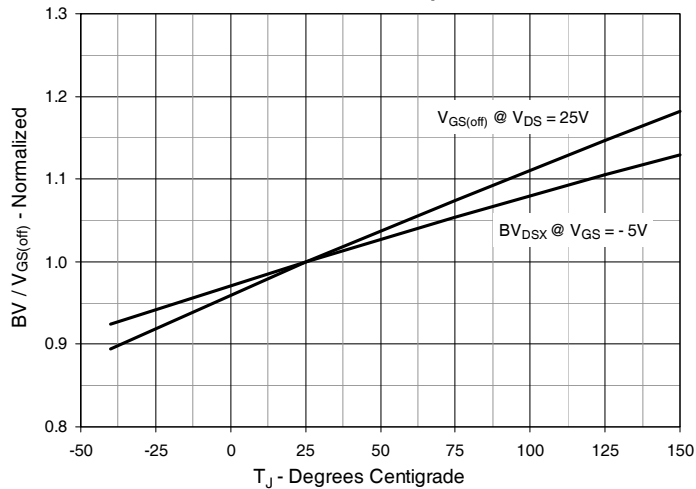
**Fig. 9. Input Admittance**



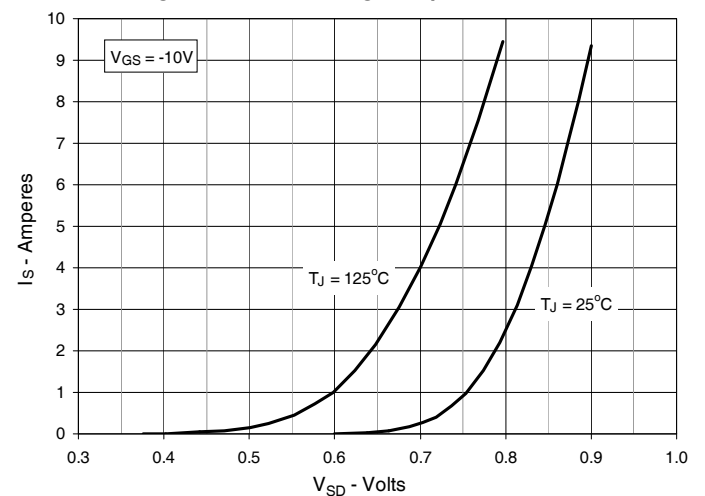
**Fig. 10. Transconductance**



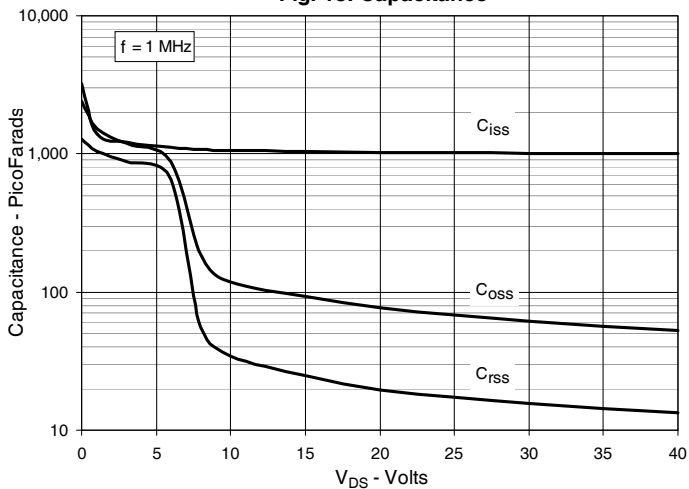
**Fig. 11. Breakdown and Threshold Voltages vs. Junction Temperature**



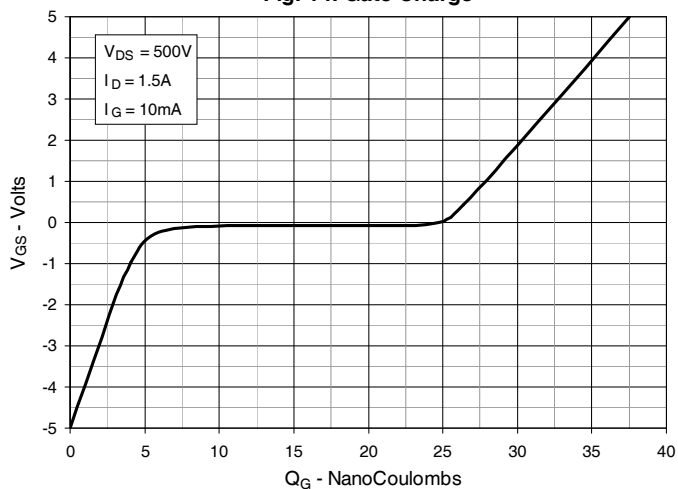
**Fig. 12. Forward Voltage Drop of Intrinsic Diode**



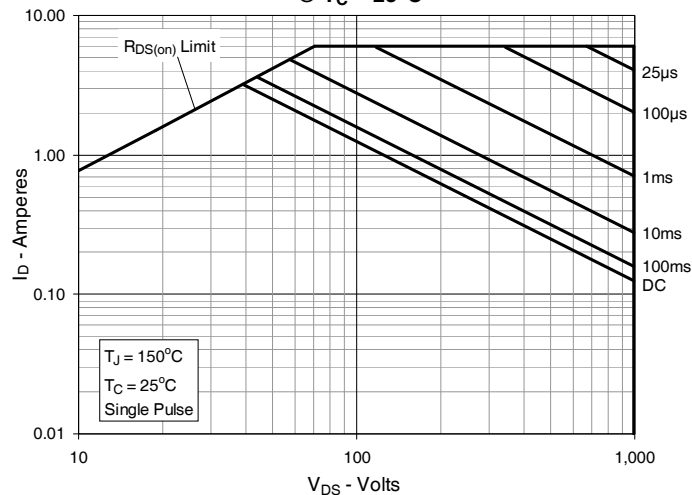
**Fig. 13. Capacitance**



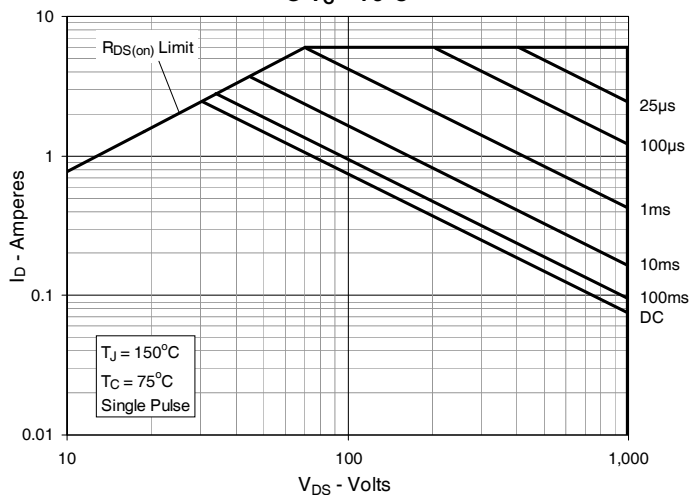
**Fig. 14. Gate Charge**



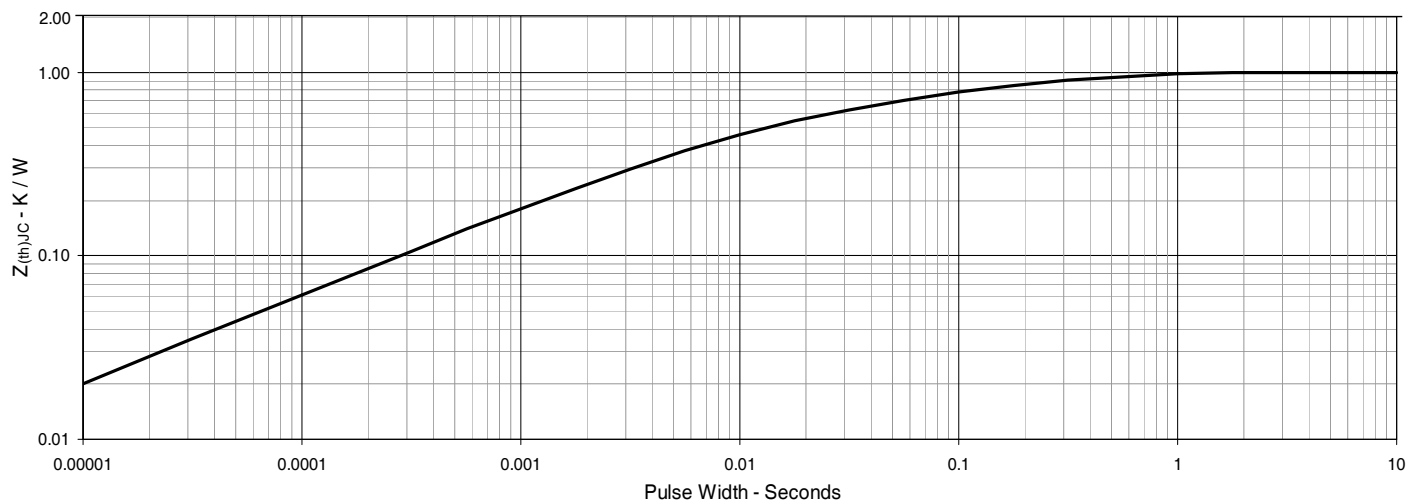
**Fig. 15. Forward-Bias Safe Operating Area @  $T_C = 25^\circ\text{C}$**



**Fig. 16. Forward-Bias Safe Operating Area @  $T_C = 75^\circ\text{C}$**



**Fig. 17. Maximum Transient Thermal Impedance**



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