

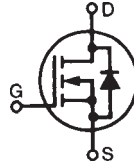
**Linear™ Power MOSFET  
w/Extended FBSOA**
**IXTK3N250L  
IXTX3N250L**

$$V_{DSS} = 2500V$$

$$I_{D25} = 3A$$

$$R_{DS(on)} \leq 10\Omega$$

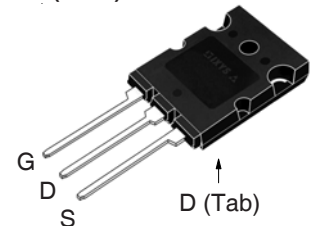
N-Channel Enhancement Mode



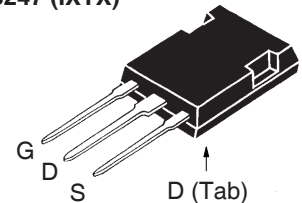
Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	2500	V
$V_{DGR}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}, R_{GS} = 1M\Omega$	2500	V
$V_{GSS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	3	A
$I_{DM}$	$T_C = 25^\circ\text{C}, \text{Pulse Width Limited by } T_{JM}$	8	A
$P_D$	$T_C = 25^\circ\text{C}$	417	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 Torque (TO-264)	1.13/10	Nm/lb.in
$F_C$	Mounting Force (PLUS247)	20..120 / 4.5..27	N/lb
Weight	TO-264	10	g
	PLUS247	6	g

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0V, I_D = 1mA$	2500		V
$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 1mA$	3.0		5.0 V
$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$			$\pm 200$ nA
$I_{DSS}$	$V_{DS} = 0.8 \cdot V_{DSS}, V_{GS} = 0V$ $T_J = 125^\circ\text{C}$			50 $\mu\text{A}$ 2 mA
$R_{DS(on)}$	$V_{GS} = 10V, I_D = 0.5 \cdot I_{D25}, \text{Note 1}$			10 $\Omega$

TO-264 (IXTK)



PLUS247 (IXTX)



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

**Features**

- Designed for Linear Operation
- International Standard Packages
- Guaranteed FBSOA at  $75^\circ\text{C}$

**Advantages**

- Easy to Mount
- Space Savings
- High Power Density

**Applications**

- Solid State Circuit Breakers
- Soft Start Controls
- Linear Amplifiers
- Programmable Loads
- Current Regulators

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	0.6	1.0	1.4	S
$C_{iss}$	$V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$		5400		pF
$C_{oss}$			260		pF
$C_{rss}$			63		pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$ $R_G = 1\Omega$ (External)		44		ns
$t_r$			32		ns
$t_{d(off)}$			120		ns
$t_f$			160		ns
$Q_{g(on)}$	$V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$		230		nC
$Q_{gs}$			58		nC
$Q_{gd}$			100		nC
$R_{thJC}$				0.30	$^\circ\text{C/W}$
$R_{thCS}$		0.15			$^\circ\text{C/W}$

### Safe Operating Area Specification

Symbol	Test Conditions	Characteristic Values			
		Min.	Typ.	Max.	
SOA	$V_{DS} = 2\text{kV}$ , $I_D = 125\text{mA}$ , $T_C = 75^\circ\text{C}$ , $T_p = 5\text{s}$	250			W

### Source-Drain Diode

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values			
		Min.	Typ.	Max.	
$I_S$	$V_{GS} = 0\text{V}$			3	A
$I_{SM}$	Repetitive, Pulse Width Limited by $T_{JM}$			12	A
$V_{SD}$	$I_F = I_S$ , $V_{GS} = 0\text{V}$ , Note 1			1.5	V
$t_{rr}$	$I_F = 1.5\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$ , $V_R = 100\text{V}$ , $V_{GS} = 0\text{V}$		370		ns
$I_{RM}$			18.4		A
$Q_{RM}$			3.4		$\mu\text{C}$

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

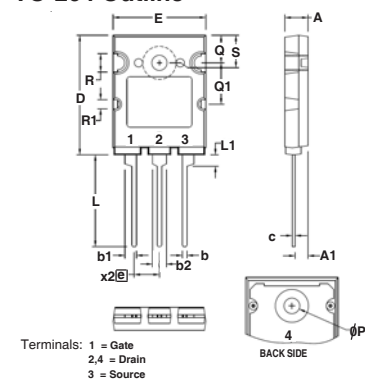
### ADVANCE TECHNICAL INFORMATION

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.

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

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

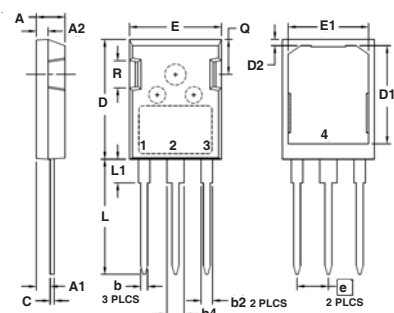
### TO-264 Outline



Terminals: 1 = Gate  
2,4 = Drain  
3 = Source

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.209	4.70	5.30
A1	.102	.118	2.60	3.00
b	.035	.049	0.90	1.25
b1	.091	.106	2.30	2.70
b2	.110	.126	2.80	3.20
c	.020	.033	0.50	0.85
D	1.012	1.035	25.70	26.30
E	.776	.799	19.70	20.30
e	.215 BSC		5.46 BSC	
L	.768	.807	19.50	20.50
L1	.091	.106	2.30	2.70
phi P	.122	.138	3.10	3.50
Q	.228	.244	5.80	6.20
Q1	.346	.362	8.80	9.20
phi R	.150	.165	3.80	4.20
phi R1	.071	.087	1.80	2.20
S	.228	.244	5.80	6.20

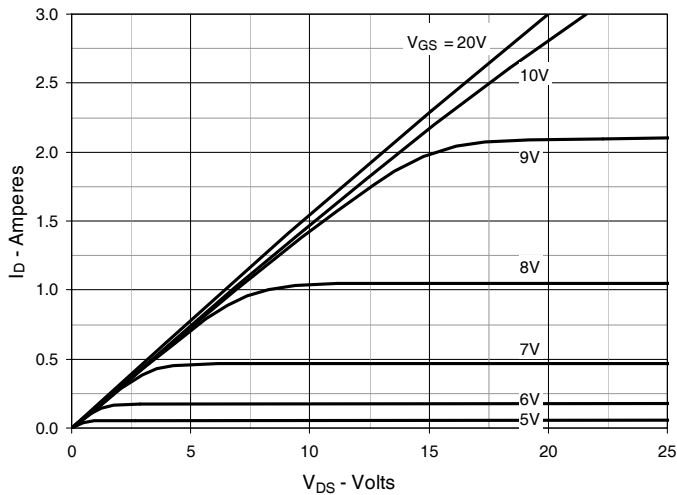
### PLUS 247™ Outline



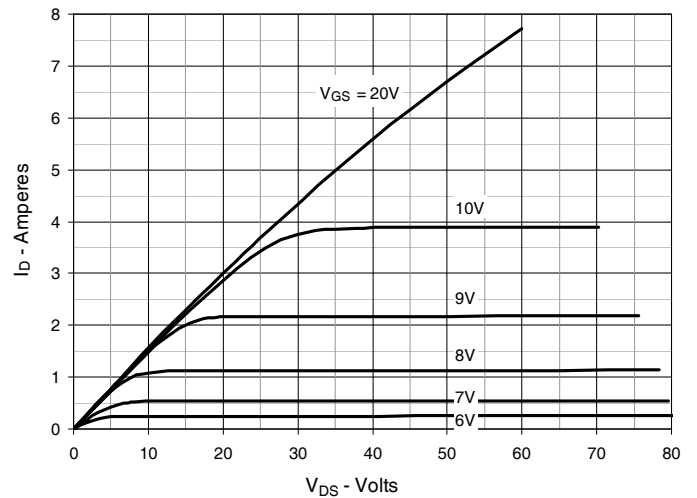
Terminals: 1 - Gate  
2,4 - Drain  
3 - Source

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b1	.075	.087	1.91	2.20
b4	.115	.126	2.92	3.20
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
D1	.650	.690	16.51	17.53
D2	.035	.050	0.89	1.27
E	.620	.635	15.75	16.13
E1	.520	.560	13.08	14.22
e	.215 BSC		5.45 BSC	
L	.780	.810	19.81	20.57
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83

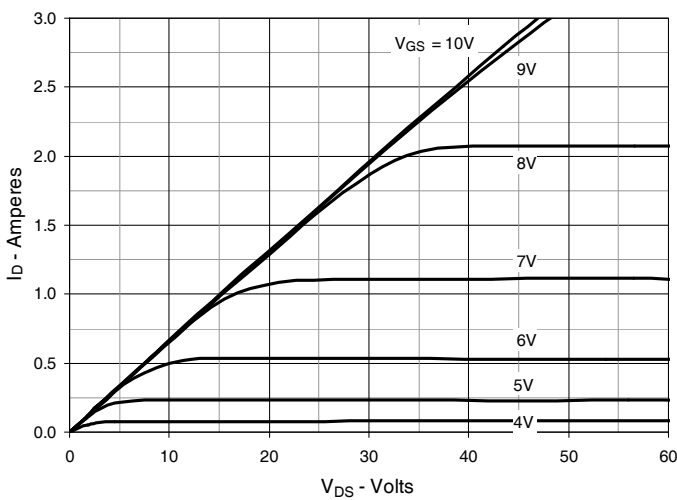
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



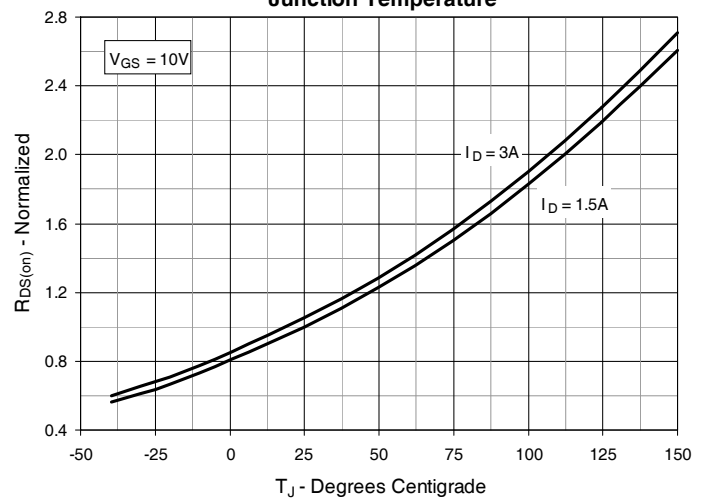
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



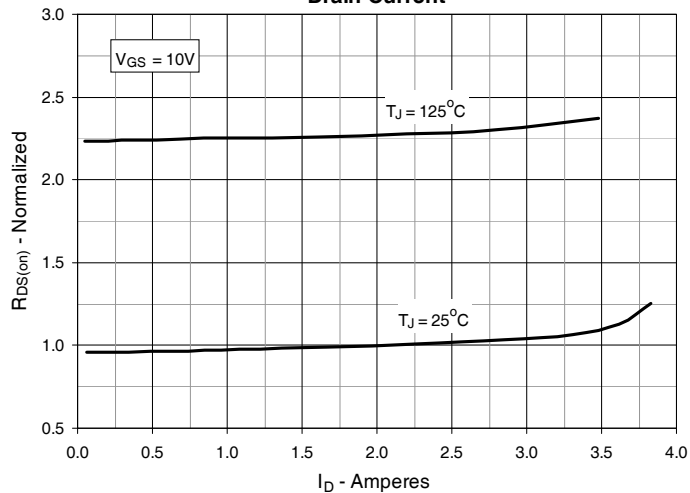
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



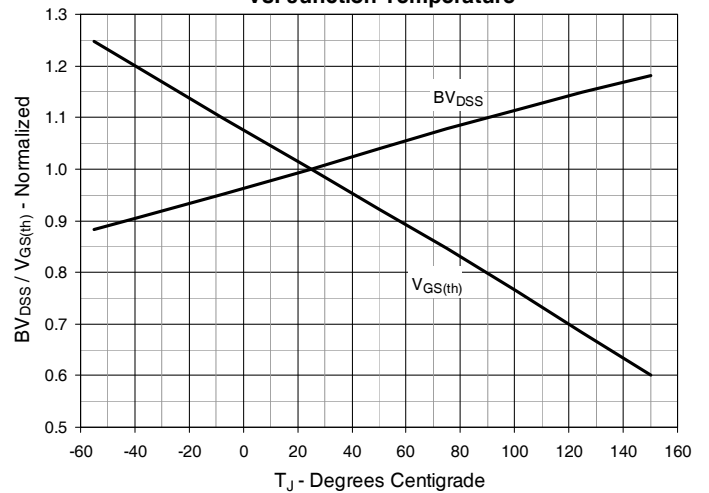
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 1.5\text{A}$  Value vs. Junction Temperature**



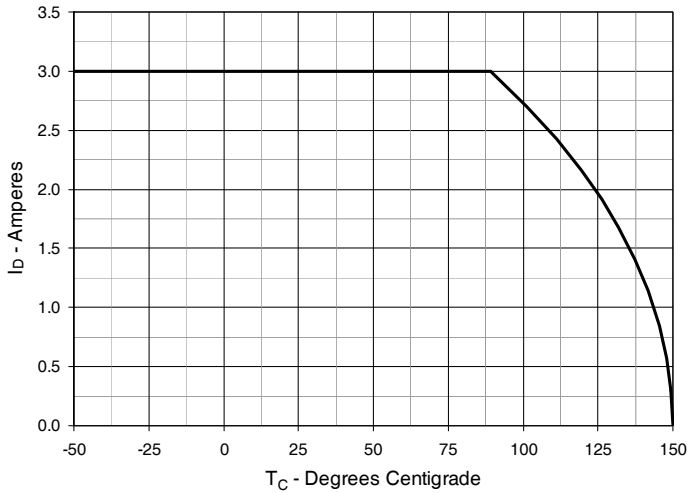
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 1.5\text{A}$  Value vs. Drain Current**



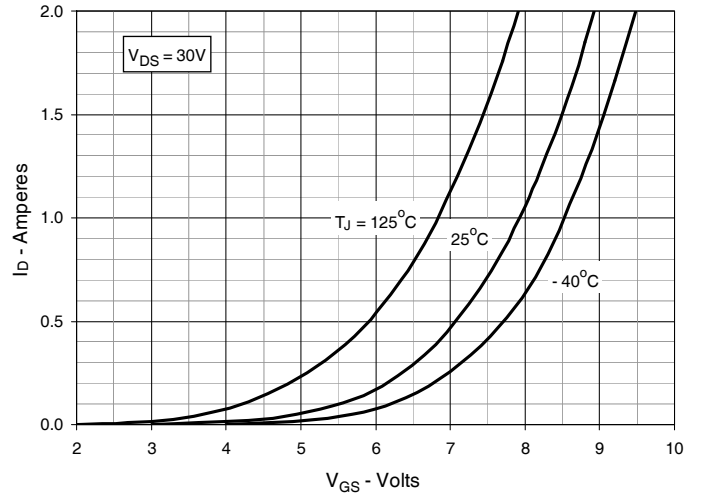
**Fig. 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature**



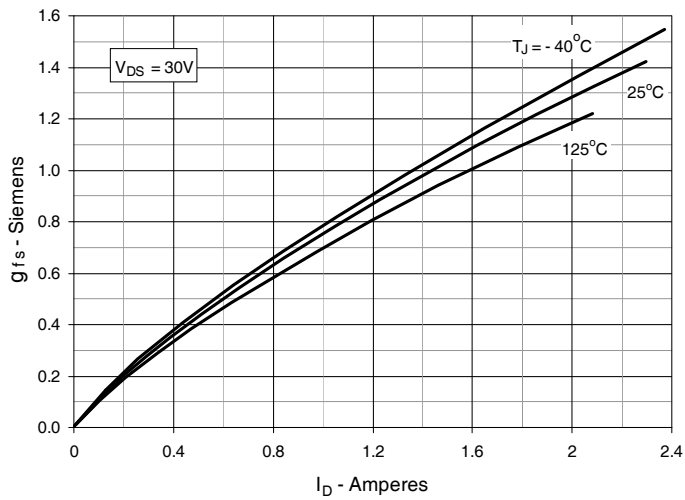
**Fig. 7. Maximum Drain Current vs. Case Temperature**



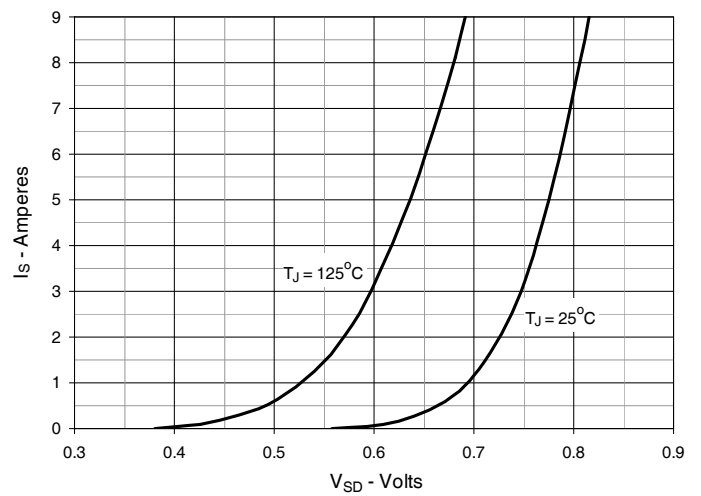
**Fig. 8. Input Admittance**



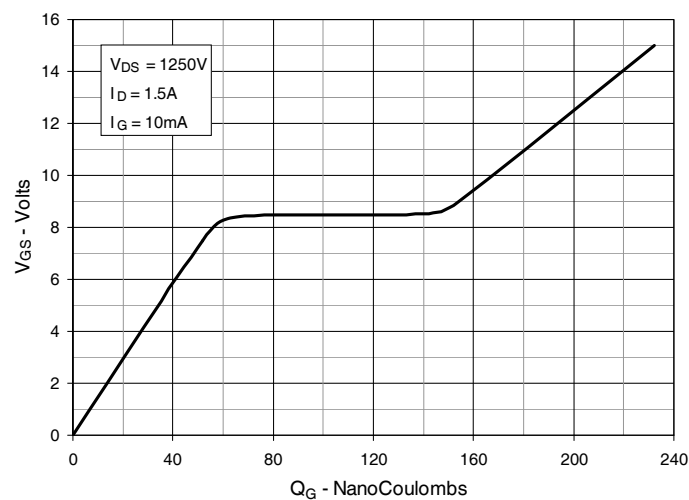
**Fig. 9. Transconductance**



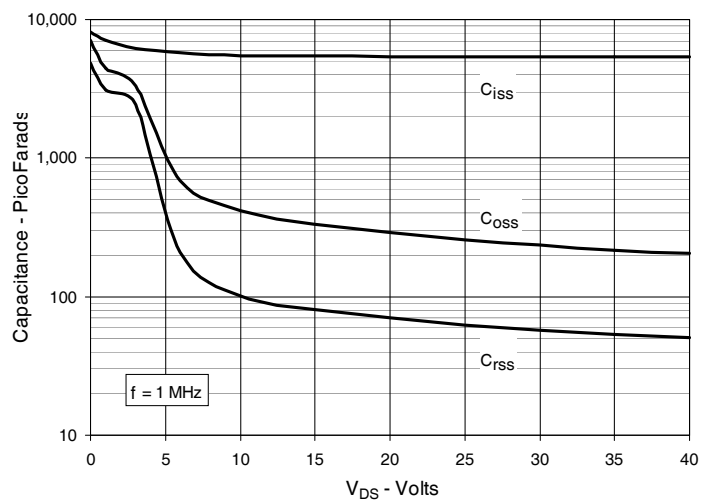
**Fig. 10. Forward Voltage Drop of Intrinsic Diode**



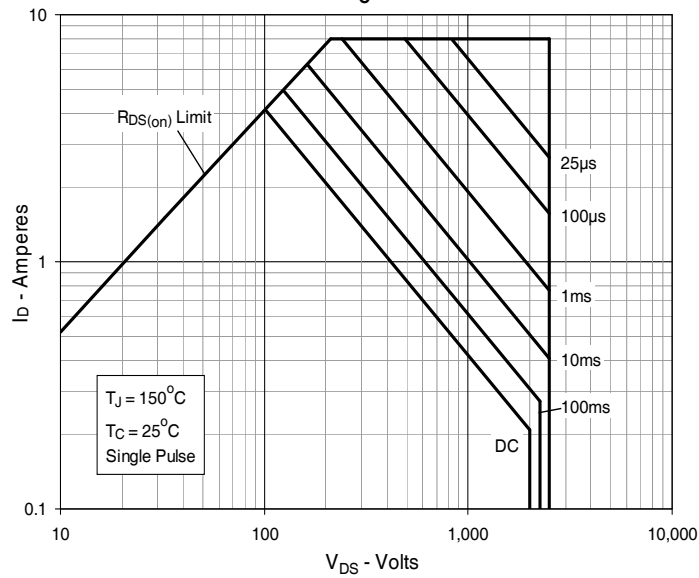
**Fig. 11. Gate Charge**



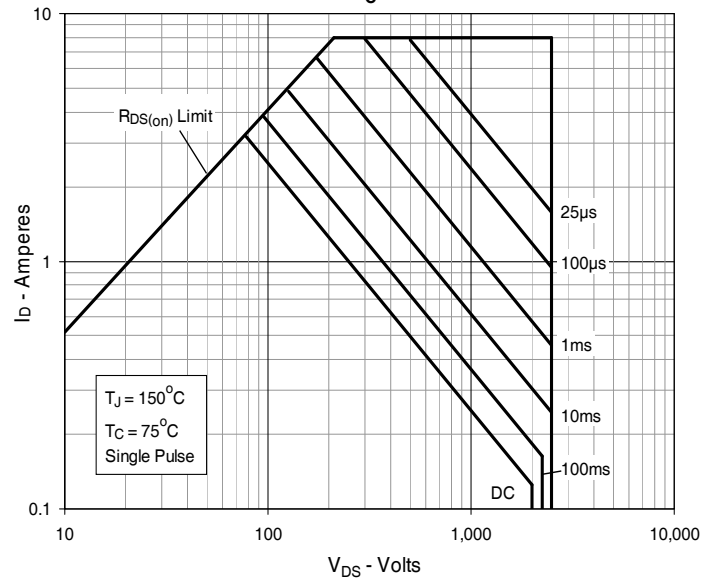
**Fig. 12. Capacitance**



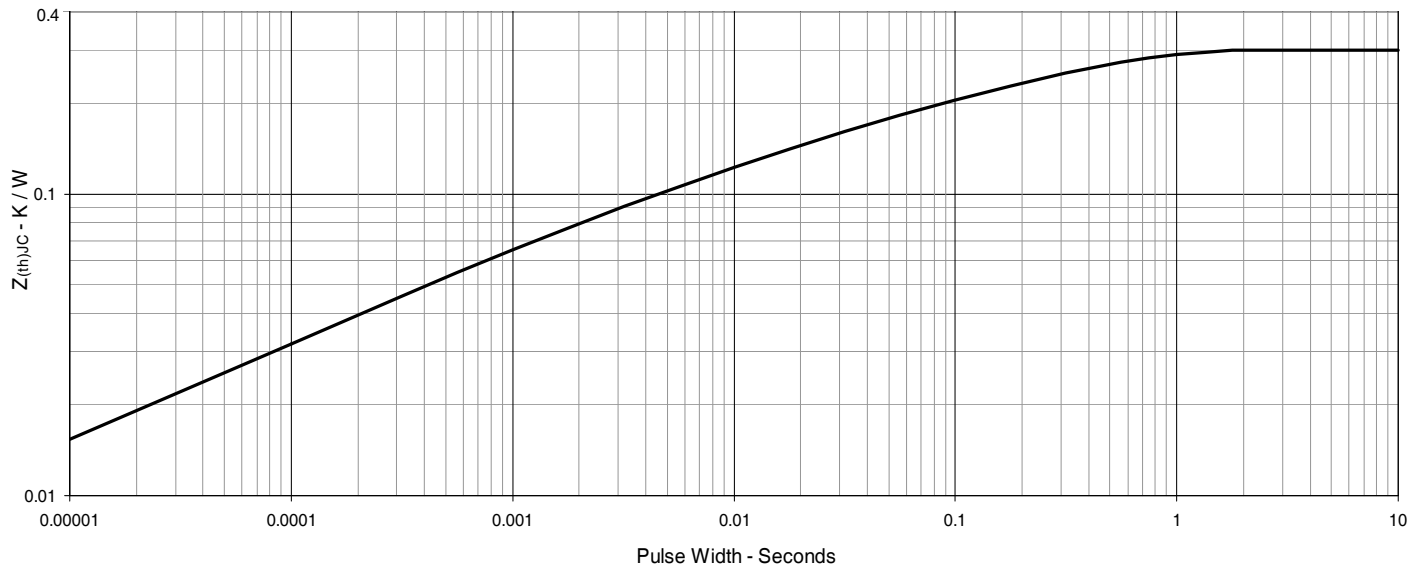
**Fig. 13. Forward-Bias Safe Operating Area**  
@  $T_C = 25^\circ\text{C}$



**Fig. 14. Forward-Bias Safe Operating Area**  
@  $T_C = 75^\circ\text{C}$



**Fig. 15. Maximum Transient Thermal Impedance**





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