

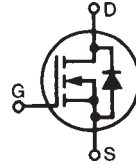
**Linear™ Power MOSFET  
w/Extended FBSOA**
**IXTK3N250L  
IXTX3N250L**

$$V_{DSS} = 2500V$$

$$I_{D25} = 3A$$

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

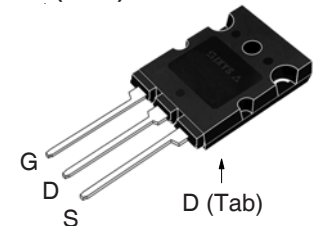
N-Channel Enhancement Mode



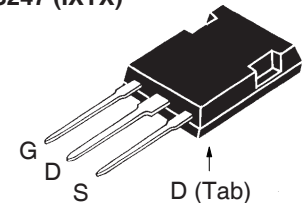
Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	2500	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ , $R_{GS} = 1M\Omega$	2500	V
$V_{GSS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	3	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , 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		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
$R_{DS(on)}$	$V_{GS} = 10V$ , $I_D = 0.5 \cdot I_{D25}$ , 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,  $d \leq 2\%$ .

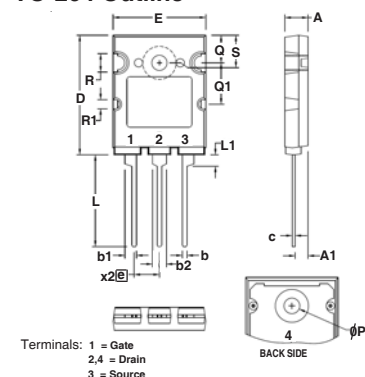
### ADVANCE TECHNICAL INFORMATION

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.

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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

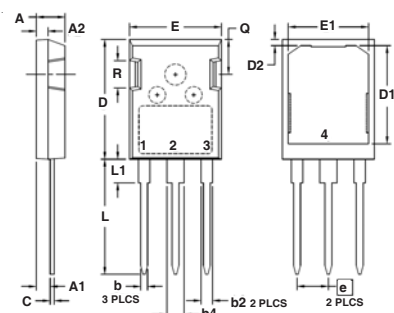
### TO-264 Outline



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

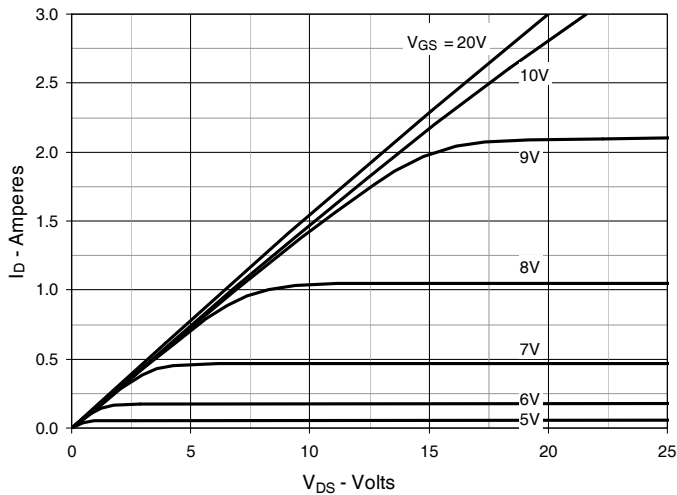
### PLUS 247™ Outline



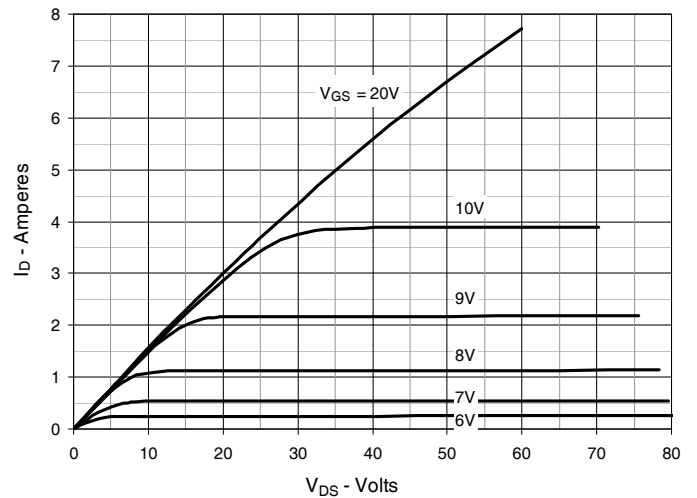
Terminals: 1 - Gate  
2,4 - Drain  
3 - Source

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
b2	.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

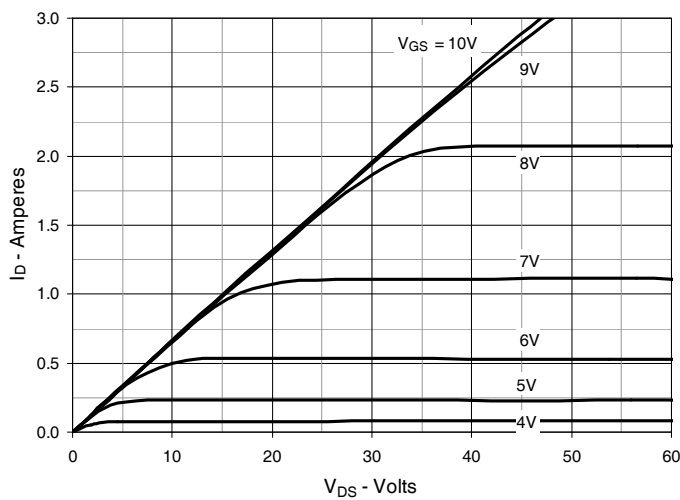
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



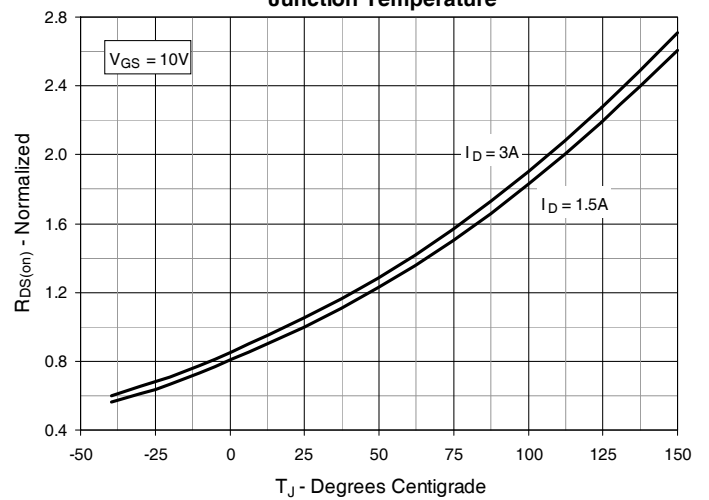
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



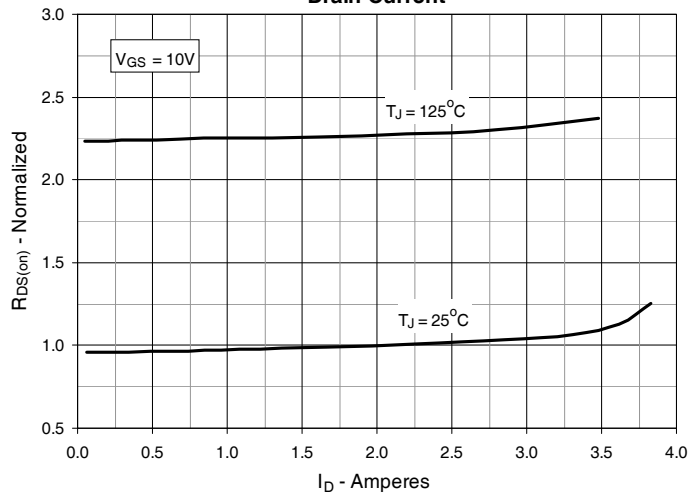
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



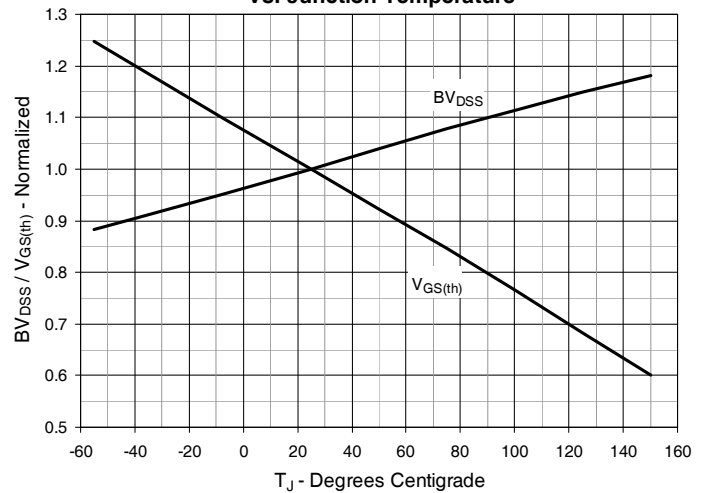
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 1.5\text{A}$  Value vs. Junction Temperature**



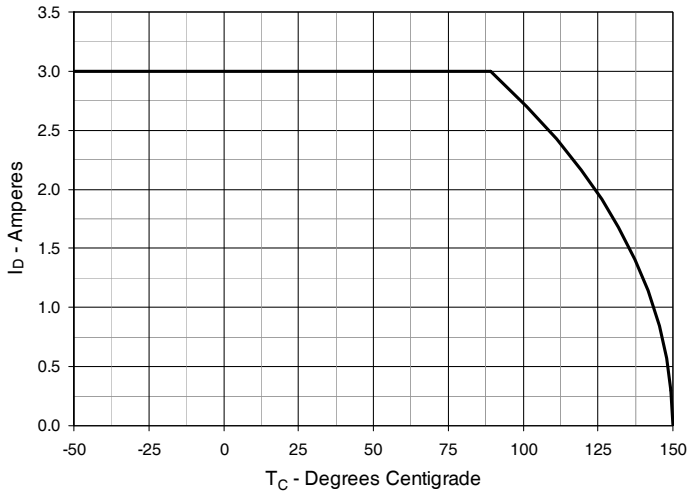
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 1.5\text{A}$  Value vs. Drain Current**



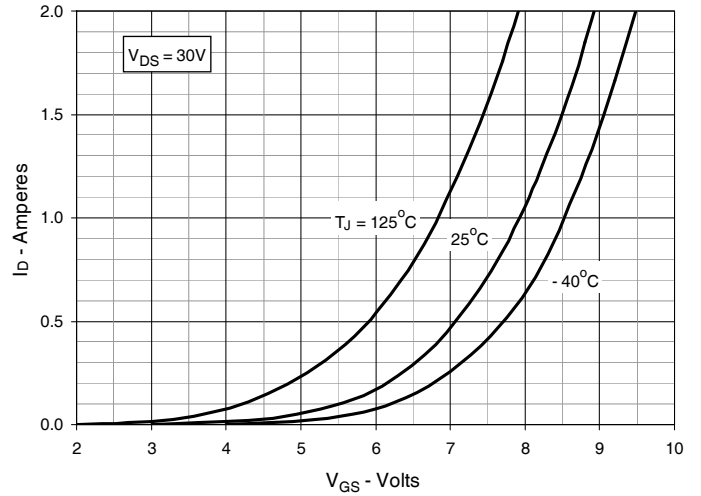
**Fig. 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature**



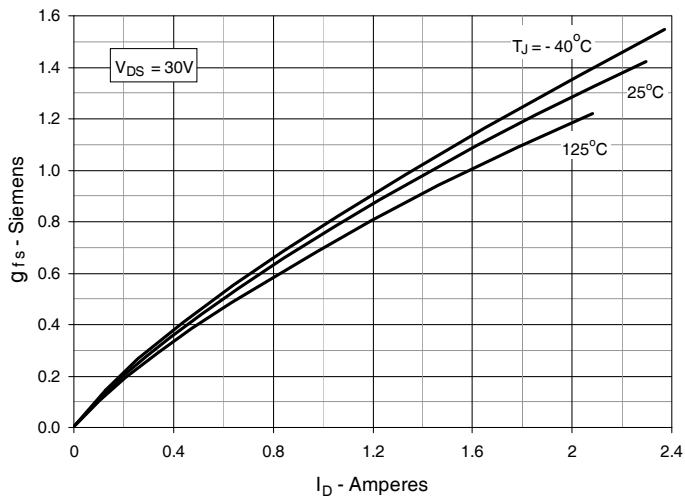
**Fig. 7. Maximum Drain Current vs. Case Temperature**



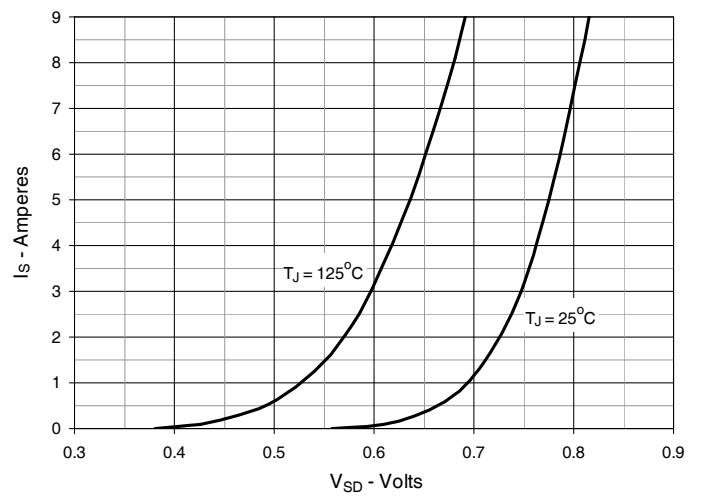
**Fig. 8. Input Admittance**



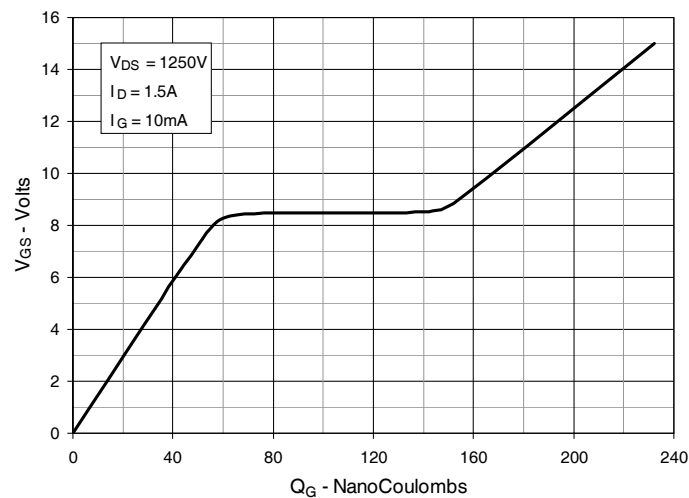
**Fig. 9. Transconductance**



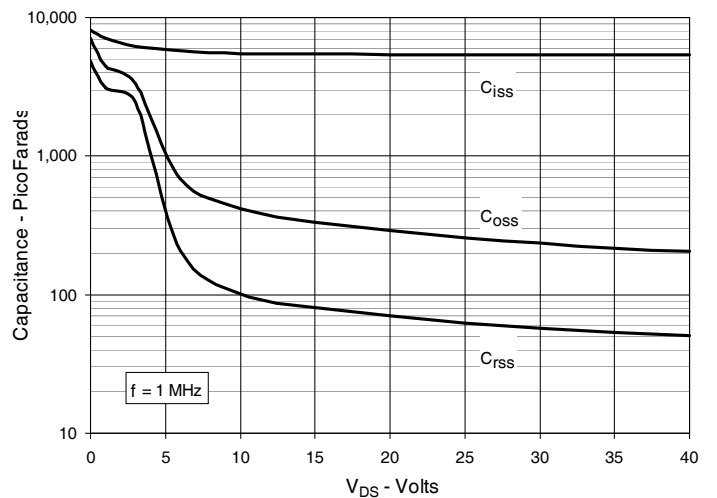
**Fig. 10. Forward Voltage Drop of Intrinsic Diode**



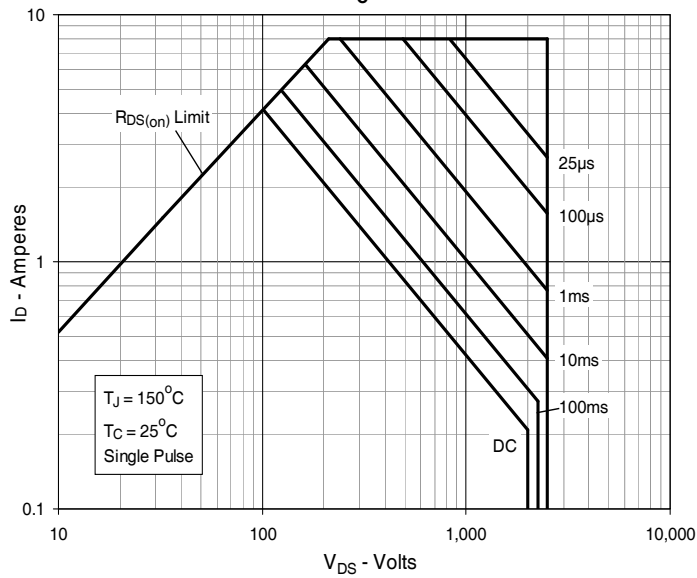
**Fig. 11. Gate Charge**



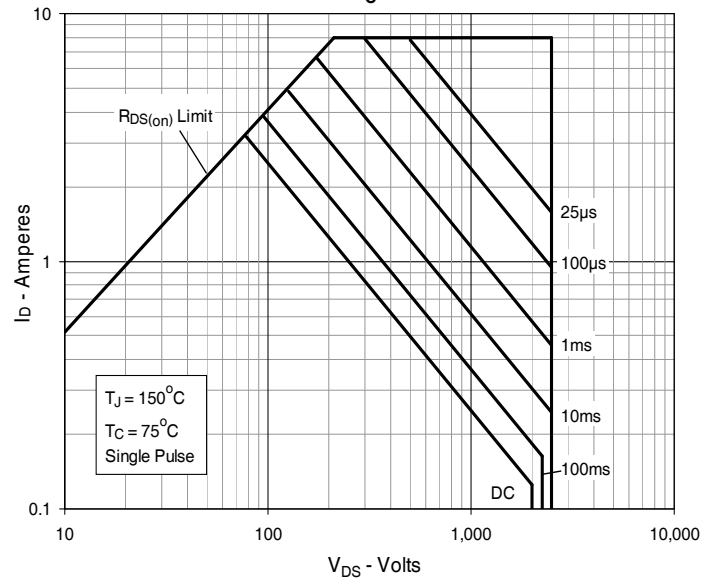
**Fig. 12. Capacitance**



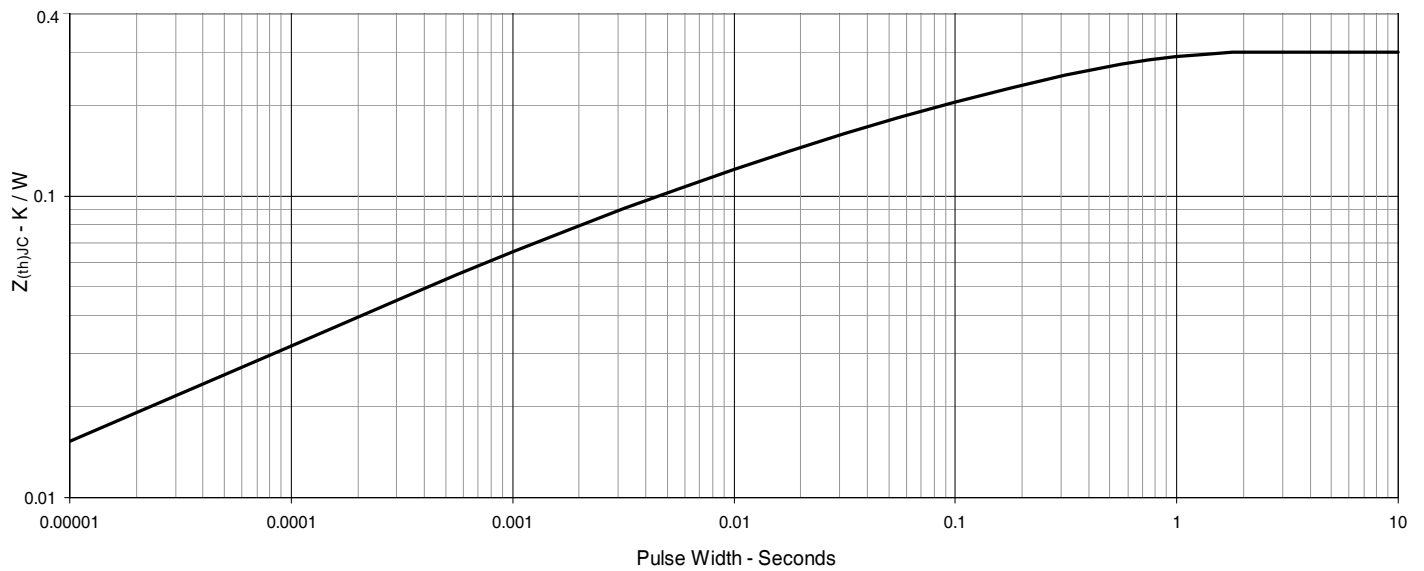
**Fig. 13. Forward-Bias Safe Operating Area**  
@  $T_C = 25^\circ\text{C}$



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



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





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