

## High Voltage Power MOSFETs

## IXTH02N250 IXTV02N250S

$$V_{DSS} = 2500V$$

$$I_{D25} = 200mA$$

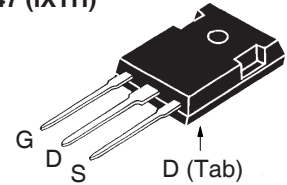
$$R_{DS(on)} \leq 450\Omega$$

N-Channel Enhancement Mode  
Fast Intrinsic Diode

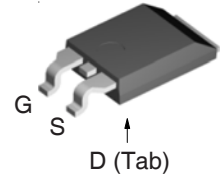


Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ C$ to $150^\circ C$	2500	V
$V_{DGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GS} = 1M\Omega$	2500	V
$V_{GSS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ C$	200	mA
$I_{DM}$	$T_C = 25^\circ C$ , Pulse Width Limited by $T_{JM}$	600	mA
$P_D$	$T_C = 25^\circ C$	83	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
$F_C$	Mounting Force (PLUS220)	11..65 / 25..14.6	N/lb.
Weight	TO-247	6	g
	PLUS220	4	g

TO-247 (IXTH)



PLUS220SMD (IXTV\_S)



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

### Features

- Fast Intrinsic Diode
- Low Package Inductance

### Advantages

- Easy to Mount
- Space Savings

### Applications

- High Voltage Power Supplies
- Capacitor Discharge
- Pulse Circuits

Symbol	Test Conditions ( $T_J = 25^\circ C$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0V$ , $I_D = 250\mu A$	2500		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250\mu A$	2.5		4.5 V
$I_{GSS}$	$V_{GS} = \pm 20V$ , $V_{DS} = 0V$			$\pm 100$ nA
$I_{DSS}$	$V_{DS} = 0.8 \cdot V_{DSS}$ , $V_{GS} = 0V$ $T_J = 125^\circ C$			5 $\mu A$
				500 $\mu A$
$R_{DS(on)}$	$V_{GS} = 10V$ , $I_D = 50mA$ , Note 1			450 $\Omega$

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 100\text{V}$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1	88	145	mS
$C_{iss}$	$V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$		116	pF
$C_{oss}$			8	pF
$C_{rss}$			3	pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$ $R_G = 100\Omega$ (External)		19	ns
$t_r$			19	ns
$t_{d(off)}$			32	ns
$t_f$			33	ns
$Q_{g(on)}$	$V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$		7.4	nC
$Q_{gs}$			0.7	nC
$Q_{gd}$			5.3	nC
$R_{thJC}$			1.5	$^\circ\text{C/W}$
$R_{thCS}$		0.25		$^\circ\text{C/W}$

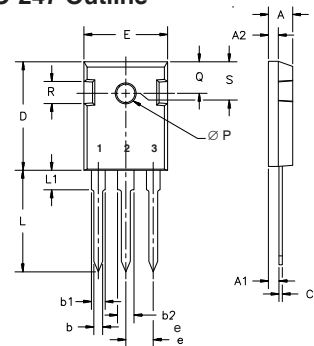
### Source-Drain Diode

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$I_S$	$V_{GS} = 0\text{V}$			200 mA
$I_{SM}$	Repetitive, Pulse Width Limited by $T_{JM}$			800 mA
$V_{SD}$	$I_F = 100\text{mA}$ , $V_{GS} = 0\text{V}$ , Note 1			2.0 V
$t_{rr}$	$I_F = 200\text{mA}$ , $-di/dt = 50\text{A}/\mu\text{s}$ , $V_R = 100\text{V}$		1.5	$\mu\text{s}$

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

\*Additional provisions for lead to lead voltage isolation are required at  $V_{DS} > 1200\text{V}$ .

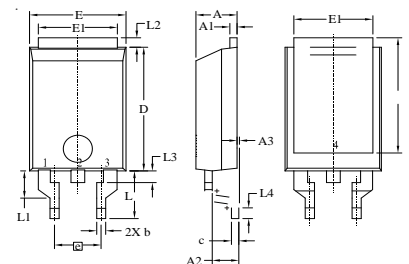
### TO-247 Outline



Terminals: 1 - Gate  
2 - Drain  
3 - Source

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	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 <sub>1</sub>		4.50		.177
ØP	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	

### PLUS220SMD Outline



1. Gate 2. Drain  
3. Source 4. Drain

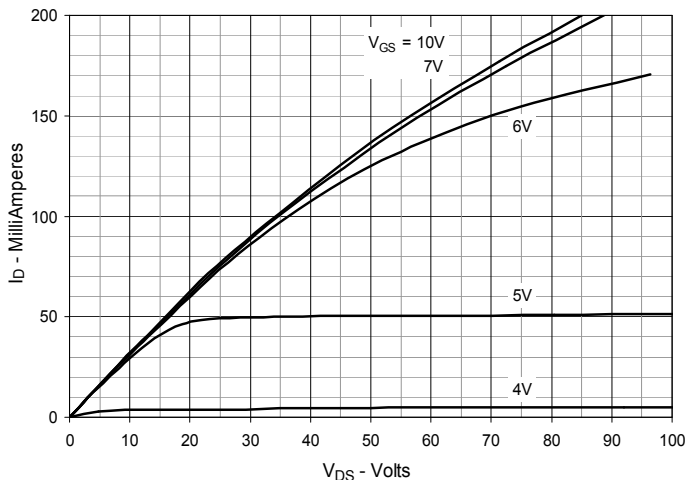
SYM	INCHES		MILLIMETER	
	MIN	MAX	MIN	MAX
A	.169	.185	4.30	4.70
A <sub>1</sub>	.028	.035	0.70	0.90
A <sub>2</sub>	.098	.118	2.50	3.00
A <sub>3</sub>	.000	.010	0.00	0.25
b	.035	.047	0.90	1.20
b <sub>1</sub>	.080	.095	2.03	2.41
b <sub>2</sub>	.054	.064	1.37	1.63
c	.028	.035	0.70	0.90
D	.551	.591	14.00	15.00
D <sub>1</sub>	.512	.539	13.00	13.70
E	.394	.433	10.00	11.00
E <sub>1</sub>	.331	.346	8.40	8.80
e	.200BSC		5.08 BSC	
L	.209	.228	5.30	5.80
L <sub>1</sub>	.118	.138	3.00	3.50
L <sub>2</sub>	.035	.051	0.90	1.30
L <sub>3</sub>	.045	.053	1.25	1.35
L <sub>4</sub>	.039	.059	1.00	1.50

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

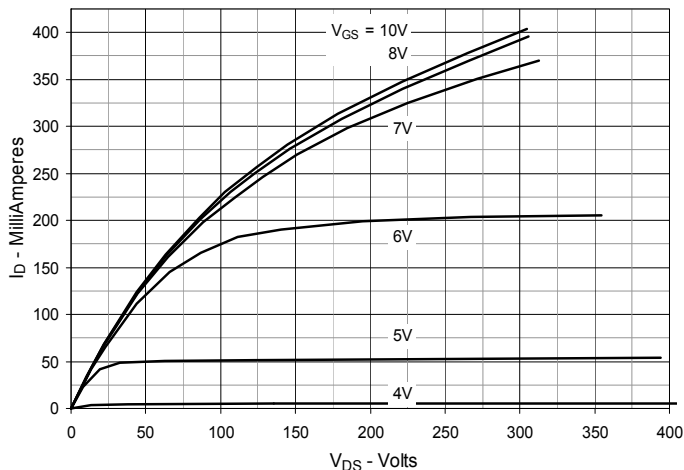
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

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	

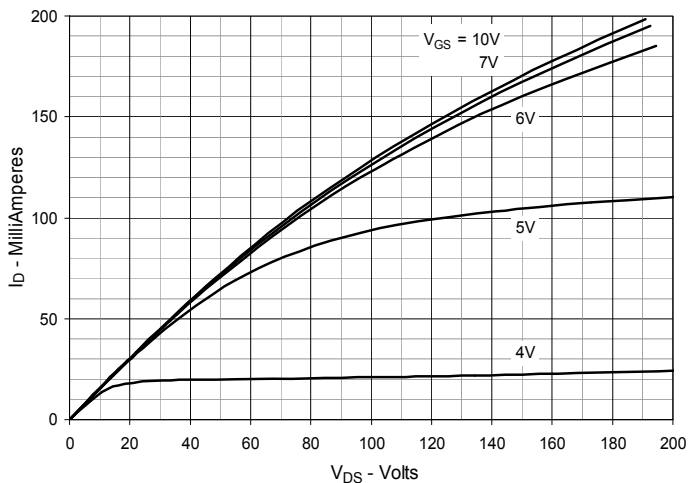
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



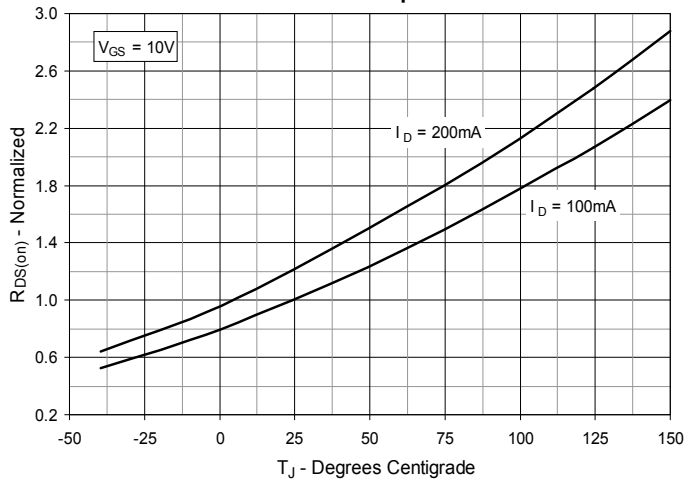
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



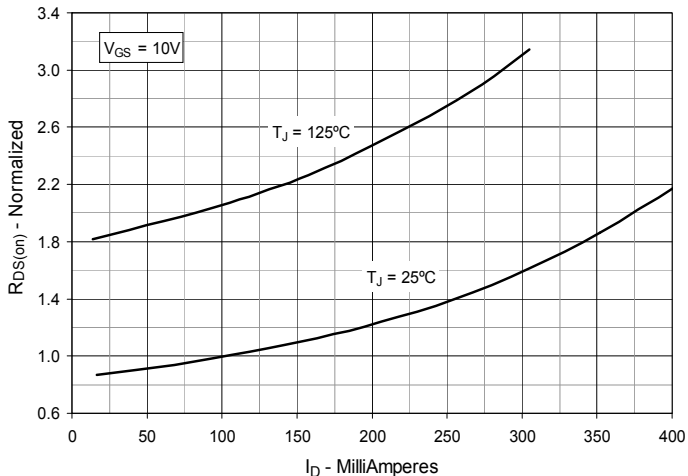
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



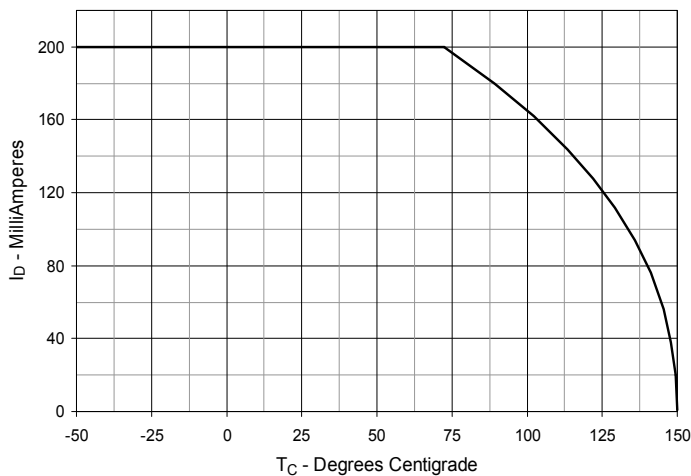
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 100\text{mA}$  Value vs. Junction Temperature**



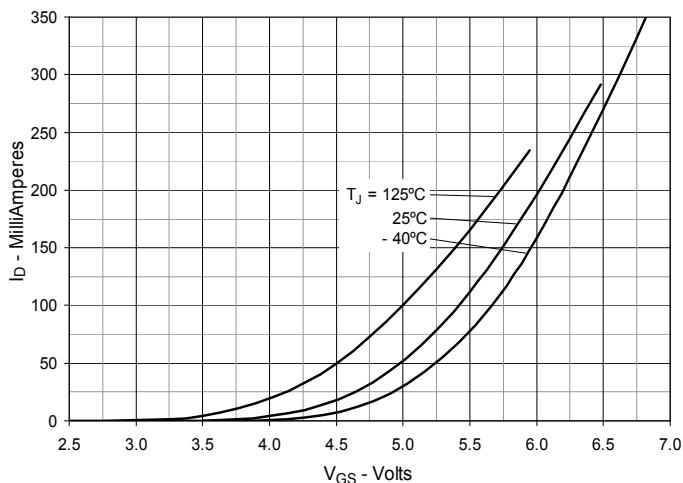
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 100\text{mA}$  Value vs. Drain Current**



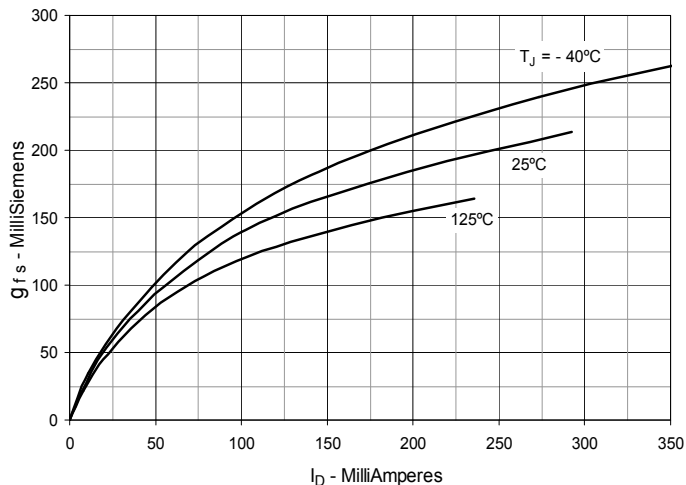
**Fig. 6. Maximum Drain Current vs. Case Temperature**



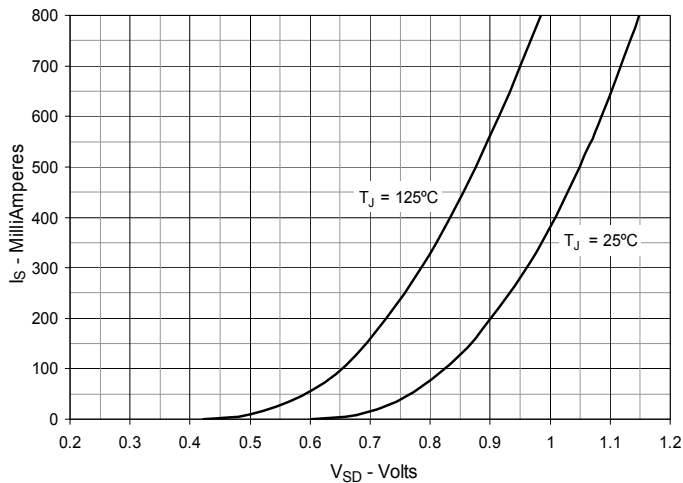
**Fig. 7. Input Admittance**



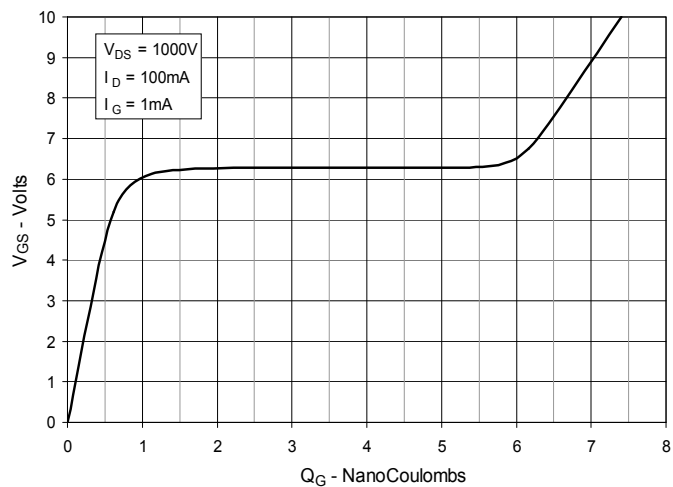
**Fig. 8. Transconductance**



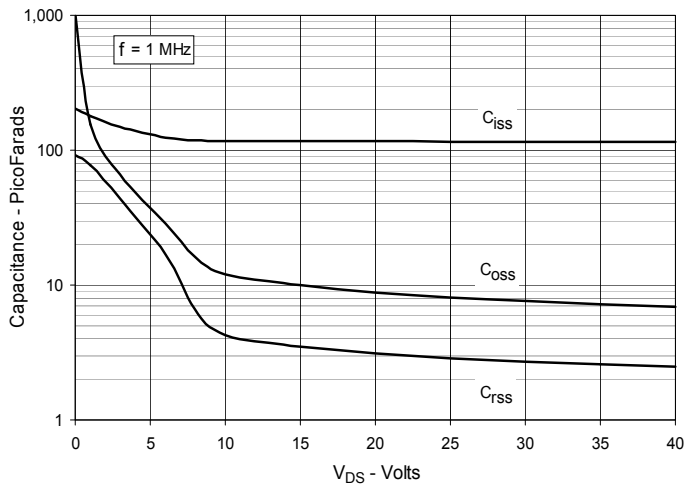
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



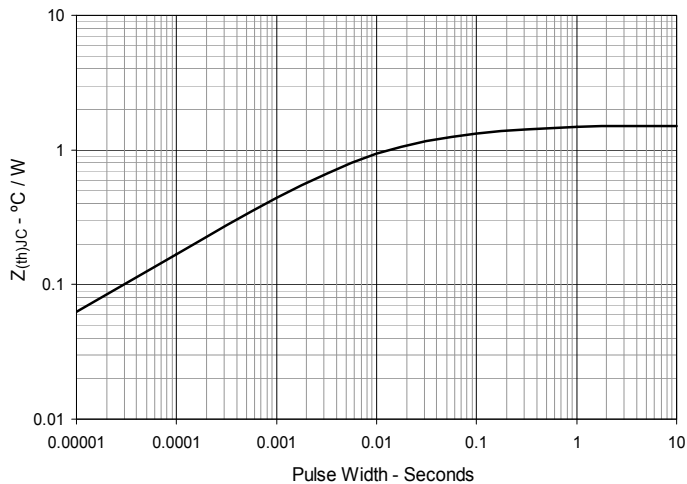
**Fig. 10. Gate Charge**



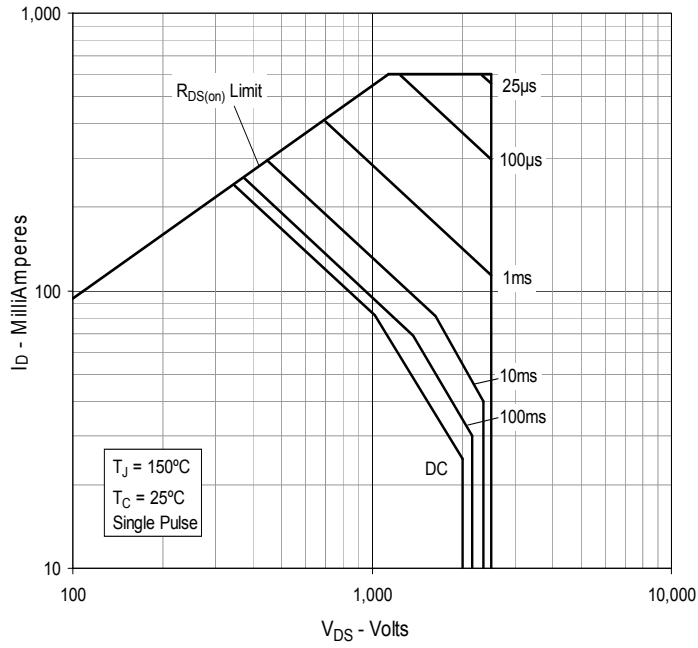
**Fig. 11. Capacitance**



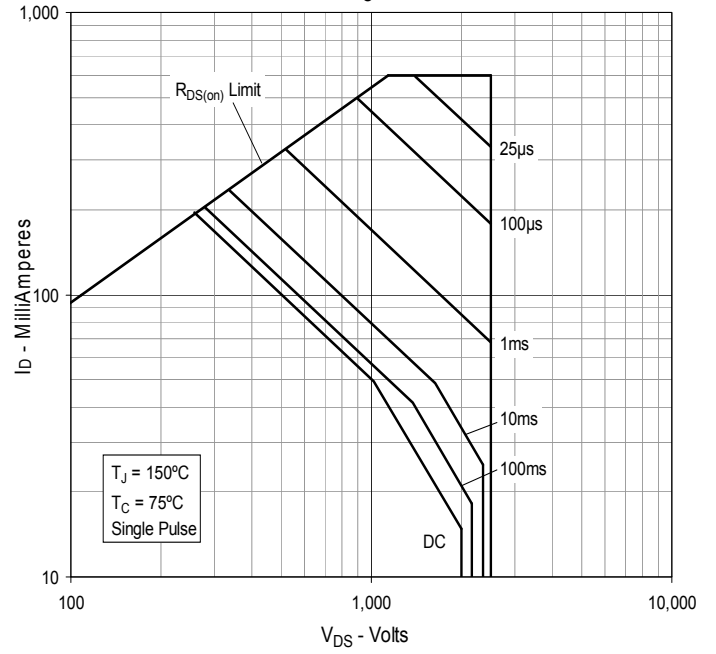
**Fig. 12. Maximum Transient Thermal Impedance**



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



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





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