

# High Voltage MOSFETs

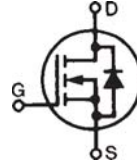
## IXTH10N100D IXTT10N100D

$$V_{DSX} = 1000V$$

$$I_{D25} = 10A$$

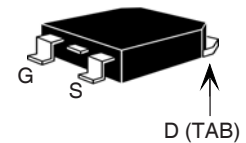
$$R_{DS(on)} \leq 1.4\Omega$$

### N-Channel, Depletion Mode

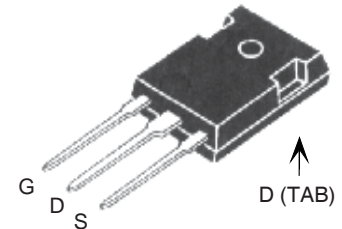


Symbol	Test Conditions	Maximum Ratings	
$V_{DSX}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	1000	V
$V_{DGX}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ , $R_{GS} = 1M\Omega$	1000	V
$V_{GSX}$	Continuous	$\pm 30$	V
$V_{GSM}$	Transient	$\pm 40$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	10	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$	20	A
$P_D$	$T_C = 25^\circ\text{C}$	400	W
$T_J$		- 55 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		- 55 ... +150	$^\circ\text{C}$
$T_L$	1.6mm (0.062 in.) from Case for 10s	300	$^\circ\text{C}$
$T_{SOLD}$	Plastic Body for 10s	260	$^\circ\text{C}$
$M_d$	Mounting Torque (TO-247)	1.13 / 10	Nm/lb.in.
Weight	TO-268	4.0	g
	TO-247	6.0	g

TO-268 (IXTT)



TO-247 (IXTH)



G = Gate      D = Drain  
S = Source      TAB = Drain

### Features

- Normally ON Mode
- International Standard Packages
- Molding Epoxies meet UL 94 V-0 Flammability Classification

### Advantages

- Easy to Mount
- Space Savings
- High Power Density

### Applications

- Level Shifting
- Triggers
- Solid State Relays
- Current Regulators
- Active Load

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSX}$	$V_{GS} = -10V$ , $I_D = 250\mu\text{A}$	1000		V
$V_{GS(off)}$	$V_{DS} = 25V$ , $I_D = 250\mu\text{A}$	-1.5		V
$I_{GSS}$	$V_{GS} = \pm 30V$ , $V_{DS} = 0V$			$\pm 100$ nA
$I_{DSS}$	$V_{DS} = V_{DSX}$ , $V_{GS} = -10V$ $T_J = 125^\circ\text{C}$			25 $\mu\text{A}$
				500 $\mu\text{A}$
$R_{DS(on)}$	$V_{GS} = 10V$ , $I_D = 10A$ , Note 1			1.4 $\Omega$
$I_{D(on)}$	$V_{GS} = 0V$ , $V_{DS} = 25V$ , Note 1		1.0	A

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 30\text{V}$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1	3.0	5.4	S
$C_{iss}$	$V_{GS} = -10\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$		2500	pF
$C_{oss}$			300	pF
$C_{rss}$			100	pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = -10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSX}$ , $I_D = 0.5 \cdot I_{D25}$ $R_G = 4.7\Omega$ (External)		35	ns
$t_r$			85	ns
$t_{d(off)}$			110	ns
$t_f$			75	ns
$Q_{g(on)}$	$V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSX}$ , $I_D = 0.5 \cdot I_{D25}$		130	nC
$Q_{gs}$			27	nC
$Q_{gd}$			58	nC
$R_{thJC}$			0.31	$^\circ\text{C/W}$
$R_{thCS}$	(TO-247)	0.21		$^\circ\text{C/W}$

### Source-Drain Diode

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$V_{SD}$	$I_F = I_{D25}$ , $V_{GS} = -10\text{V}$ , Note 1		1.1	1.5 V
$t_{rr}$	$I_F = 10\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}$ , $V_{GS} = -10\text{V}$		850	ns

Note 1: Pulse Test,  $t \leq 300\mu\text{s}$ ; Duty Cycle,  $d \leq 2\%$ .

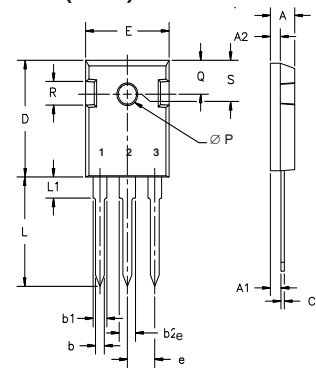
### PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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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
	4,850,072	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	

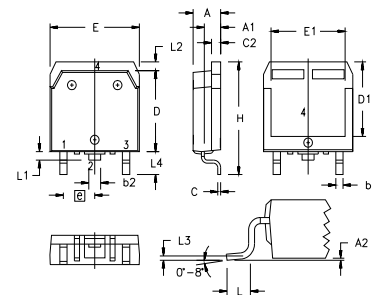
### TO-247 (IXTH) Outline



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

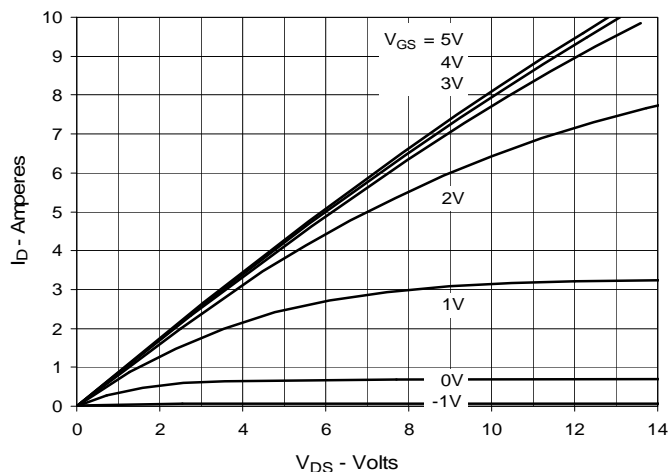
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		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 (IXTT) Outline

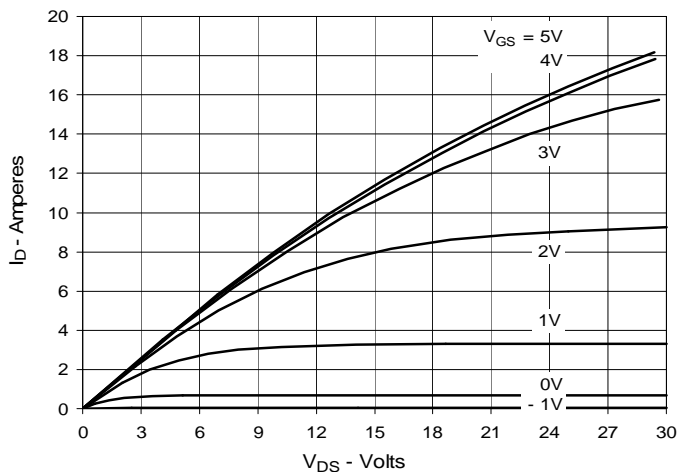


SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e		.215 BSC		5.45 BSC
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3		.010 BSC		0.25 BSC
L4	.150	.161	3.80	4.10

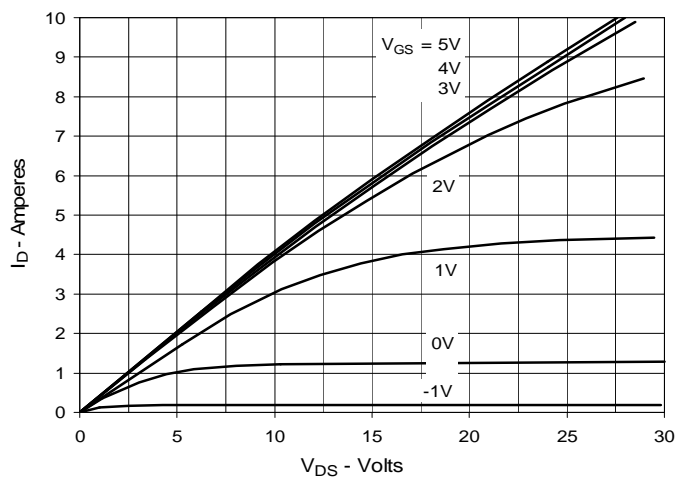
**Fig. 1. Output Characteristics @ 25°C**



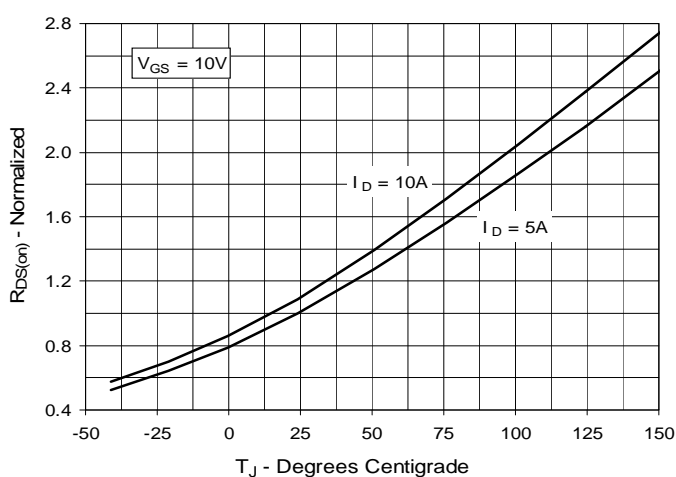
**Fig. 2. Extended Output Characteristics @ 25°C**



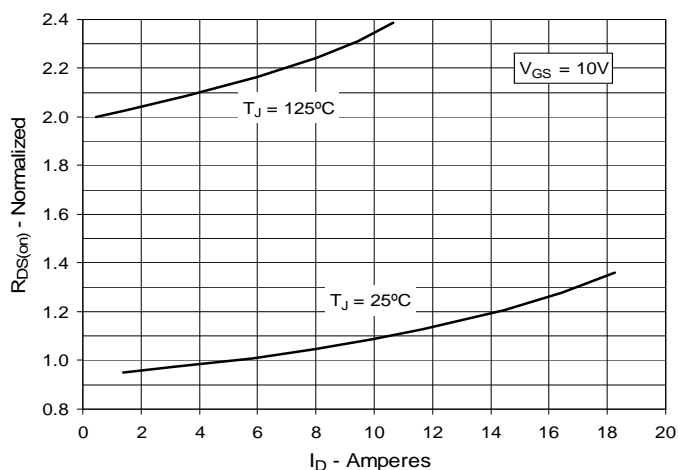
**Fig. 3. Output Characteristics @ 125°C**



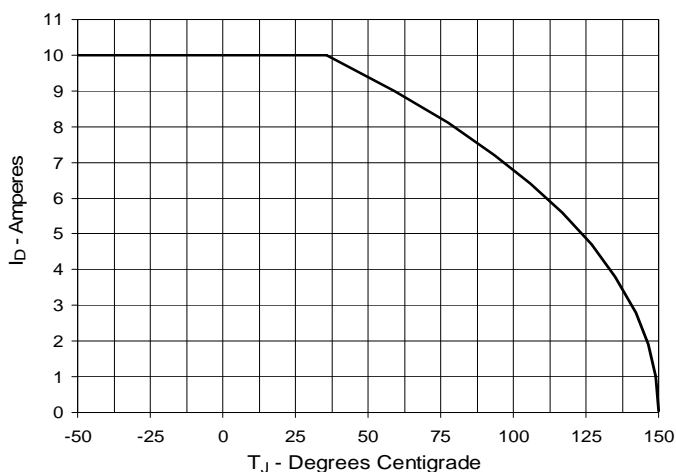
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 5A$  Value vs. Junction Temperature**



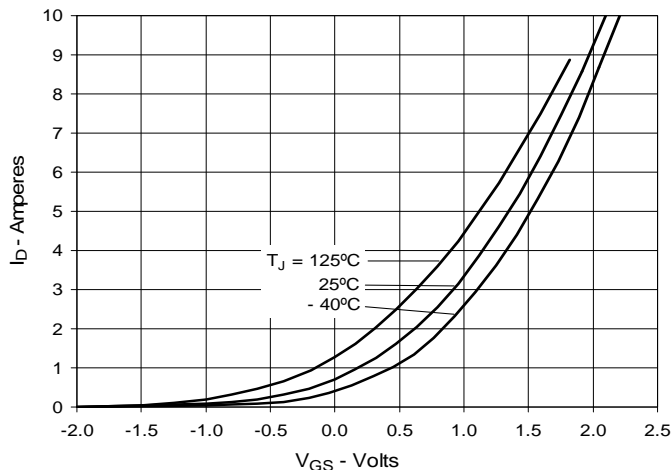
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 5A$  Value vs. Drain Current**



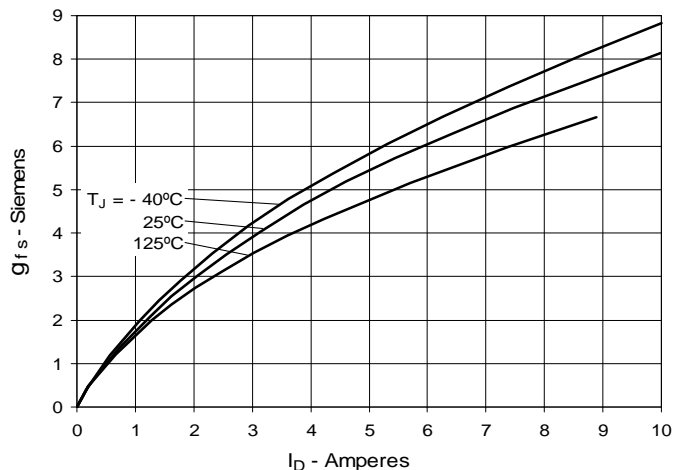
**Fig. 6. Maximum Drain Current vs. Case Temperature**



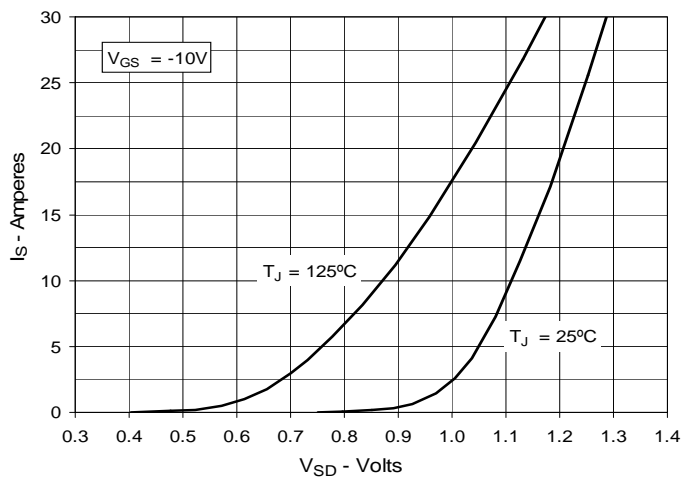
**Fig. 7. Input Admittance**



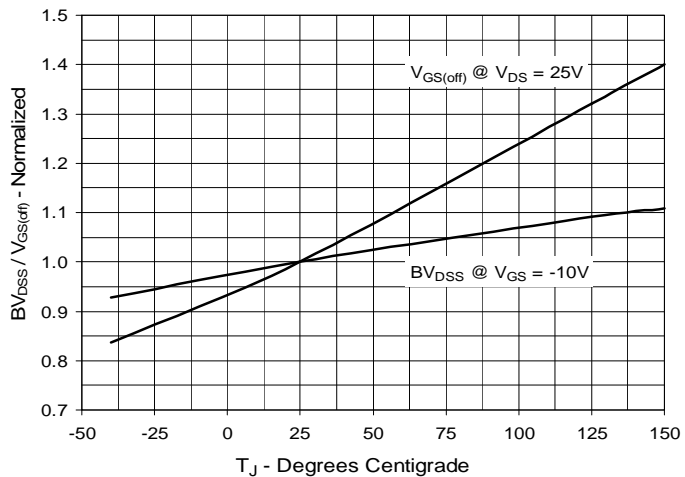
**Fig. 8. Transconductance**



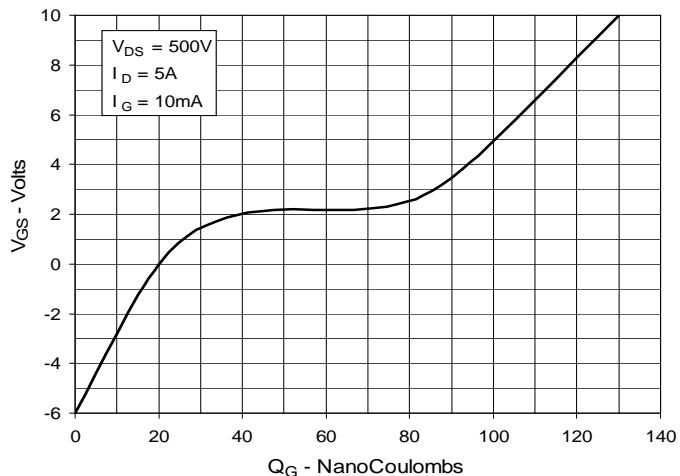
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



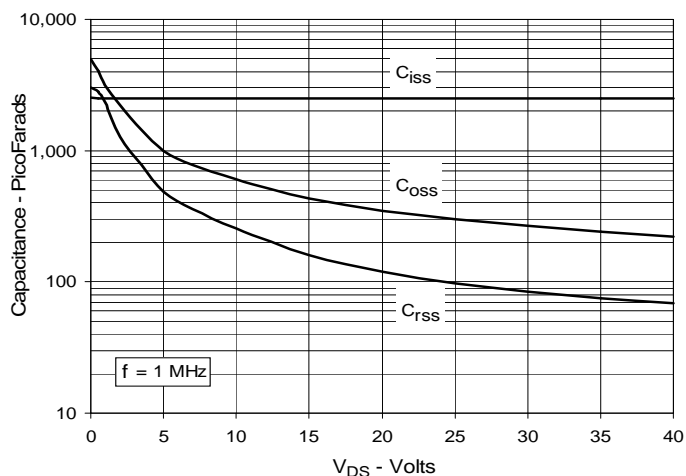
**Fig. 10. Breakdown & Threshold Voltages vs. Junction Temperature**



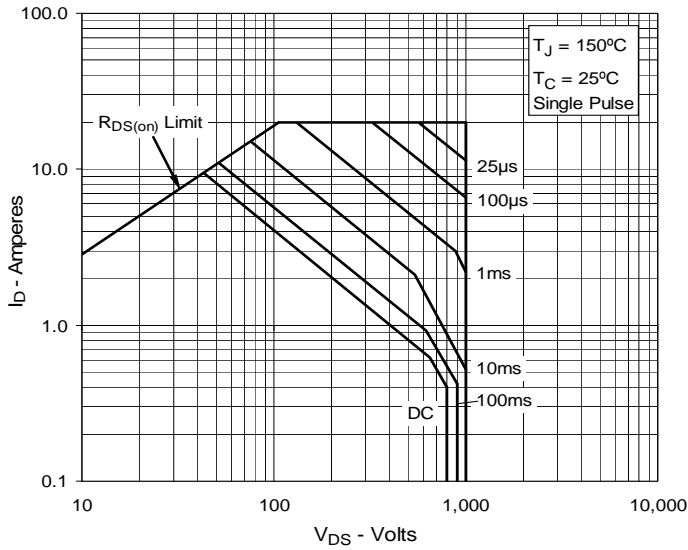
**Fig. 11. Gate Charge**



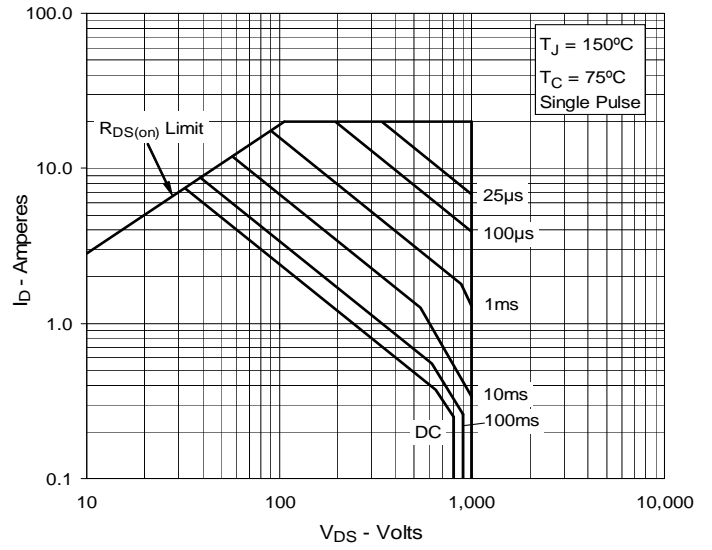
**Fig. 12. Capacitance**



**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**

