

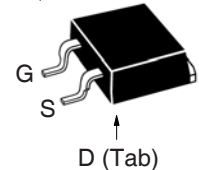
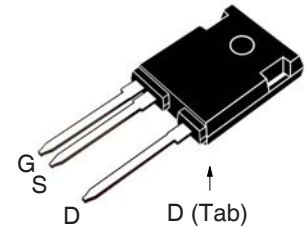
**Depletion Mode  
MOSFET**
**IXTA1N170DHV  
IXTH1N170DHV**

$$V_{DSX} = 1700V$$

$$I_{D(on)} \geq 1A$$

$$R_{DS(on)} \leq 16\Omega$$

**N-Channel**

**TO-263HV (IXTA)**

**TO-247HV (IXTH)**


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

Symbol	Test Conditions	Maximum Ratings	
$V_{DSX}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	1700	V
$V_{DGX}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ , $R_{GS} = 1M\Omega$	1700	V
$V_{GSX}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$P_D$	$T_C = 25^\circ\text{C}$	290	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	$^\circ\text{C}$
$F_C$	Mounting Force (TO-263HV)	10..65 / 22..14.6	N/lb
$M_d$	Mounting Torque (TO-247HV)	1.13/10	Nm/lb.in
<b>Weight</b>	TO-263HV	2.5	g
	TO-247HV	6.0	g

**Features**

- Normally ON Mode
- Molding Epoxies Meet UL 94 V-0 Flammability Classification

**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.
$BV_{DSX}$	$V_{GS} = -5V$ , $I_D = 250\mu\text{A}$	1700		V
$V_{GS(off)}$	$V_{DS} = 25V$ , $I_D = 250\mu\text{A}$	- 2.5		- 4.5 V
$I_{GSX}$	$V_{GS} = \pm 20V$ , $V_{DS} = 0V$			$\pm 100$ nA
$I_{DSX(off)}$	$V_{DS} = V_{DSX}$ , $V_{GS} = -5V$ $T_J = 125^\circ\text{C}$			10 $\mu\text{A}$ 100 $\mu\text{A}$
$R_{DS(on)}$	$V_{GS} = 0V$ , $I_D = 0.5A$ , Note 1			16 $\Omega$
$I_{D(on)}$	$V_{GS} = 0V$ , $V_{DS} = 50V$ , Note 1	1.0		A

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 30\text{V}$ , $I_D = 0.5\text{A}$ , Note 1	570	950	mS
$C_{iss}$	$V_{GS} = -10\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$		3090	pF
$C_{oss}$			95	pF
$C_{rss}$			30	pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = \pm 5\text{V}$ , $V_{DS} = 850\text{V}$ , $I_D = 0.5\text{A}$ $R_G = 10\Omega$ (External)		46	ns
$t_r$			38	ns
$t_{d(off)}$			130	ns
$t_f$			216	ns
$Q_{g(on)}$	$V_{GS} = \pm 5\text{V}$ , $V_{DS} = 850\text{V}$ , $I_D = 0.5\text{A}$		47	nC
$Q_{gs}$			3.7	nC
$Q_{gd}$			25	nC
$R_{thJC}$	TO-247HV			0.43 $^\circ\text{C/W}$
$R_{thCS}$			0.21	$^\circ\text{C/W}$

### Safe-Operating-Area Specification

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
SOA	$V_{DS} = 1700\text{V}$ , $I_D = 100\text{mA}$ , $T_C = 75^\circ\text{C}$ , $T_p = 5\text{s}$	170		W

### Source-Drain Diode

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$V_{SD}$	$I_F = 1\text{A}$ , $V_{GS} = -10\text{V}$ , Note 1		0.75	1.30 V
$t_{rr}$	$I_F = 1\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}$ , $V_{GS} = -10\text{V}$		2.8	$\mu\text{s}$
$I_{RM}$			45.0	A
$Q_{RM}$			63.0	$\mu\text{C}$

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

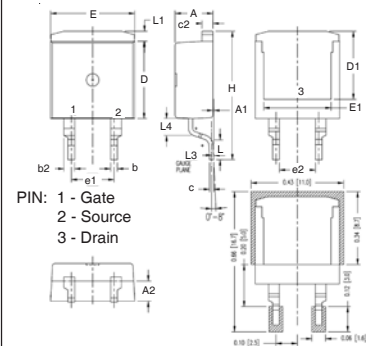
### PRELIMINARY TECHNICAL INFORMATION

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.

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

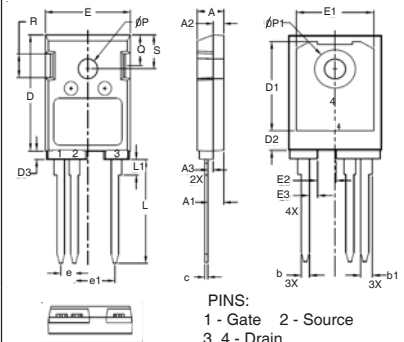
IXYS MOSFETs and IGBTs are covered 4,835,592 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585 7,005,734 B2 7,157,338B2  
by one or more of the following U.S. patents: 4,860,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692 7,063,975 B2  
4,881,106 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-263HV-2L Outline



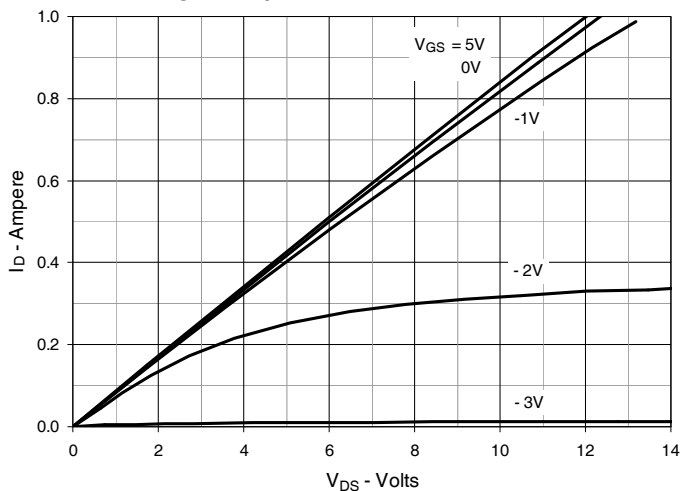
SYM	INCHES		MILLIMETER	
	MIN	MAX	MIN	MAX
A	.170	.185	4.30	4.70
A1	.000	.008	0.00	0.20
A2	.091	.098	2.30	2.50
b	.028	.035	0.70	0.90
b2	.046	.054	1.18	1.38
C	.018	.024	0.45	0.60
C2	.049	.055	1.25	1.40
D	.354	.370	9.00	9.40
D1	.311	.327	7.90	8.30
E	.386	.402	9.80	10.20
E1	.307	.323	7.80	8.20
e1	.200	BSC	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

### TO-247HV Outline

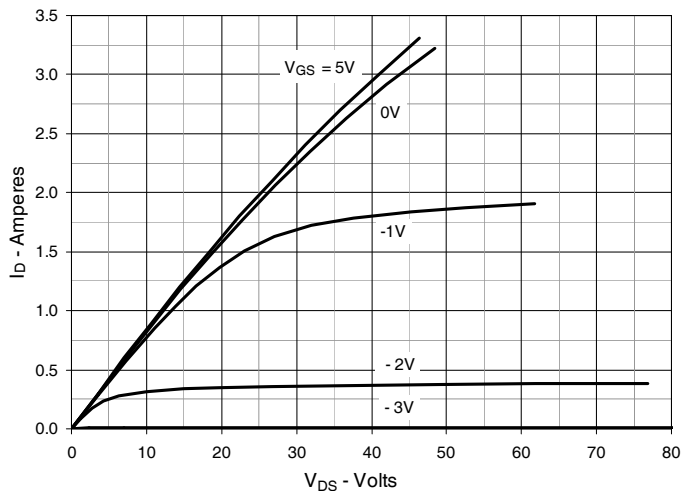


SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A1	.114	.122	2.90	3.10
A2	.075	.083	1.90	2.10
A3	.035	.043	0.90	1.10
b	.053	.059	1.35	1.50
b1	.075	.083	1.90	2.10
c	.022	.030	0.55	0.75
D	.819	.843	20.80	21.40
D1	.638	.646	16.20	16.40
D2	.134	.146	3.40	3.70
D3	.055	.063	1.40	1.60
E	.622	.638	15.80	16.20
E1	.520	.528	13.20	13.40
E2	.118	.126	3.00	3.20
E3	.051	.059	1.30	1.50
e	.100	BSC	2.54	BSC
e1	.300	BSC	7.62	BSC
L	.732	.748	18.60	19.00
L1	.106	.118	2.70	3.00
øP	.138	.142	3.50	3.60
øP1	.272	.280	6.90	7.10
Q	.216	.224	5.50	5.70
R	.165	.169	4.20	4.30
S	.240	.248	6.10	6.30

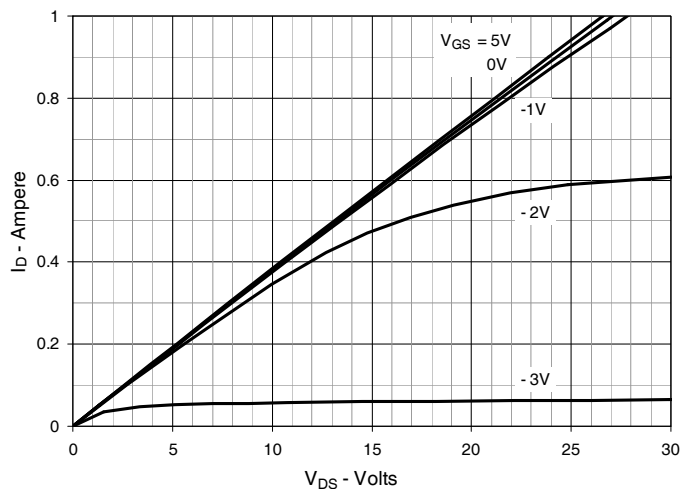
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



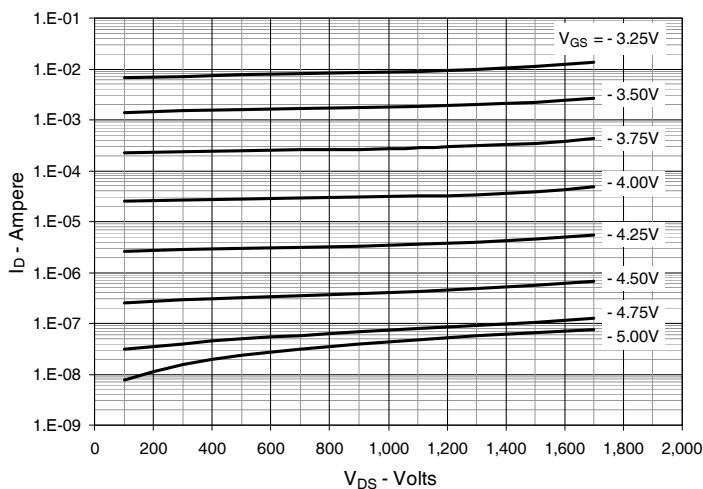
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



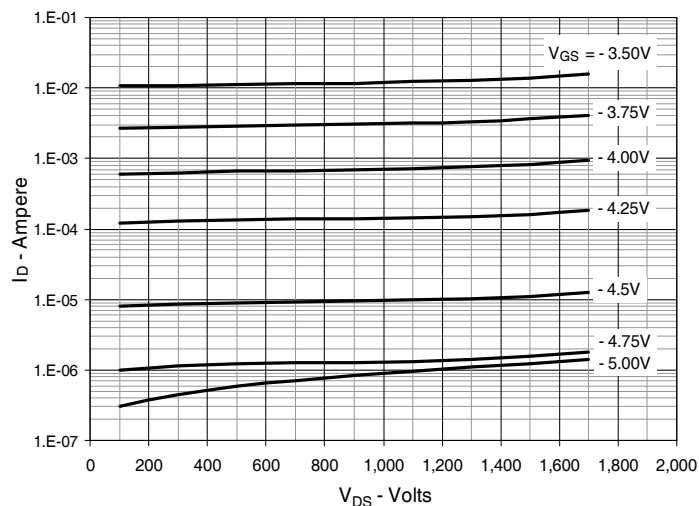
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



**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**

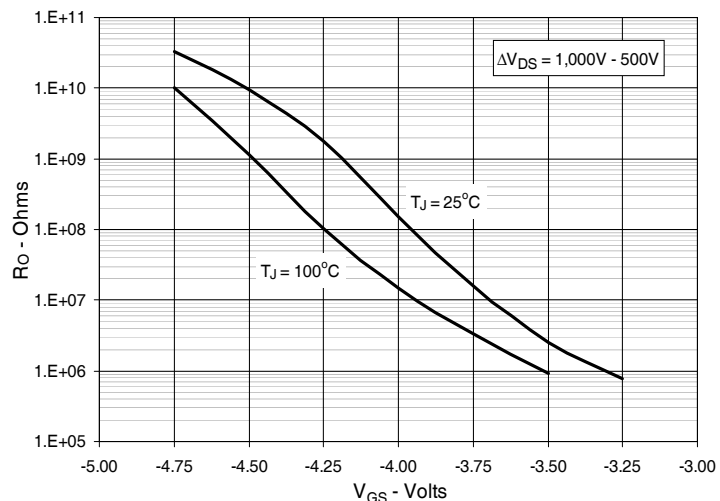


Fig. 7. Normalized  $R_{DS(on)}$  vs. Junction Temperature

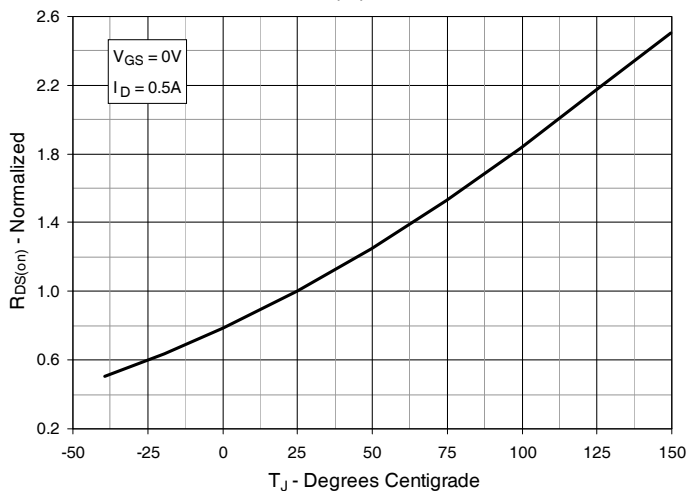


Fig. 8.  $R_{DS(on)}$  Normalized to  $I_D = 0.5A$  Value vs. Drain Current

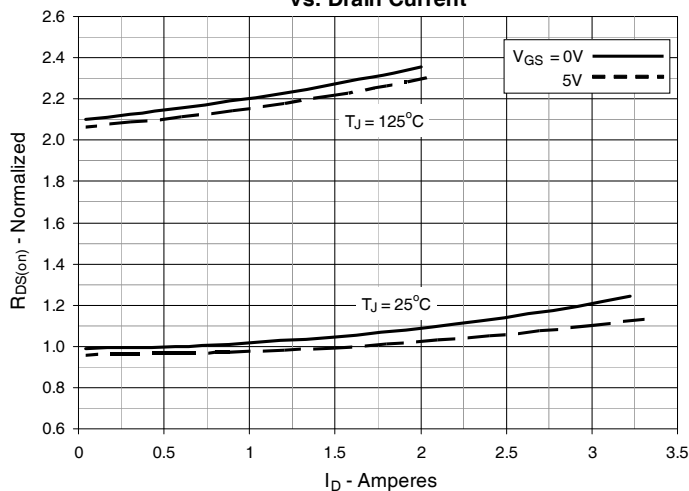


Fig. 9. Input Admittance

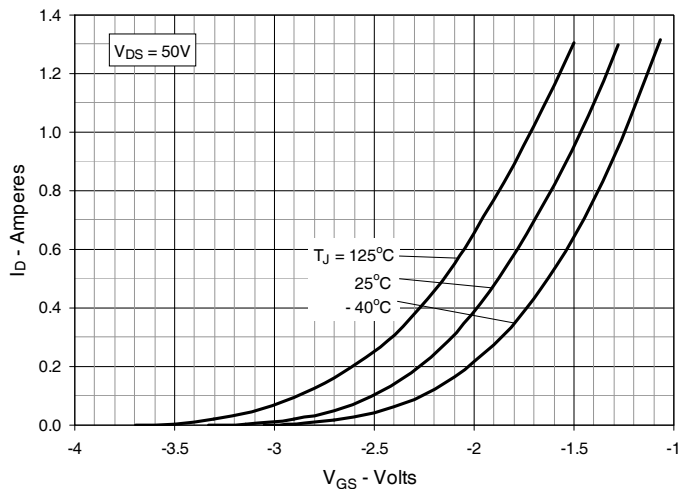


Fig. 10. Transconductance

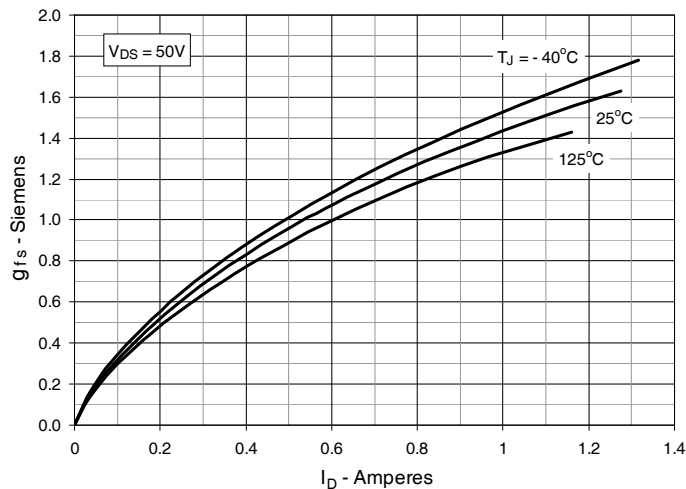


Fig. 11. Normalized Breakdown and Threshold Voltages vs. Junction Temperature

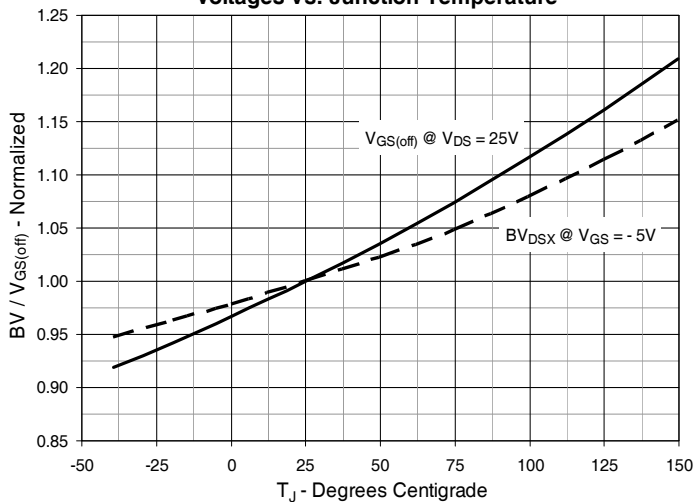
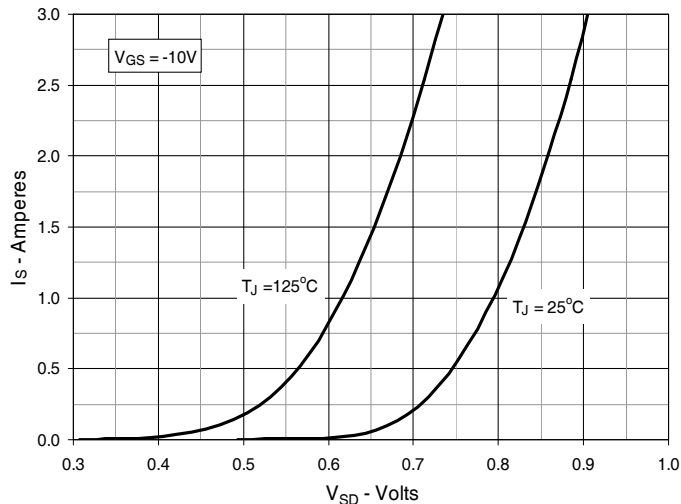
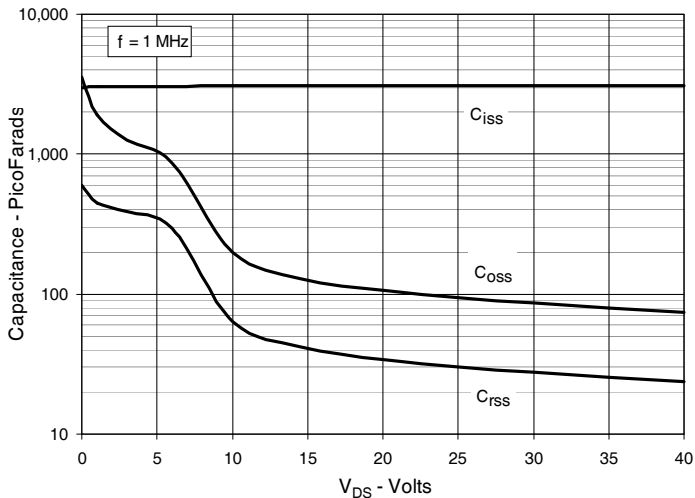


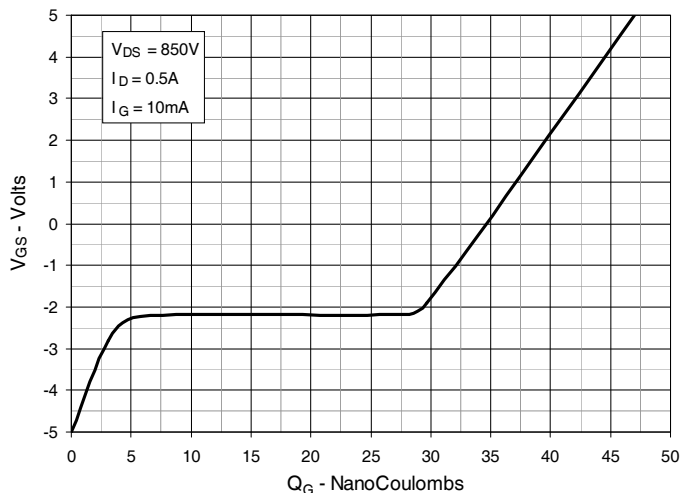
Fig. 12. Forward Voltage Drop of Intrinsic Diode



**Fig. 13. Capacitance**

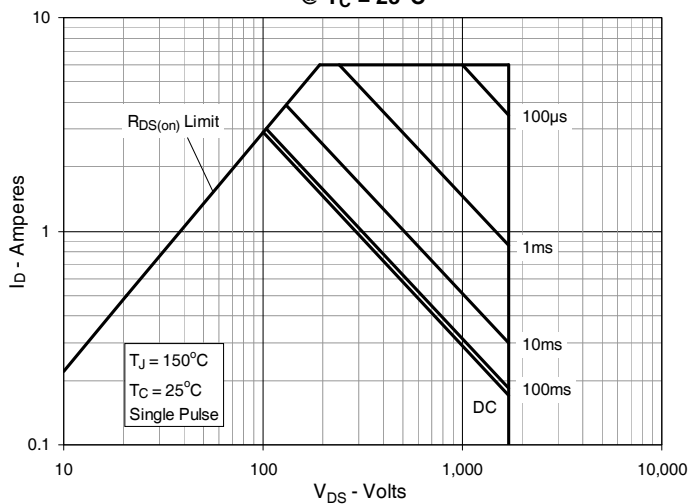


**Fig. 14. Gate Charge**



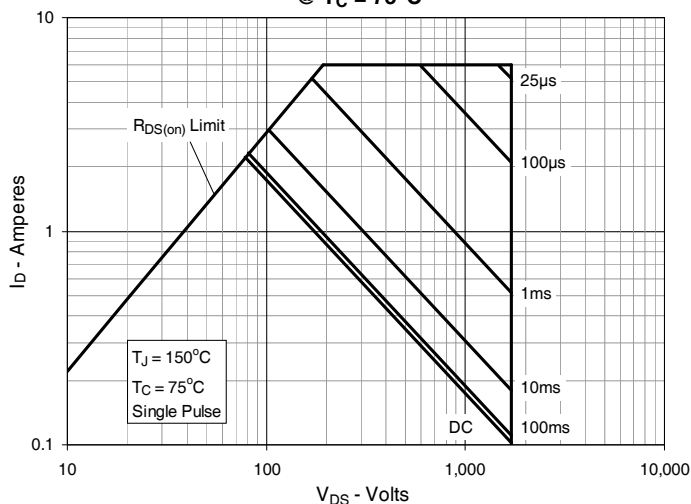
**Fig. 15. Forward-Bias Safe Operating Area @  $T_C = 25^\circ C$**

@  $T_C = 25^\circ C$

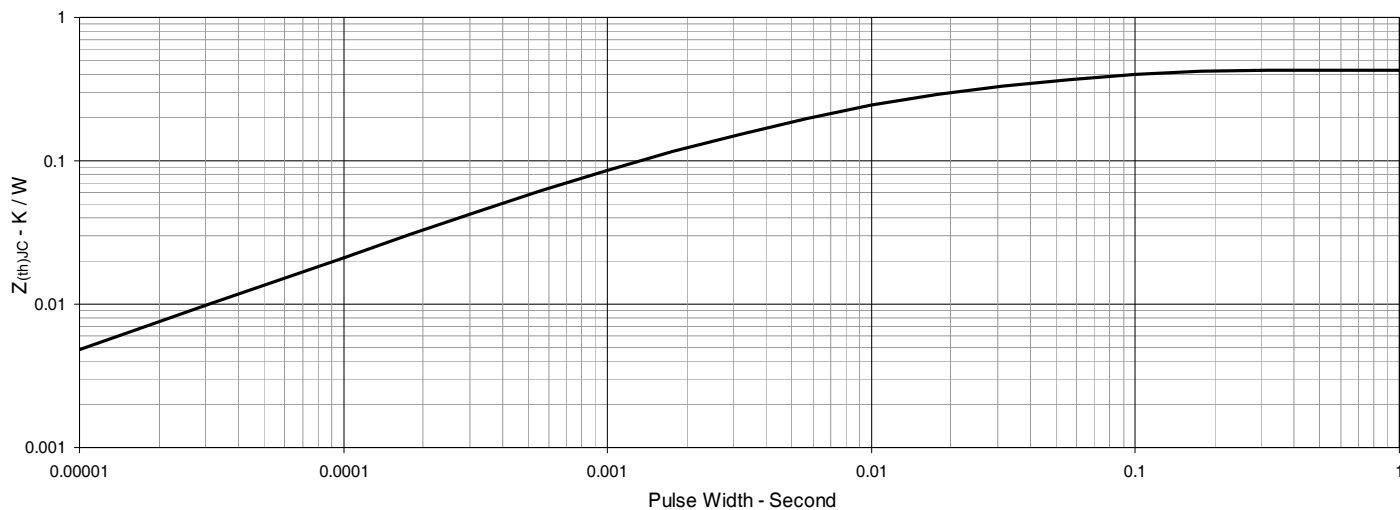


**Fig. 16. Forward-Bias Safe Operating Area @  $T_C = 75^\circ C$**

@  $T_C = 75^\circ C$



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





---

Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at [www.littelfuse.com/disclaimer-electronics](http://www.littelfuse.com/disclaimer-electronics).