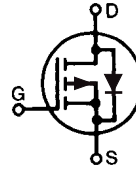


## PolarP™ Power MOSFET

P-Channel Enhancement Mode  
Avalanche Rated

**IXTA10P50P**  
**IXTH10P50P**  
**IXTP10P50P**  
**IXTQ10P50P**

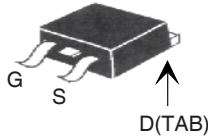


$$V_{DSS} = -500V$$

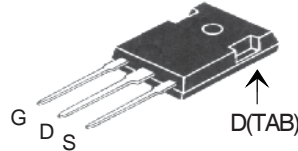
$$I_{D25} = -10A$$

$$R_{DS(on)} \leq 1\Omega$$

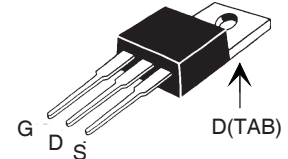
TO-263 (IXTA)



TO-247 (IXTH)

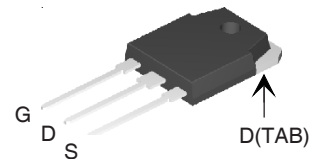


TO-220 (IXTP)



Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	- 500	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ , $R_{GS} = 1M\Omega$	- 500	V
$V_{GSS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	- 10	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	- 30	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	- 10	A
$E_{AS}$	$T_C = 25^\circ\text{C}$	1.5	J
<b>dV/dt</b>	$I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$	10	V/ns
<b>P<sub>D</sub></b>	$T_C = 25^\circ\text{C}$	300	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	$^\circ\text{C}$
<b>M<sub>d</sub></b>	Mounting torque (TO-3P, TO-220, TO-247)	1.13/10	Nm/lb.in.
<b>Weight</b>	TO-247	6.0	g
	TO-3P	5.5	g
	TO-220	3.0	g
	TO-263	2.5	g

TO-3P (IXTQ)



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

### Features:

- International standard packages
- Fast intrinsic diode
- Dynamic dV/dt Rated
- Avalanche Rated
- Rugged PolarP™ process
- Low  $Q_G$  and  $R_{ds(on)}$  characterization
- Low Drain-to-Tab capacitance
- Low package inductance
- easy to drive and to protect

### Applications:

- High side switching
- Push-pull amplifiers
- DC Choppers
- Current regulators
- Automatic test equipment

### Advantages:

- Low gate charge results in simple drive requirement
- Improved Gate, Avalanche and dynamic dV/dt ruggedness
- High power density
- Fast switching
- Easy to parallel

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
<b>BV<sub>DSS</sub></b>	$V_{GS} = 0V$ , $I_D = -250 \mu\text{A}$	- 500		V
<b>V<sub>GS(th)</sub></b>	$V_{DS} = V_{GS}$ , $I_D = -250 \mu\text{A}$	- 2.5		V
<b>I<sub>GSS</sub></b>	$V_{GS} = \pm 20V$ , $V_{DS} = 0V$			$\pm 100$ nA
<b>I<sub>DSS</sub></b>	$V_{DS} = V_{DSS}$			- 10 $\mu\text{A}$
	$V_{GS} = 0V$ $T_J = 125^\circ\text{C}$			- 150 $\mu\text{A}$
<b>R<sub>DS(on)</sub></b>	$V_{GS} = -10V$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1			1 $\Omega$

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = -10\text{V}$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1	6.5	11	S
$C_{iss}$	$V_{GS} = 0\text{V}$ , $V_{DS} = -25\text{V}$ , $f = 1\text{MHz}$		2670	pF
$C_{oss}$			275	pF
$C_{rss}$			42	pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = -10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$ $R_G = 3.3\Omega$ (External)		23	ns
$t_r$			22	ns
$t_{d(off)}$			50	ns
$t_f$			38	ns
$Q_{g(on)}$	$V_{GS} = -10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$		50	nC
$Q_{gs}$			17	nC
$Q_{gd}$			18	nC
$R_{thJC}$				0.42 $^\circ\text{C/W}$
$R_{thCS}$	(TO-3P)(TO-247)	0.21		$^\circ\text{C/W}$
	(TO-220)	0.50		$^\circ\text{C/W}$

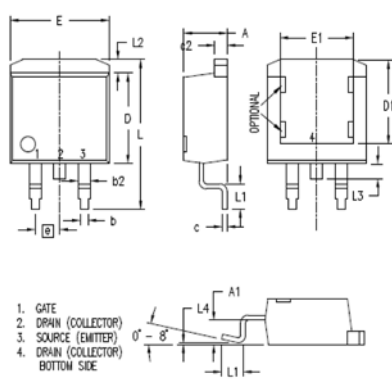
**Source-Drain Diode**

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$I_S$	$V_{GS} = 0\text{V}$			-10 A
$I_{SM}$	Repetitive, pulse width limited by $T_{JM}$			-40 A
$V_{SD}$	$I_F = -5\text{A}$ , $V_{GS} = 0\text{V}$ , Note 1			-3.0 V
$t_{rr}$	$I_F = -5\text{A}$ , $-di/dt = -100\text{A}/\mu\text{s}$ $V_R = -100\text{V}$ , $V_{GS} = 0\text{V}$		414	ns
$Q_{RM}$			5.9	$\mu\text{C}$
$I_{RM}$			-28.6	A

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

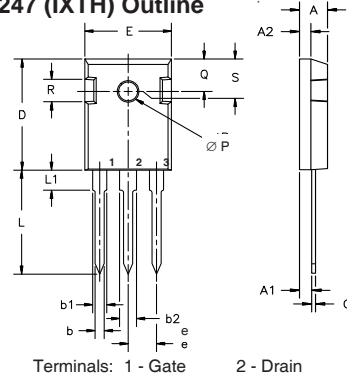
IXYS reserves the right to change limits, test conditions, and dimensions.

**TO-263 (IXTA) Outline**



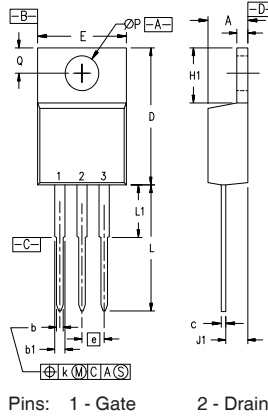
SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.160	.190	4.06	4.83
A1	.080	.110	2.03	2.79
b	.020	.039	0.51	0.99
b2	.045	.055	1.14	1.40
c	.016	.029	0.40	0.74
c2	.045	.055	1.14	1.40
D	.340	.380	8.64	9.65
D1	.315	.350	8.00	8.89
E	.380	.410	9.65	10.41
E1	.245	.320	6.22	8.13
e	.100 BSC		2.54 BSC	
L	.575	.625	14.61	15.88
L1	.090	.110	2.29	2.79
L2	.040	.055	1.02	1.40
L3	.050	.070	1.27	1.78
L4	0	.005	0	0.13

**TO-247 (IXTH) Outline**



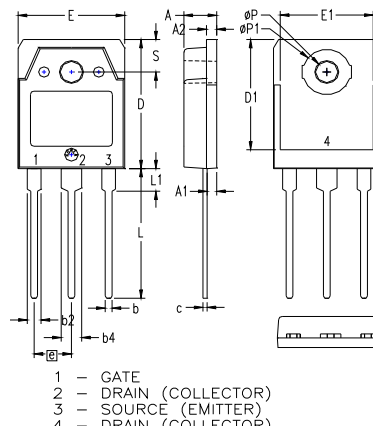
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
ØP	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216

**TO-220 (IXTP) Outline**



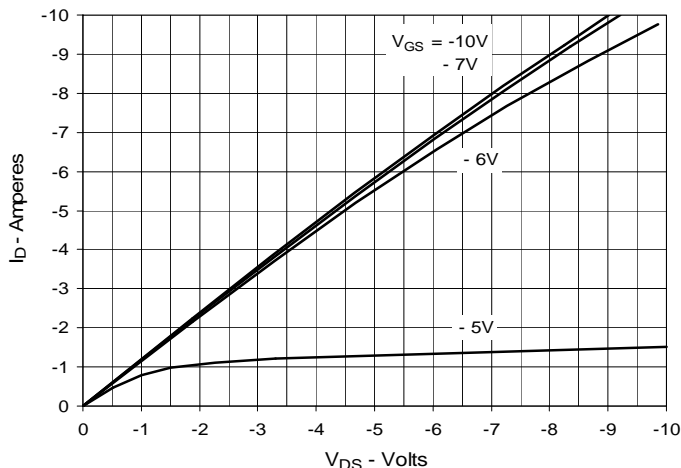
SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.170	.190	4.32	4.83
b	.025	.040	0.64	1.02
b1	.045	.065	1.15	1.65
c	.014	.022	0.35	0.56
D	.580	.630	14.73	16.00
E	.390	.420	9.91	10.66
e	.100 BSC		2.54 BSC	
F	.045	.055	1.14	1.40
H1	.230	.270	5.85	6.85
J1	.090	.110	2.29	2.79
k	0	.015	0	0.38
L	.500	.550	12.70	13.97
L1	.110	.230	2.79	5.84
ØP	.139	.161	3.53	4.08
Q	.100	.125	2.54	3.18

**TO-3P (IXTQ) Outline**

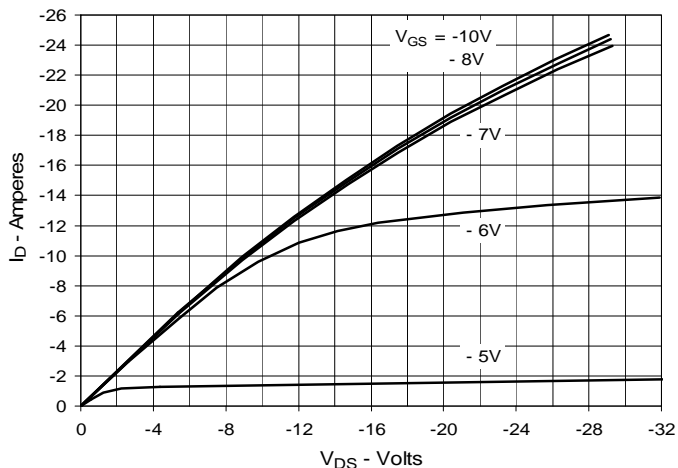


SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.193	4.70	4.90
A1	.051	.059	1.30	1.50
A2	.057	.065	1.45	1.65
b	.035	.045	0.90	1.15
b2	.075	.087	1.90	2.20
b4	.114	.126	2.90	3.20
c	.022	.031	0.55	0.80
D	.780	.799	19.80	20.30
D1	.665	.677	16.90	17.20
E	.610	.622	15.50	15.80
E1	.531	.539	13.50	13.70
e	.215 BSC		5.45 BSC	
L	.779	.795	19.80	20.20
L1	.134	.142	3.40	3.60
ØP	.126	.134	3.20	3.40
ØP1	.272	.280	6.90	7.10
S	.193	.201	4.90	5.10

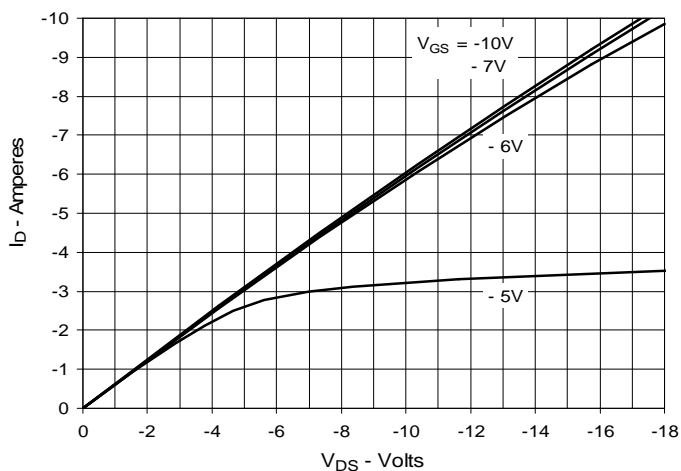
**Fig. 1. Output Characteristics @ 25°C**



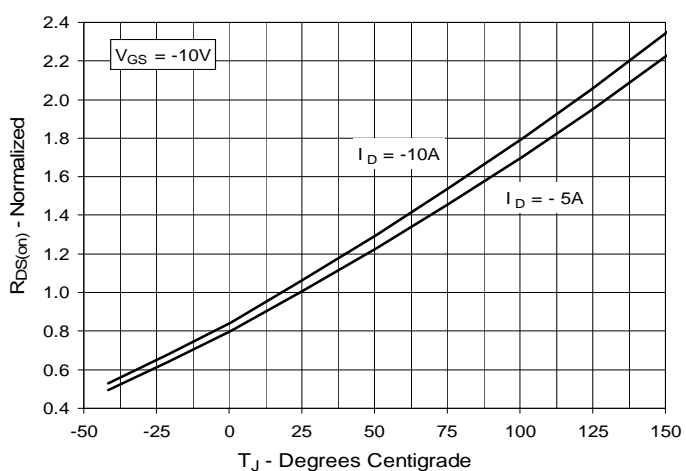
**Fig. 2. Extended Output Characteristics @ 25°C**



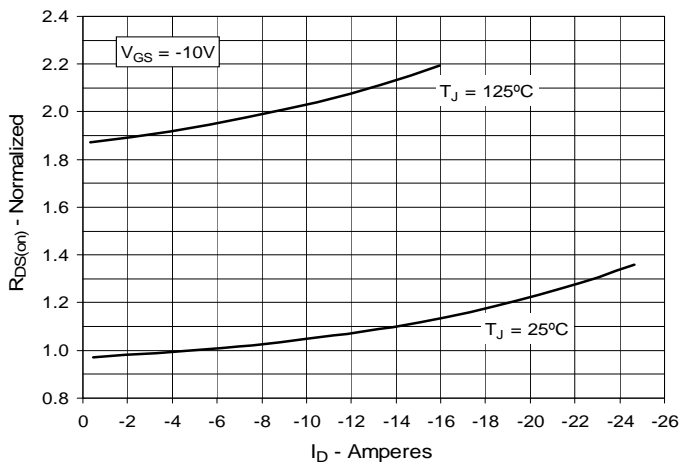
**Fig. 3. Output Characteristics @ 125°C**



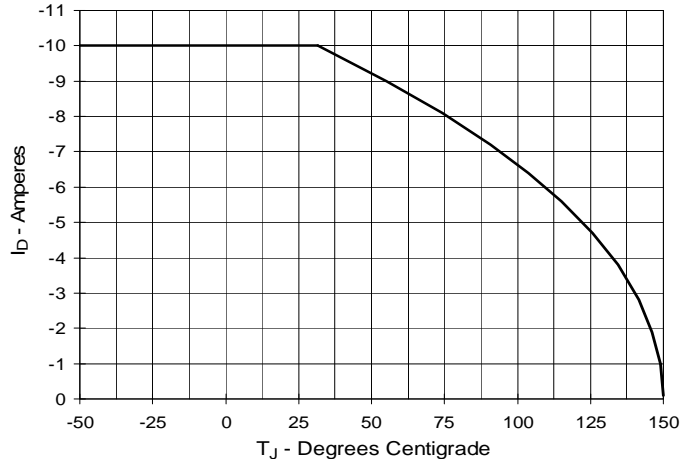
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = -5A$  vs. Junction Temperature**



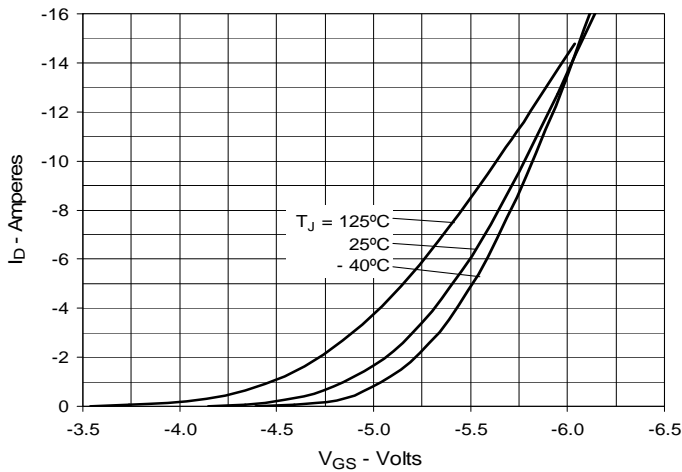
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = -5A$  vs. Drain Current**



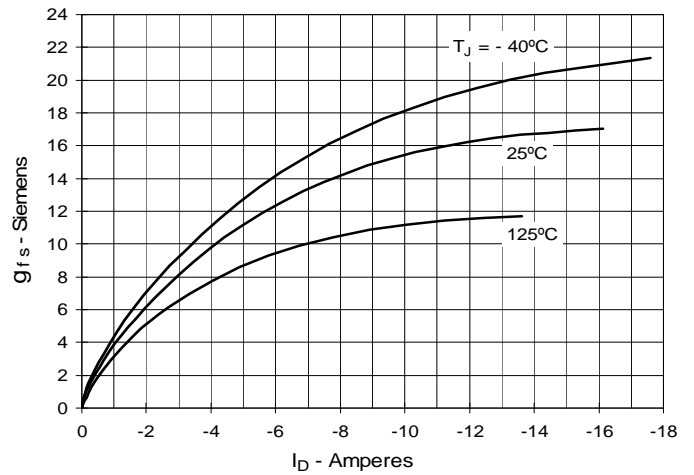
**Fig. 6. Maximum Drain Current vs. Case Temperature**



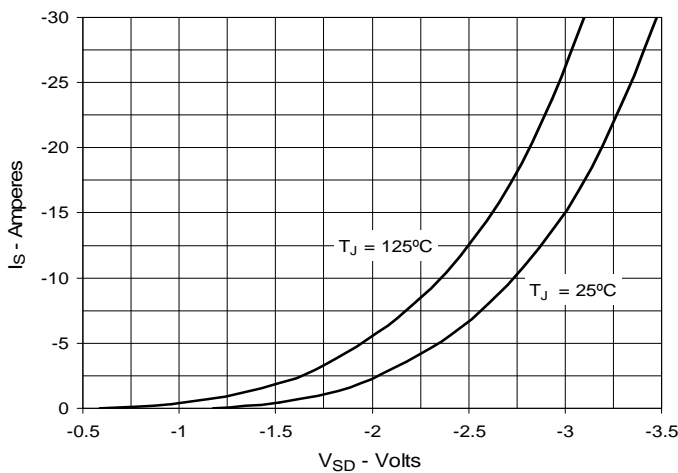
**Fig. 7. Input Admittance**



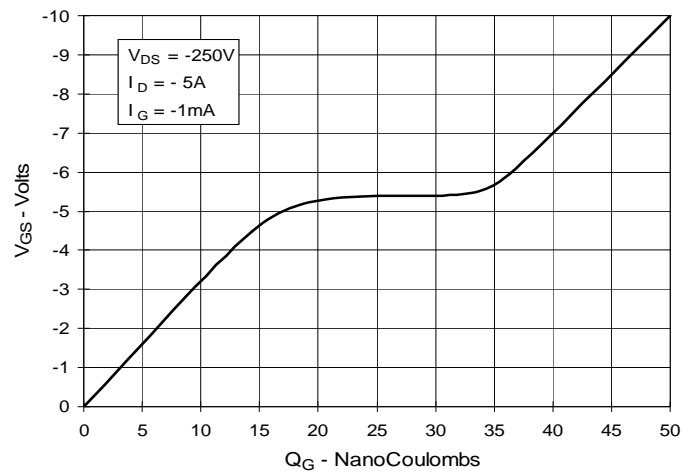
**Fig. 8. Transconductance**



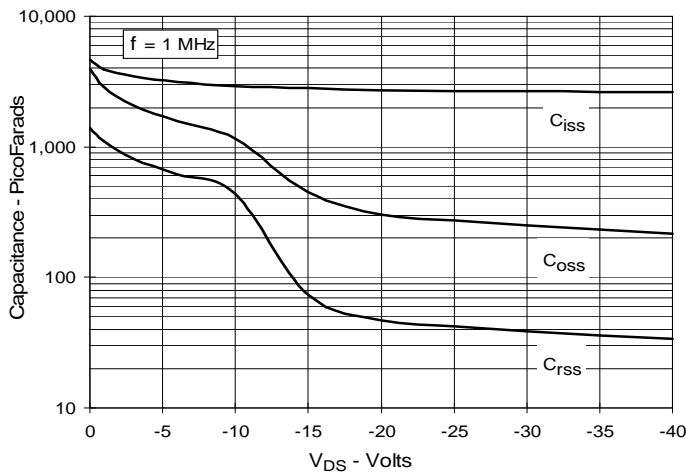
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



**Fig. 12. Forward-Bias Safe Operating Area**

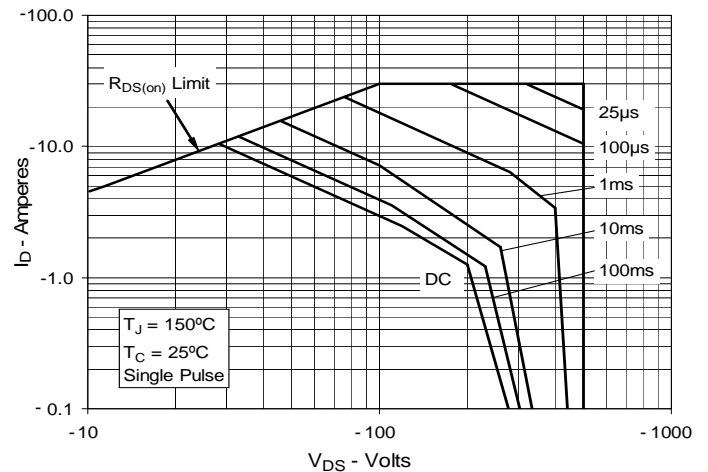


Fig. 13. Maximum Transient Thermal Impedance

