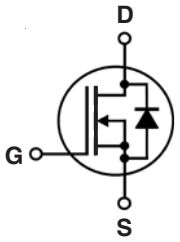
IXYS

Depletion Mode MOSFET

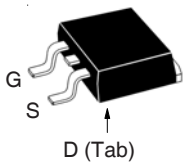
IXTA6N50D2
IXTP6N50D2
IXTH6N50D2

V_{DSX} = 500V
$I_{D(on)}$ ≥ 6A
$R_{DS(on)}$ ≤ 550mΩ

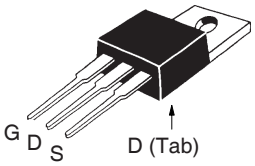
N-Channel



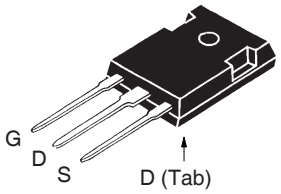
TO-263 AA (IXTA)



TO-220AB (IXTP)



TO-247 (IXTH)



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSX}	T_J = 25°C to 150°C	500	V
V_{GSX}	Continuous	±20	V
V_{GSM}	Transient	±30	V
P_D	T_C = 25°C	300	W
T_J		- 55 ... +150	°C
T_{JM}		150	°C
T_{stg}		- 55 ... +150	°C
T_L	1.6mm (0.062 in.) from Case for 10s	300	°C
T_{SOLD}	Plastic Body for 10s	260	°C
M_d	Mounting Torque (TO-220 & TO-247)	1.13 / 10	Nm/lb.in.
Weight	TO-263	2.5	g
	TO-220	3.0	g
	TO-247	6.0	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSX}	V_{GS} = - 5V, I_D = 250μA	500			V
$V_{GS(off)}$	V_{DS} = 25V, I_D = 250μA	- 2.5		- 4.5	V
I_{GSX}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
$I_{DSX(off)}$	V_{DS} = V_{DSX}, V_{GS} = - 5V			5	μA
	T_J = 125°C			50	μA
$R_{DS(on)}$	V_{GS} = 0V, I_D = 3A, Note 1			550	mΩ
$I_{D(on)}$	V_{GS} = 0V, V_{DS} = 25V, Note 1	6			A

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

- Audio Amplifiers
- Start-up Circuits
- Protection Circuits
- Ramp Generators
- Current Regulators
- Active Loads

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.
g_{fs}	V_{DS} = 30V, I_D = 3A, Note 1	2.8	4.5	S
C_{iss}	V_{GS} = -10V, V_{DS} = 25V, f = 1MHz		2800	pF
C_{oss}			255	pF
C_{rss}			64	pF
$t_{d(on)}$	**Resistive Switching Times**		28	ns
t_r	V_{GS} = ±5V, V_{DS} = 250V, I_D = 3A		72	ns
$t_{d(off)}$	R_G = 2.4Ω (External)		82	ns
t_f			43	ns
$Q_{g(on)}$	V_{GS} = ±5V, V_{DS} = 250V, I_D = 3A		96	nC
Q_{gs}			11	nC
Q_{gd}			48	nC
R_{thJC}				0.41 °C/W
R_{thCS}	TO-220		0.50	°C/W
	TO-247		0.21	°C/W

Safe-Operating-Area Specification

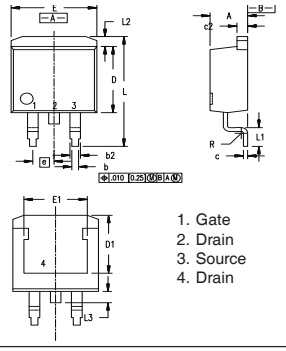
Symbol	Test Conditions	Characteristic Values Min.	Typ.	Max.
SOA	V_{DS} = 400V, I_D = 0.45A, T_C = 75°C, Tp = 5s	180		W

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.
V_{SD}	I_F = 6A, V_{GS} = -10V, Note 1		0.8	1.3 V
t_{rr}	I_F = 3A, -di/dt = 100A/μs		350	ns
I_{RM}	V_R = 100V, V_{GS} = -10V		16	A
Q_{RM}			2.8	μC

Note 1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.

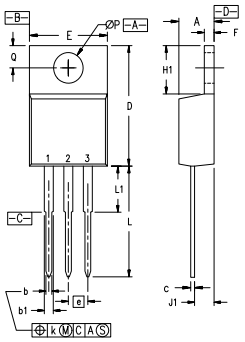
TO-263 Outline



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

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.06	4.83	.160	.190
b	0.51	0.99	.020	.039
b2	1.14	1.40	.045	.055
c	0.40	0.74	.016	.029
c2	1.14	1.40	.045	.055
D	8.64	9.65	.340	.380
D1	8.00	8.89	.280	.320
E	9.65	10.41	.380	.405
E1	6.22	8.13	.270	.320
e	2.54	BSC	.100	BSC
L	14.61	15.88	.575	.625
L1	2.29	2.79	.090	.110
L2	1.02	1.40	.040	.055
L3	1.27	1.78	.050	.070

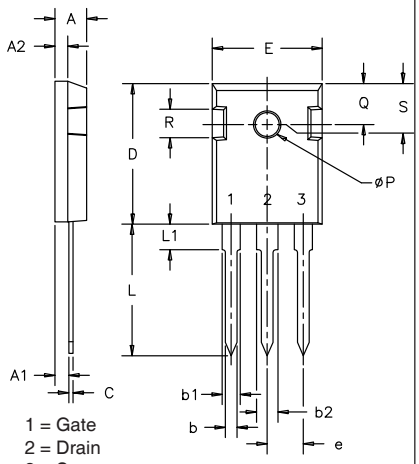
TO-220 Outline



Pins: 1 - Gate 2 - Drain
3 - Source

SYM	INCHES MIN	MAX	MILLIMETERS 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-247 Outline



1 = Gate
2 = Drain
3 = Source

SYM	INCHES MIN	MAX	MILLIMETERS MIN	MAX
A	.185	.209	4.7	5.3
A_1	.087	.102	2.2	2.54
A_2	.059	.098	2.2	2.6
b	.040	.055	1.0	1.4
b_1	.065	.084	1.65	2.13
b_2	.113	.123	2.87	3.12
C	.016	.031	.4	.8
D	.819	.845	20.80	21.46
E	.610	.640	15.75	16.26
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1		.177		4.50
ØP	.140	.144	3.55	3.65
Q	.212	.244	5.4	6.2
R	.170	.216	4.32	5.49
S	.242 BSC		6.15 BSC	

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

Fig. 1. Output Characteristics @ T_J = 25°C

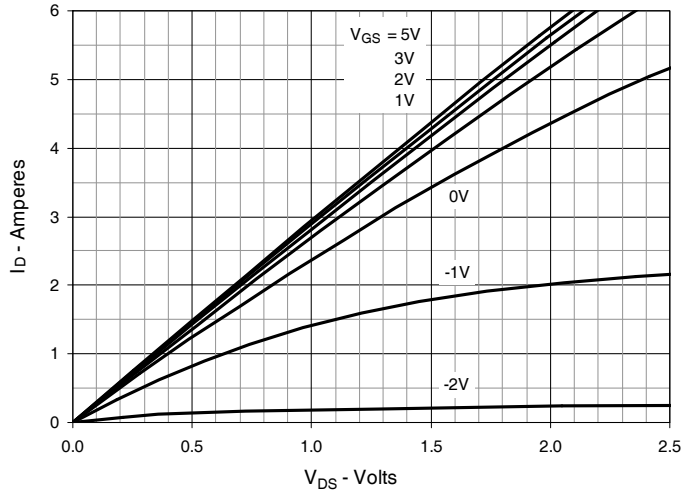


Fig. 2. Extended Output Characteristics @ T_J = 25°C

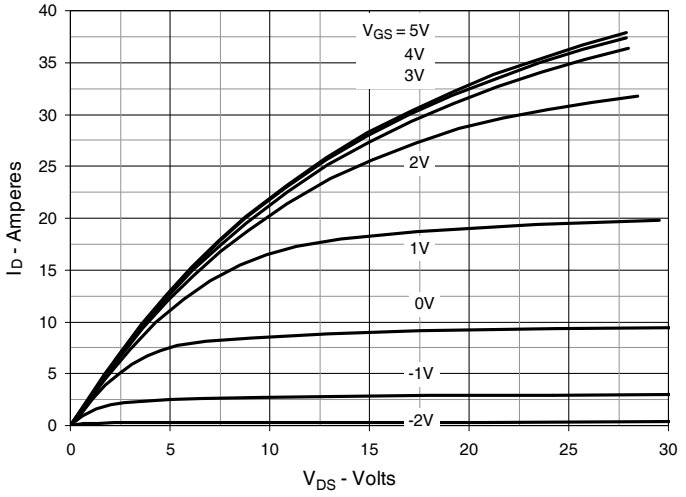


Fig. 3. Output Characteristics @ T_J = 125°C

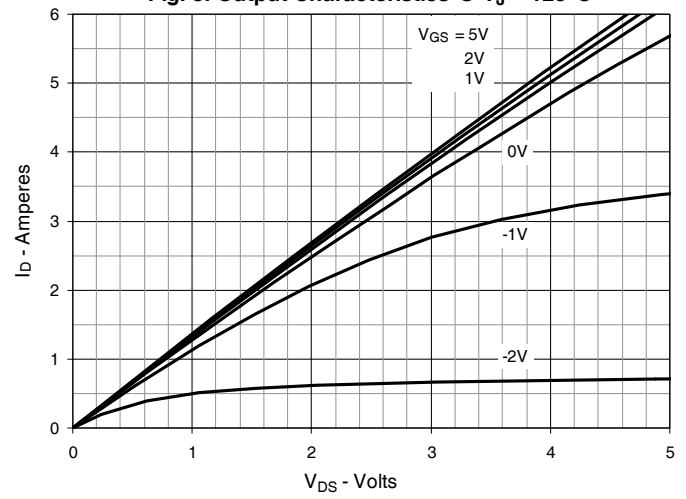


Fig. 4. Drain Current @ T_J = 25°C

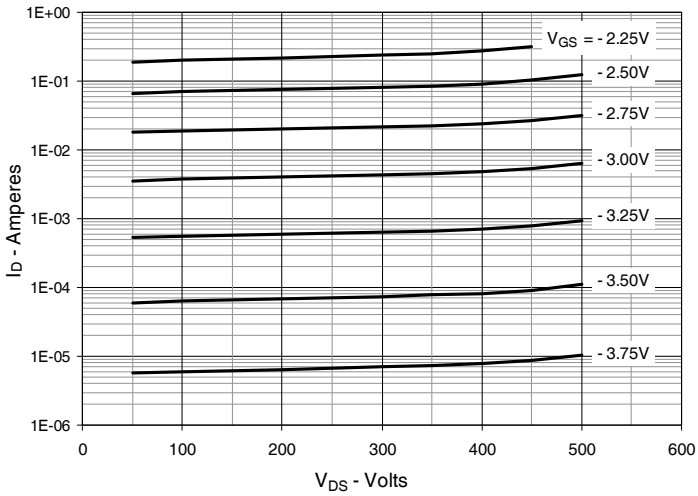


Fig. 5. Drain Current @ T_J = 100°C

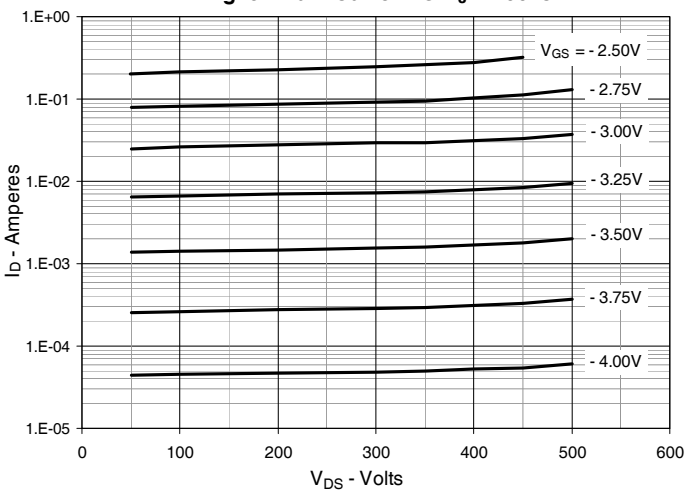


Fig. 6. Dynamic Output Resistance vs. Gate Voltage

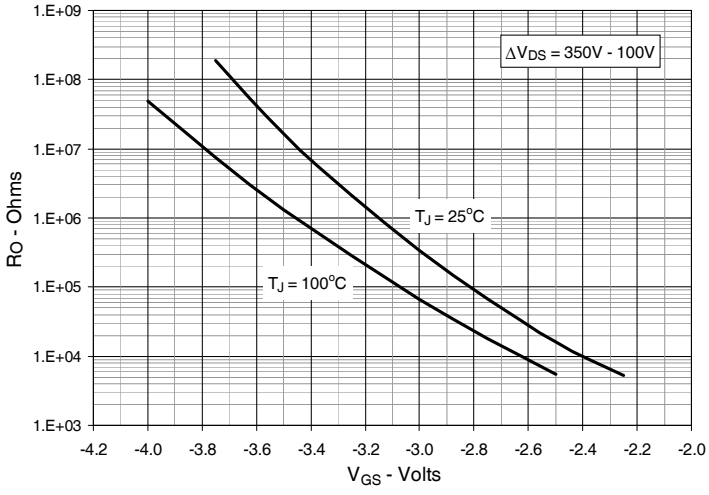


Fig. 7. Normalized $R_{DS(on)}$ vs. Junction Temperature

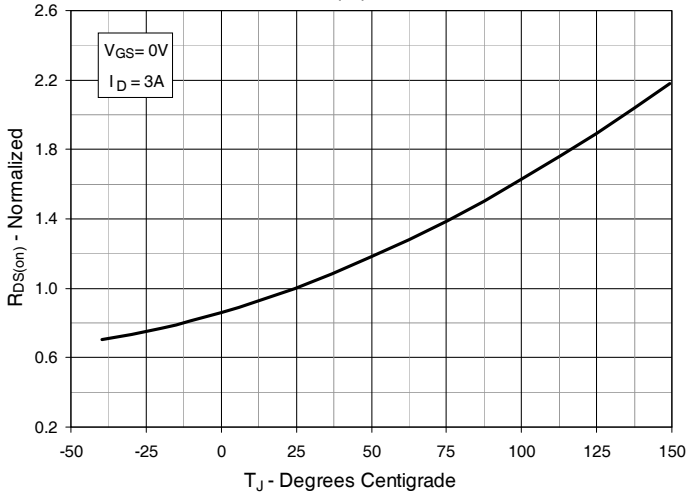


Fig. 8. $R_{DS(on)}$ Normalized to I_D = 3A Value vs. Drain Current

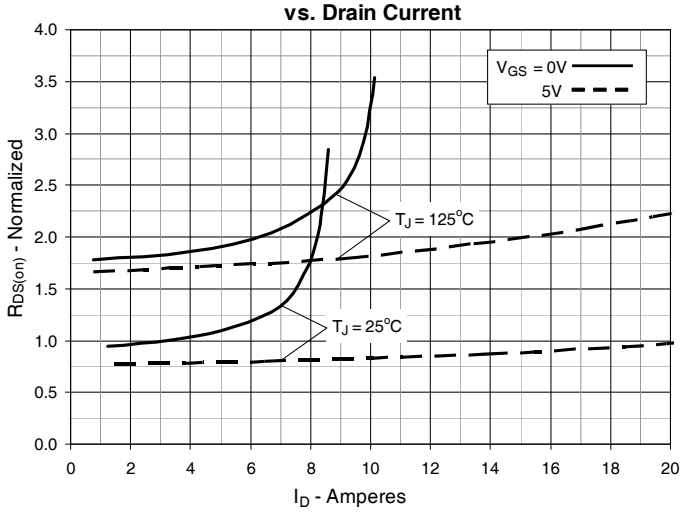


Fig. 9. Input Admittance

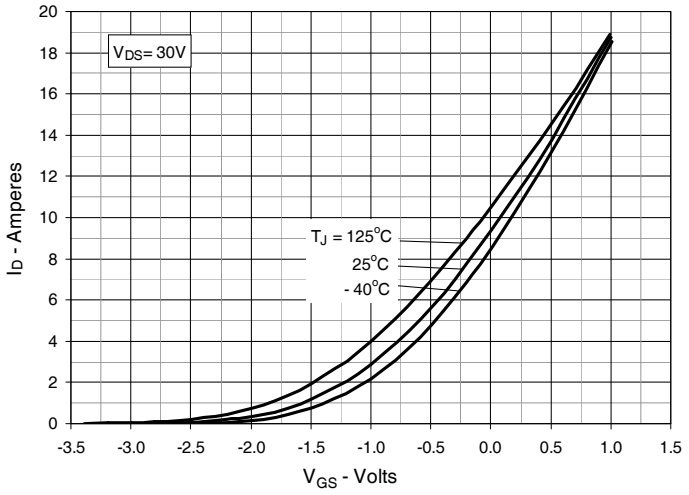


Fig. 10. Transconductance

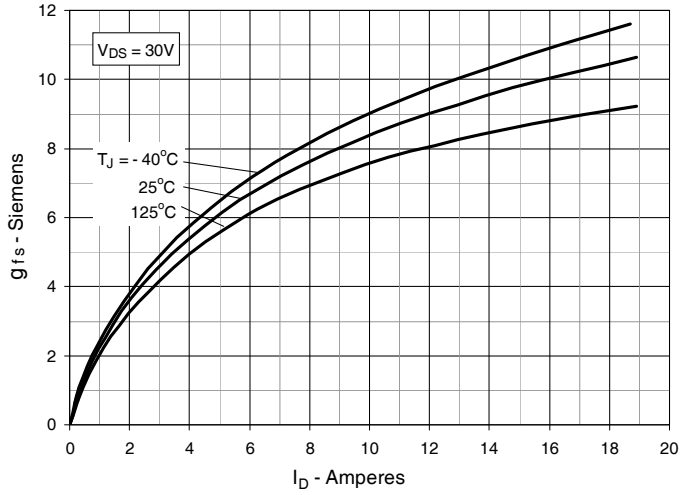


Fig. 11. Breakdown and Threshold Voltages vs. Junction Temperature

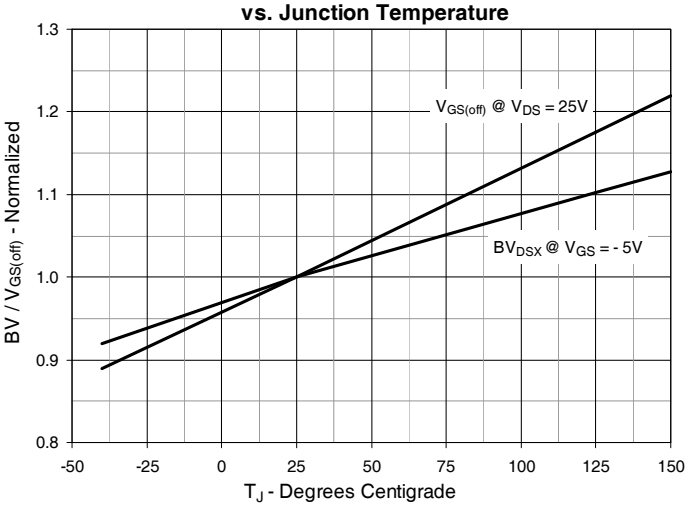


Fig. 12. Forward Voltage Drop of Intrinsic Diode

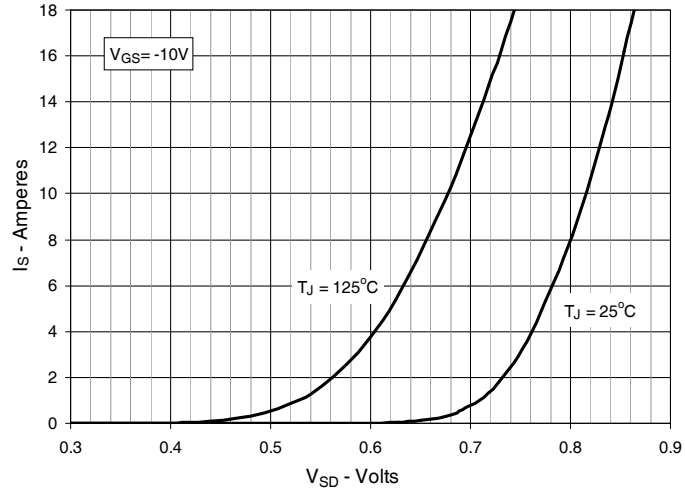


Fig. 13. Capacitance

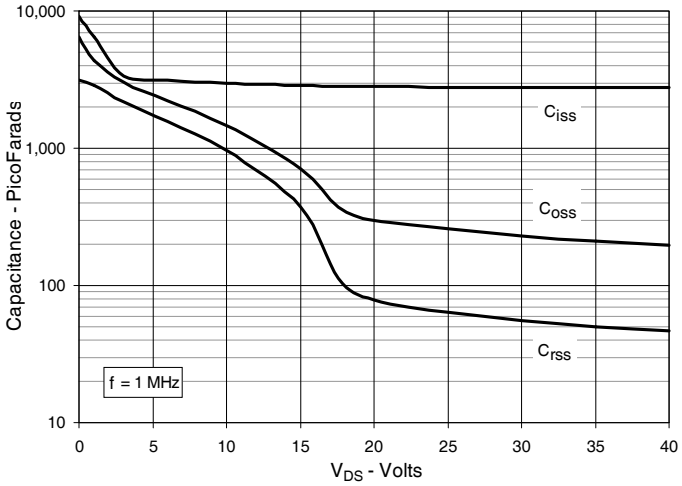


Fig. 14. Gate Charge

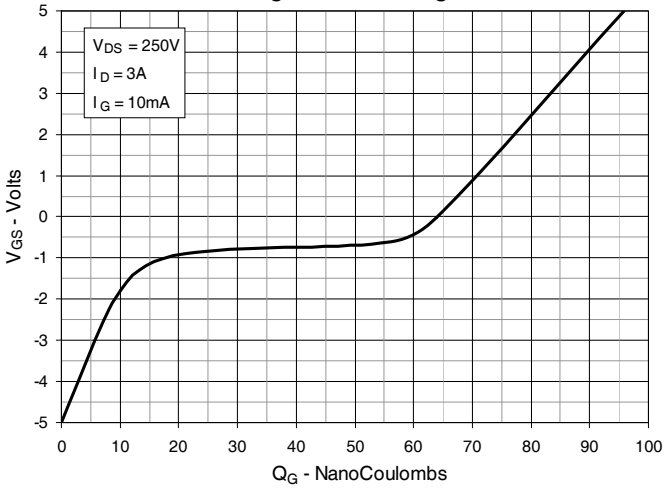


Fig. 15. Forward-Bias Safe Operating Area @ T_C = 25°C

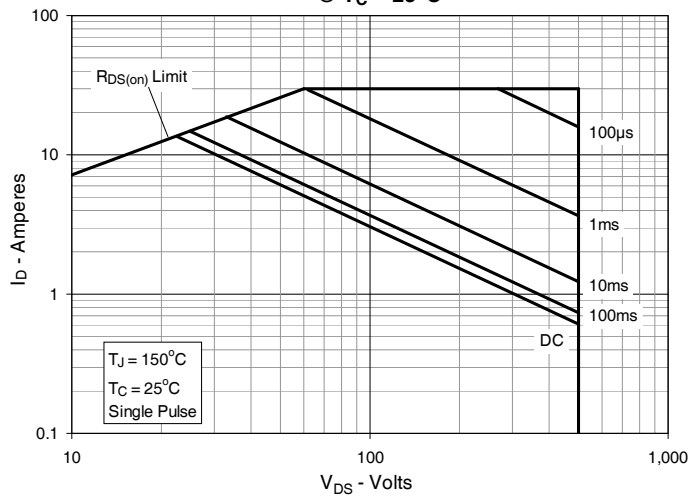


Fig. 16. Forward-Bias Safe Operating Area @ T_C = 75°C

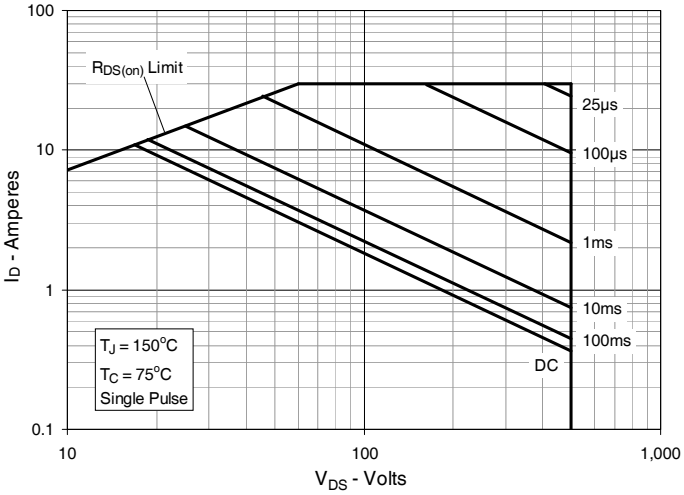


Fig. 17. Maximum Transient Thermal Impedance