IXYS

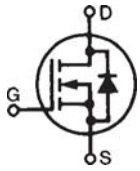
Preliminary Technical Information

Depletion Mode MOSFET

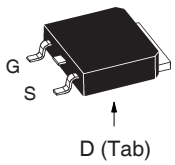
IXTY1R6N50D2
IXTA1R6N50D2
IXTP1R6N50D2

V_{DSX} = 500V
$I_{D(on)}$ ≥ 1.6A
$R_{DS(on)}$ ≤ 2.3Ω

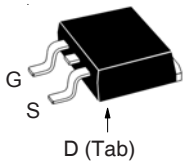
N-Channel



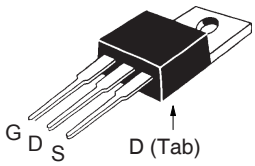
TO-252 (IXTY)



TO-263 AA (IXTA)



TO-220AB (IXTP)



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	100	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)	1.13 / 10	Nm/lb.in.
Weight	TO-252	0.35	g
	TO-263	2.50	g
	TO-220	3.00	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 = 100μA	- 2.0		- 4.0	V
I_{GSX}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
$I_{DSX(off)}$	V_{DS} = V_{DSX}, V_{GS} = - 5V			2	μA
	T_J = 125°C			25	μA
$R_{DS(on)}$	V_{GS} = 0V, I_D = 0.8A, Note 1			2.3	Ω
$I_{D(on)}$	V_{GS} = 0V, V_{DS} = 25V, Note 1	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

IXYS

IXTY1R6N50D2 IXTA1R6N50D2
IXTP1R6N50D2

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 30V, I_D = 0.8A, Note 1	1.00	1.75		S
C_{iss}	V_{GS} = -10V, V_{DS} = 25V, f = 1MHz		645		pF
C_{oss}			65		pF
C_{rss}			16.5		pF
$t_{d(on)}$	**Resistive Switching Times**		25		ns
t_r	V_{GS} = ±5V, V_{DS} = 250V, I_D = 0.8A		70		ns
$t_{d(off)}$	R_G = 5Ω (External)		35		ns
t_f			41		ns
$Q_{g(on)}$	V_{GS} = 5V, V_{DS} = 250V, I_D = 0.8A		23.7		nC
Q_{gs}			2.2		nC
Q_{gd}			13.8		nC
R_{thJC}				1.25	°C/W
R_{thCS}	TO-220		0.50		°C/W

Safe-Operating-Area Specification

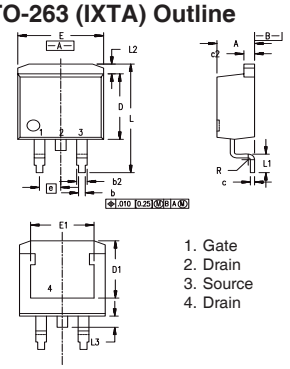
Symbol	Test Conditions	Characteristic Values Min.	Typ.	Max.	
SOA	V_{DS} = 400V, I_D = 0.15A, T_C = 75°C, Tp = 5s	60			W

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
V_{SD}	I_F = 1.6A, V_{GS} = -10V, Note 1		0.8	1.3	V
t_{rr}	I_F = 1.6A, -di/dt = 100A/μs		400		ns
I_{RM}	V_R = 100V, V_{GS} = -10V		9.16		A
Q_{RM}			1.83		μC

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

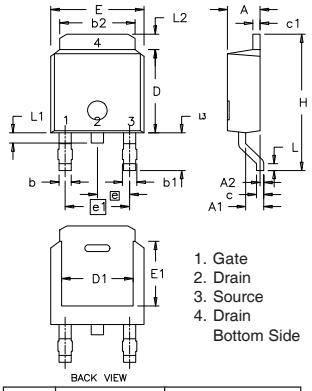
TO-263 (IXTA) Outline



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

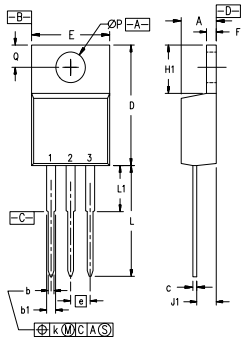
TO-252 AA (IXTY) Outline



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

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	2.19	2.38	0.086	0.094
A1	0.89	1.14	0.035	0.045
A2	0	0.13	0	0.005
b	0.64	0.89	0.025	0.035
b1	0.76	1.14	0.030	0.045
b2	5.21	5.46	0.205	0.215
c	0.46	0.58	0.018	0.023
c1	0.46	0.58	0.018	0.023
D	5.97	6.22	0.235	0.245
D1	4.32	5.21	0.170	0.205
E	6.35	6.73	0.250	0.265
E1	4.32	5.21	0.170	0.205
e	2.28 BSC		0.090 BSC	
e1	4.57 BSC		0.180 BSC	
H	9.40	10.42	0.370	0.410
L	0.51	1.02	0.020	0.040
L1	0.64	1.02	0.025	0.040
L2	0.89	1.27	0.035	0.050
L3	2.54	2.92	0.100	0.115

TO-220 (IXTP) Outline



Pins: 1 - Gate 2 - Drain
3 - Source 4 - Drain

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

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.

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

Fig. 1. Output Characteristics @ T_J = 25ºC

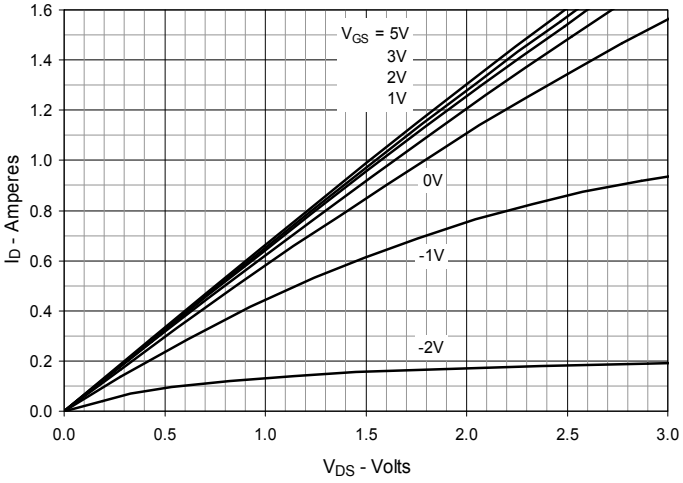


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

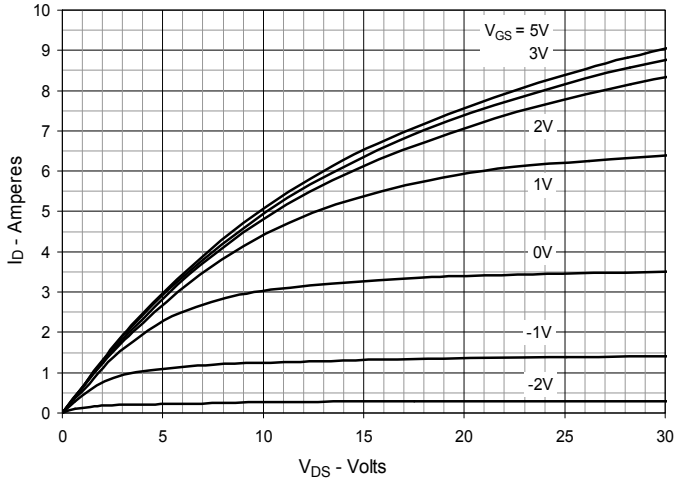


Fig. 3. Output Characteristics @ T_J = 125ºC

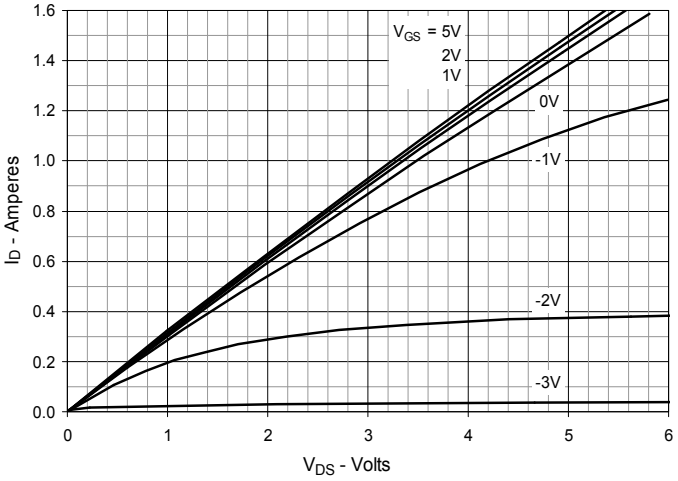


Fig. 4. Drain Current @ T_J = 25ºC

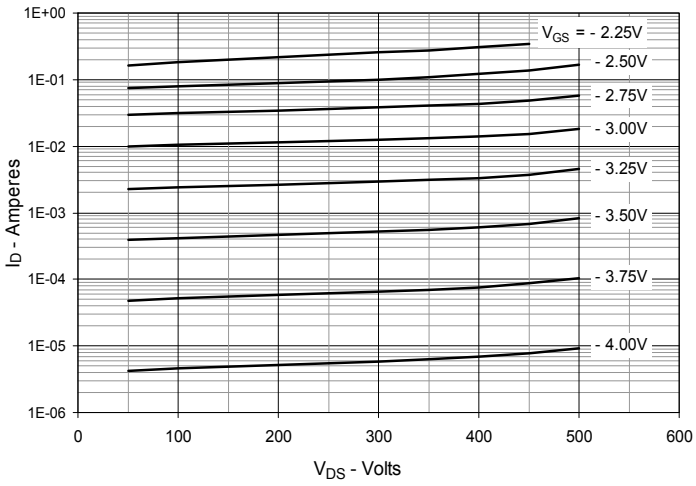


Fig. 5. Drain Current @ T_J = 100ºC

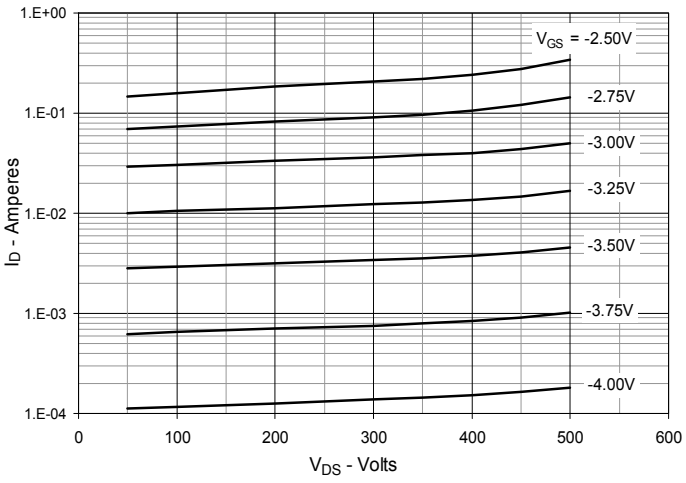


Fig. 6. Dynamic Resistance vs. Gate Voltage

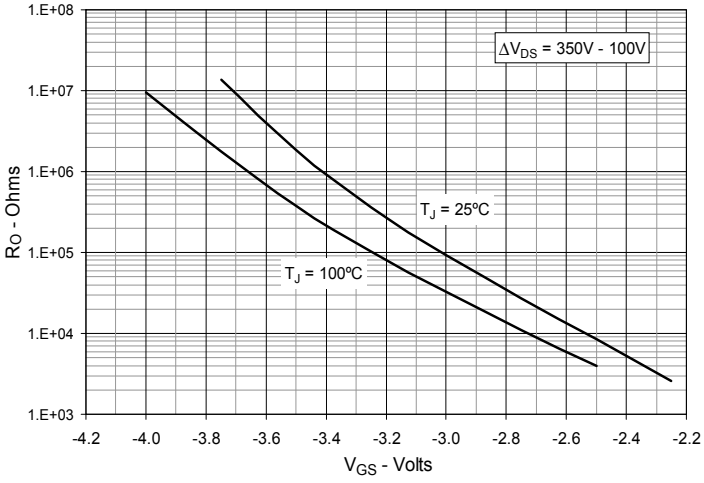


Fig. 7. Normalized $R_{DS(on)}$ vs. Junction Temperature

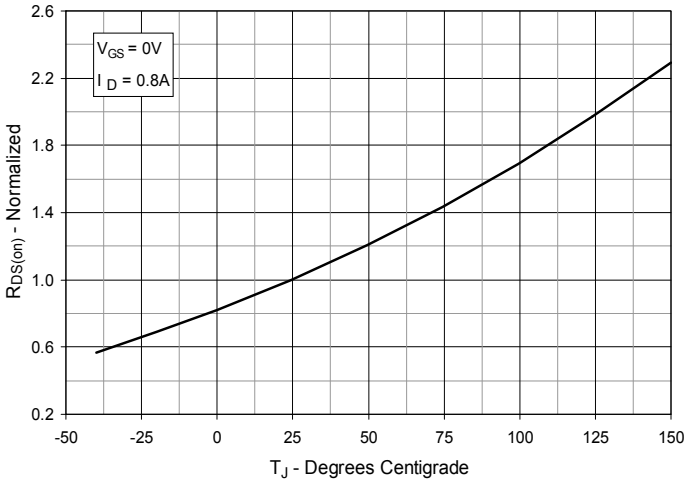


Fig. 8. $R_{DS(on)}$ Normalized to I_D = 0.8A Value vs. Drain Current

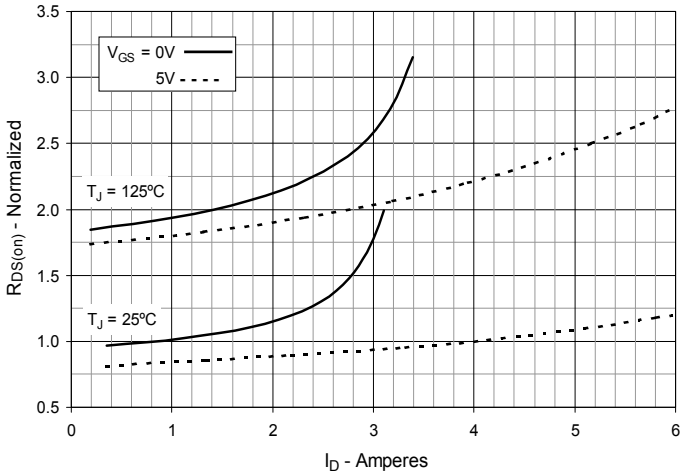


Fig. 9. Input Admittance

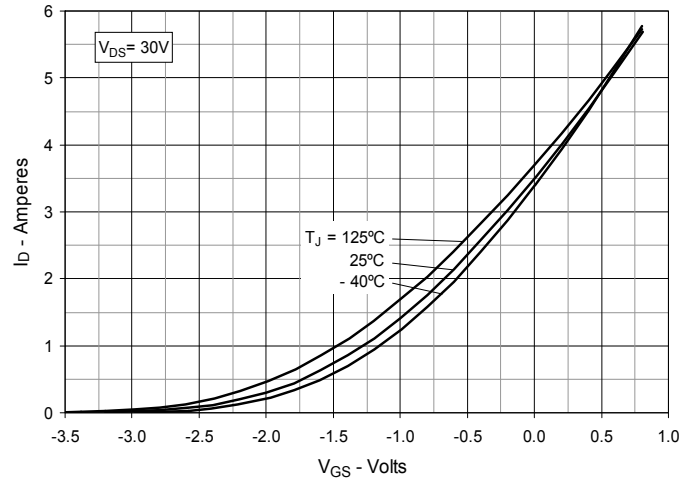


Fig. 10. Transconductance

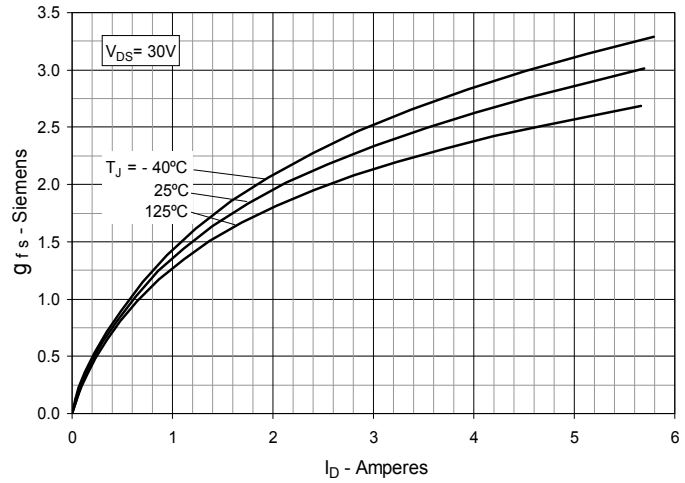


Fig. 11. Breakdown and Threshold Voltages vs. Junction Temperature

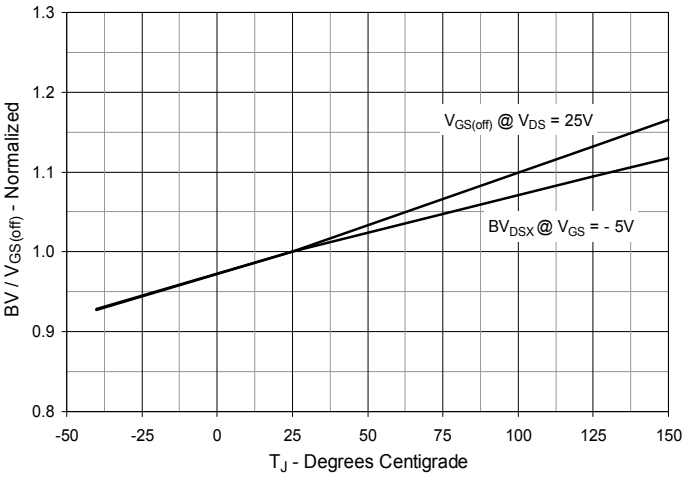


Fig. 12. Forward Voltage Drop of Intrinsic Diode

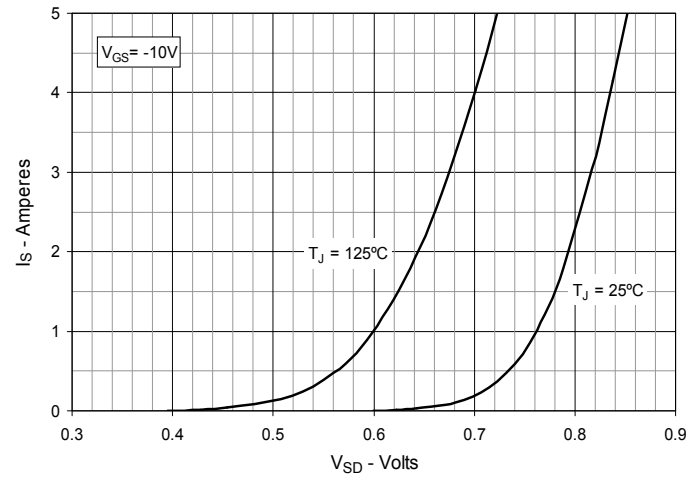


Fig. 13. Capacitance

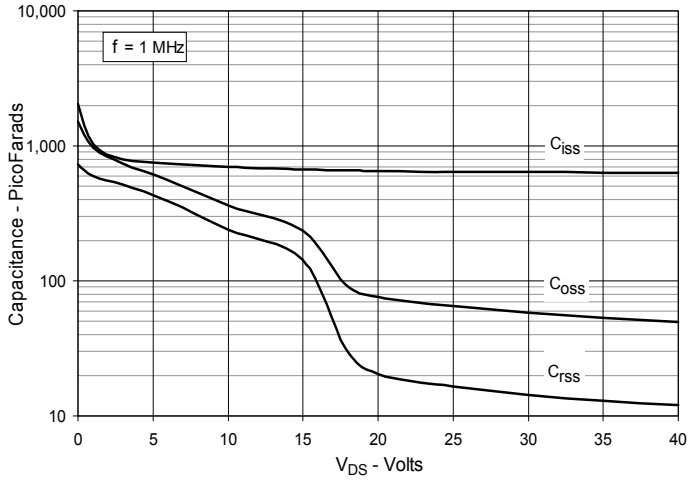


Fig. 14. Gate Charge

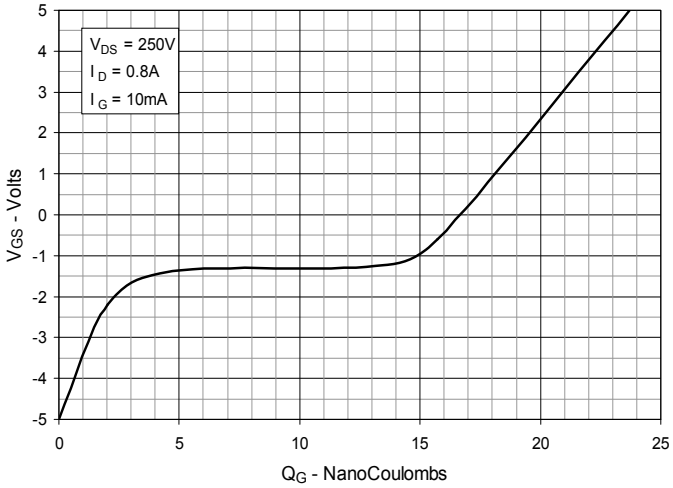


Fig. 15. Forward-Bias Safe Operating Area @ T_C = 25ºC

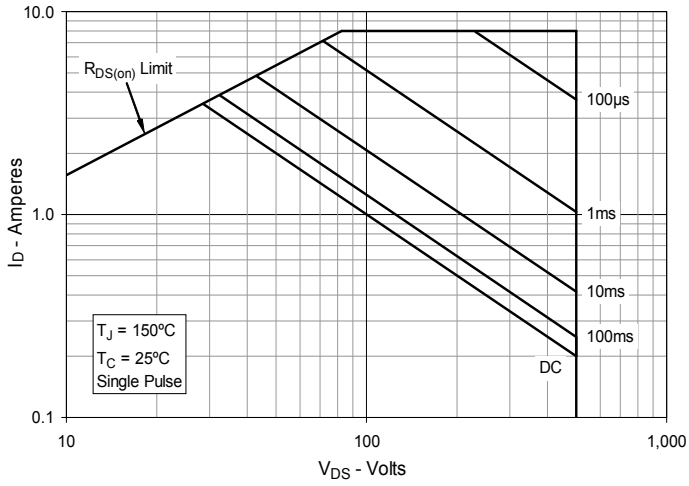


Fig. 16. Forward-Bias Safe Operating Area @ T_C = 75ºC

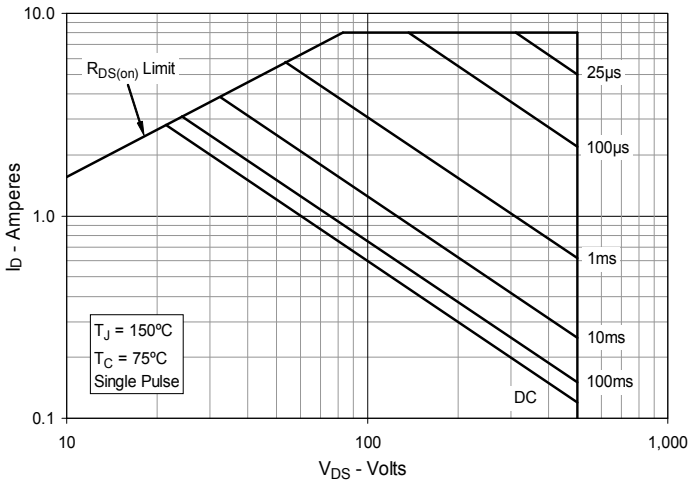


Fig. 17. Maximum Transient Thermal Resistance