IXYS

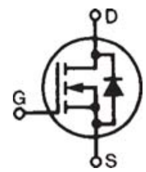
Preliminary Technical Information

Depletion Mode MOSFET

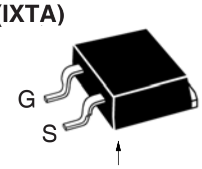
IXTA1N170DHV
IXTH1N170DHV

V_{DSX} = 1700V
$I_{D(on)}$ ≥ 1A
$R_{DS(on)}$ ≤ 16Ω

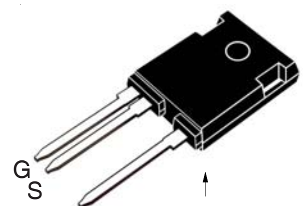
N-Channel



TO-263HV (IXTA)



TO-247HV (IXTH)



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSX}	T_J = 25°C to 150°C	1700	V
V_{DGX}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	1700	V
V_{GSX}	Continuous	±20	V
V_{GSM}	Transient	±30	V
P_D	T_C = 25°C	290	W
T_J		- 55 ... +150	°C
T_{JM}		150	°C
T_{stg}		- 55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	°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
Weight	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°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSX}	V_{GS} = - 5V, I_D = 250μA	1700			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			10	μA
	T_J = 125°C			100	μA
$R_{DS(on)}$	V_{GS} = 0V, I_D = 0.5A, Note 1			16	Ω
$I_{D(on)}$	V_{GS} = 0V, V_{DS} = 50V, Note 1	1.0			A

IXYS

IXTA1N170DHV
IXTH1N170DHV

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

Safe-Operating-Area Specification

Symbol	Test Conditions	Characteristic Values Min.	Typ.	Max.	
SOA	V_{DS} = 1700V, I_D = 100mA, T_C = 75°C, Tp = 5s	170			W

Source-Drain Diode

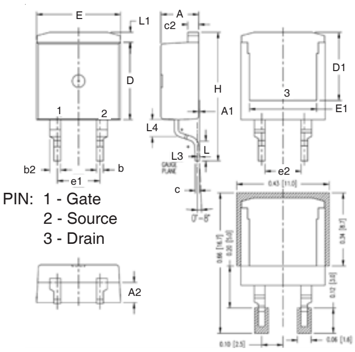
Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
V_{SD}	I_F = 1A, V_{GS} = -10V, Note 1		0.75	1.30	V
t_{rr}	I_F = 1A, -di/dt = 100A/µs		2.8		µs
I_{RM}	V_R = 100V, V_{GS} = -10V		45.0		A
Q_{RM}			63.0		µC

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

PRELIMANARY 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.

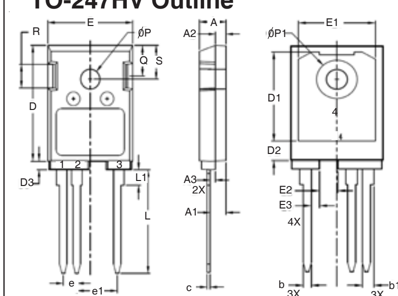
TO-263HV-2L Outline



PIN: 1 - Gate
2 - Source
3 - Drain

SYM	INCHES MIN	MAX	MILLIMETER 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



PINS:
1 - Gate 2 - Source
3, 4 - Drain

SYM	INCHES MIN	MAX	MILLIMETERS 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 @ $T_J = 25^oC$

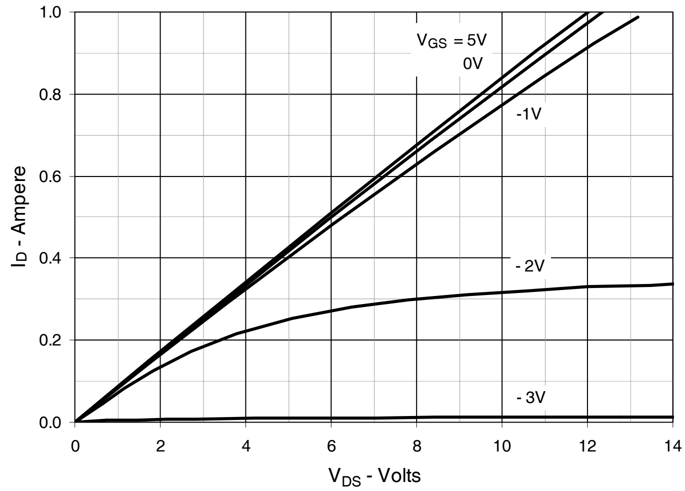


Fig. 2. Extended Output Characteristics @ $T_J = 25^oC$

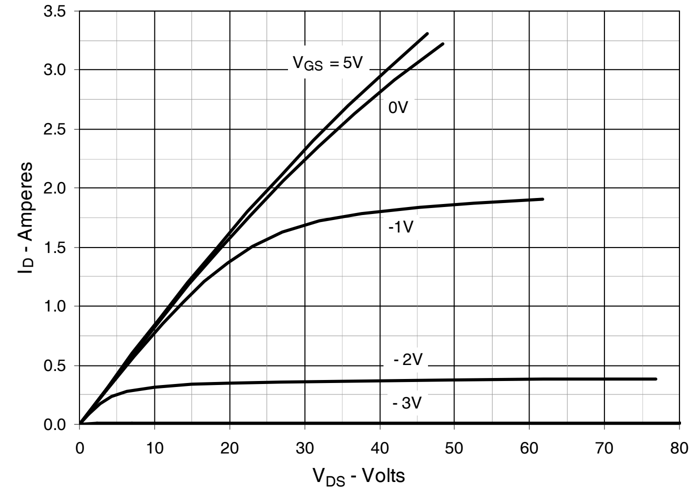


Fig. 3. Output Characteristics @ $T_J = 125^oC$

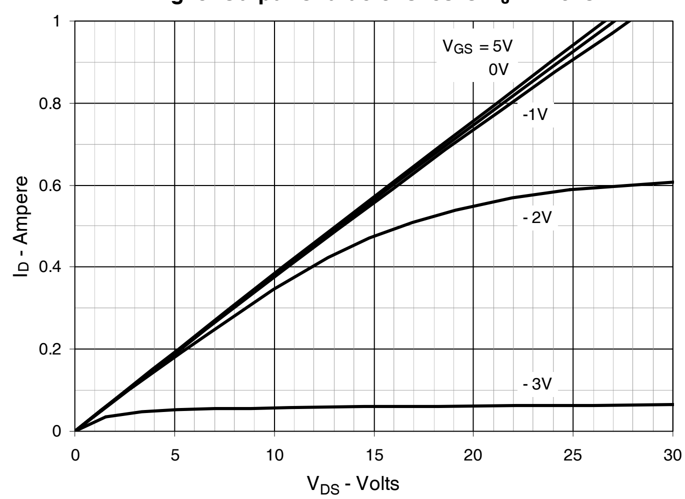


Fig. 4. Drain Current @ $T_J = 25^oC$

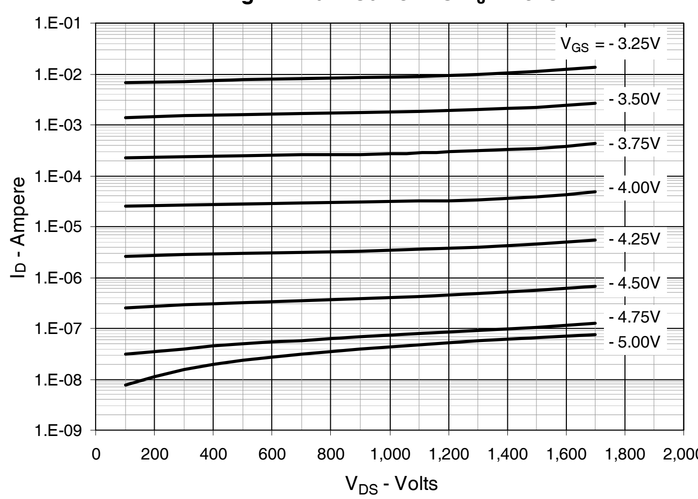


Fig. 5. Drain Current @ $T_J = 100^oC$

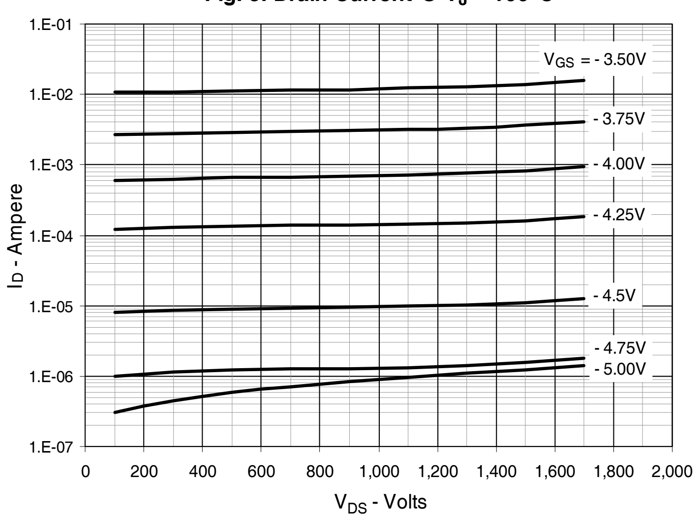


Fig. 6. Dynamic Resistance vs. Gate Voltage

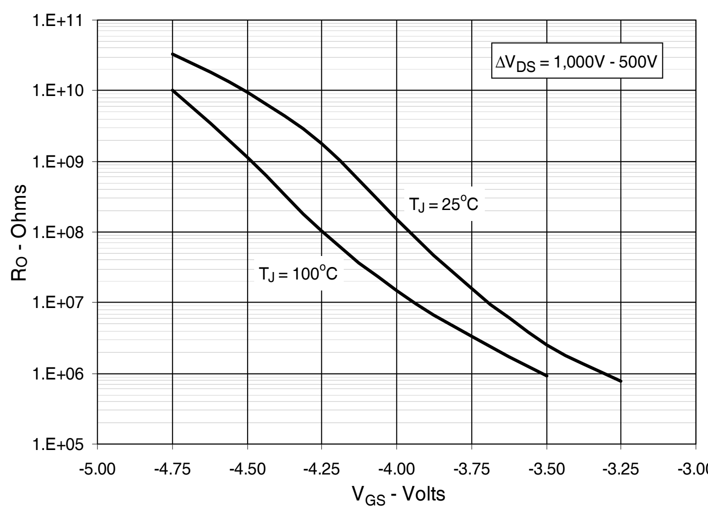


Fig. 7. Normalized $R_{DS(on)}$ vs. Junction Temperature

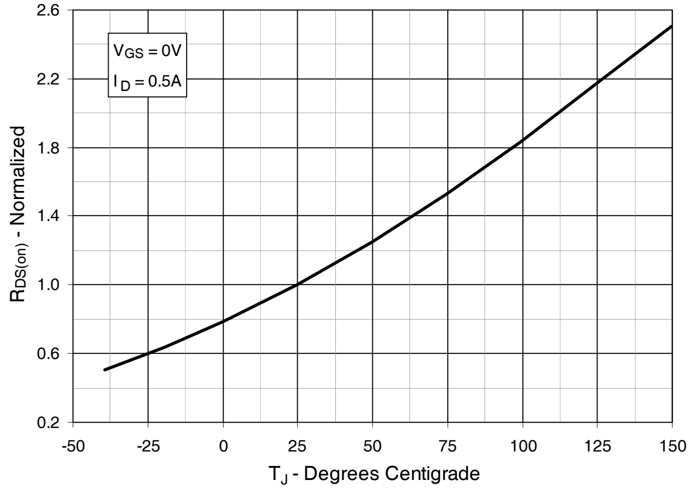


Fig. 8. $R_{DS(on)}$ Normalized to I_D = 0.5A Value vs. Drain Current

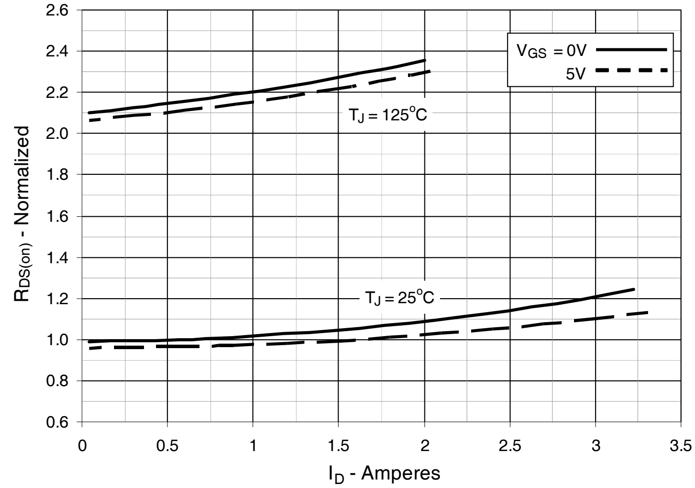


Fig. 9. Input Admittance

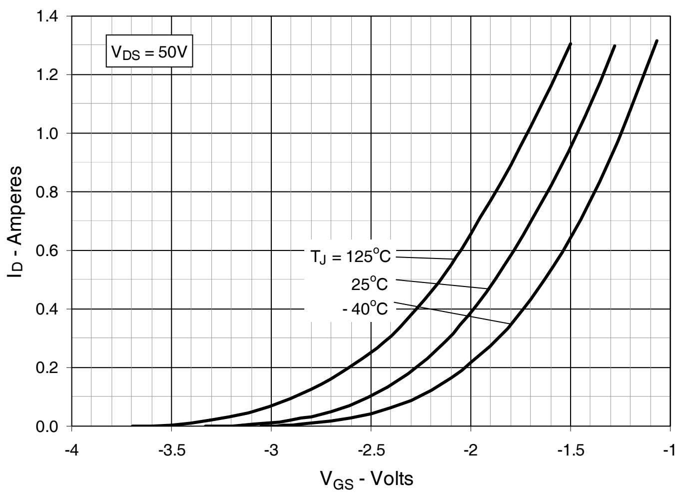


Fig. 10. Transconductance

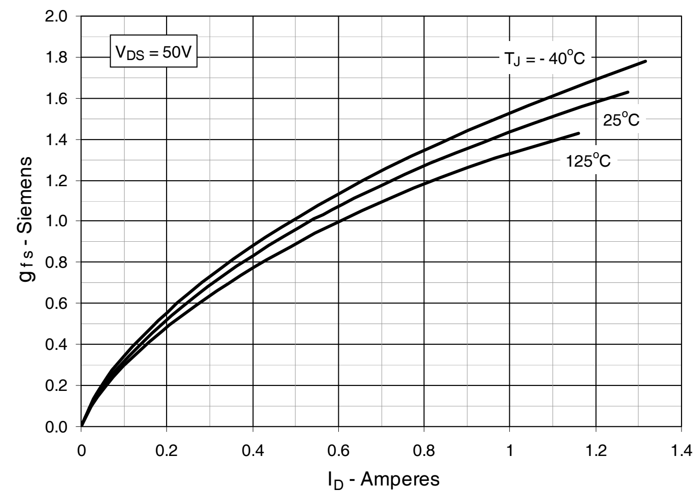


Fig. 11. Normalized Breakdown and Threshold Voltages vs. Junction Temperature

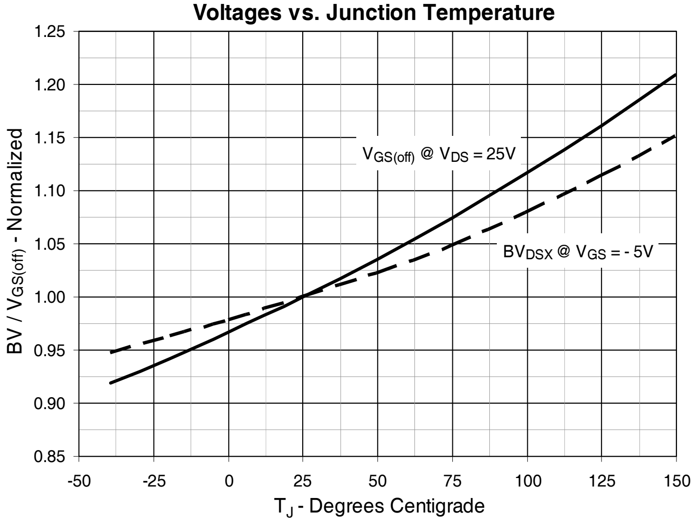


Fig. 12. Forward Voltage Drop of Intrinsic Diode

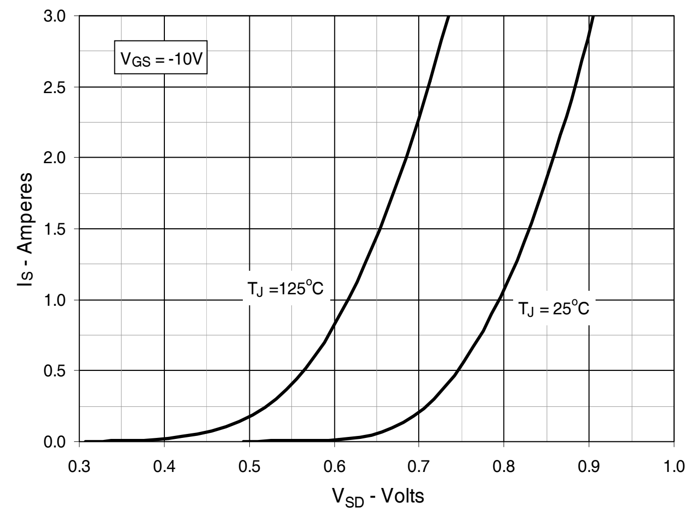


Fig. 13. Capacitance

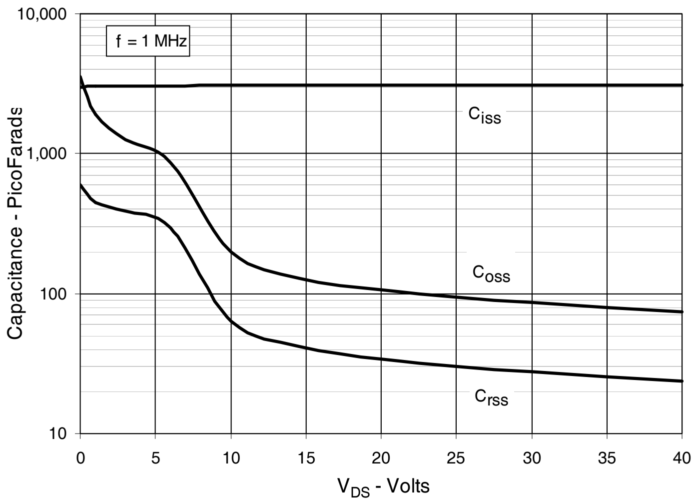


Fig. 14. Gate Charge

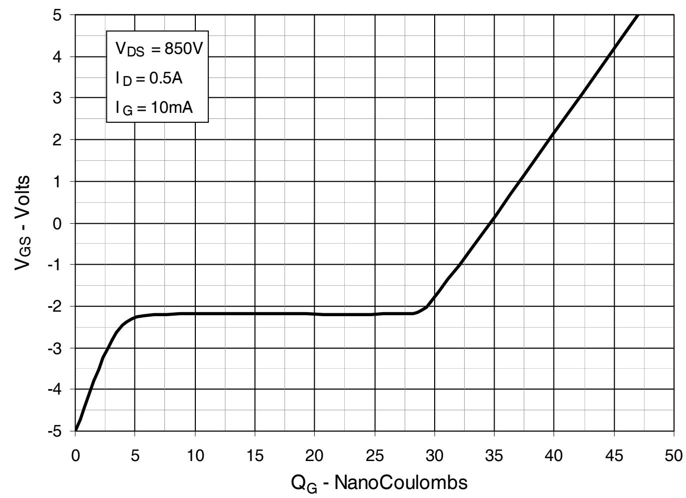


Fig. 15. Forward-Bias Safe Operating Area @ T_C = 25°C

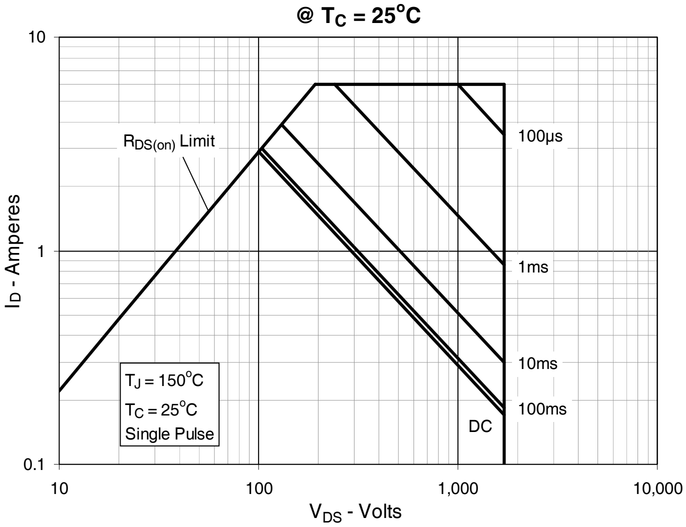


Fig. 16. Forward-Bias Safe Operating Area @ T_C = 75°C

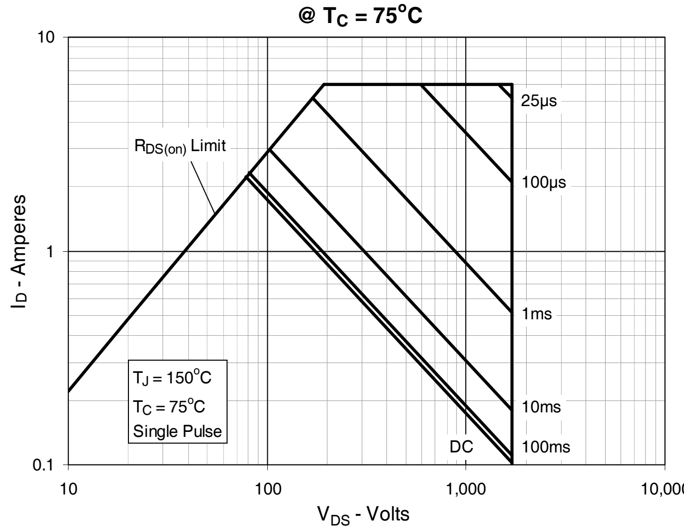


Fig. 17. Maximum Transient Thermal Impedance