IXYS

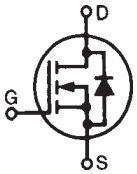
Preliminary Technical Information

Linear L2™ Power MOSFET with extended FBSOA

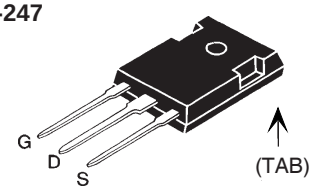
IXTH30N60L2
IXTQ30N60L2
IXTT30N60L2

V_{DSS} = 600V
I_{D25} = 30A
$R_{DS(on)}$ ≤ 240mΩ

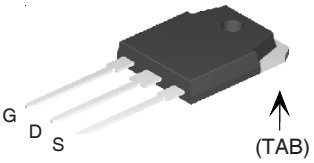
N-Channel Enhancement Mode
Avalanche rated



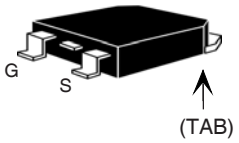
TO-247



TO-3P



TO-268



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	600	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	600	V
V_{GSS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C	30	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	80	A
I_A	T_C = 25°C	30	A
E_{AS}	T_C = 25°C	2	J
P_D	T_C = 25°C	540	W
T_J		-55 to +150	°C
T_{JM}		+150	°C
T_{stg}		-55 to +150	°C
T_L	1.6mm (0.063in) from case for 10s	300	°C
T_{SOLD}	Plastic body for 10s	260	°C
M_d	Mounting torque (TO-247&TO-3P)	1.13/10	Nm/lb.in.
Weight	TO-247	6.0	g
	TO-3P	5.5	g
	TO-268	4.0	g

Symbol (T_J = 25°C, unless otherwise specified)	Test Conditions	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 1mA	600			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250μA	2.5		4.5	V
I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
I_{DSS}	$V_{DS} = V_{DSS}$			50	μA
	V_{GS} = 0V T_J = 125°C			300	μA
$R_{DS(on)}$	V_{GS} = 10V, $I_D = 0.5 \bullet I_{D25}$, Note 1			240	mΩ

Features

- Designed for linear operation
- International standard packages
- Avalanche rated
- Molding epoxies meet UL 94 V-0 flammability classification
- Guaranteed FBSOA at 75°C

Applications

- Solid state circuit breakers
- Soft start controls
- Linear amplifiers
- Programmable loads
- Current regulators

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Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 10V, I_D = 0.5 • I_{D25}, Note 1	10	14	18	S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		10.7		nF
C_{oss}			600		pF
C_{rss}			130		pF
$t_{d(on)}$	**Resistive Switching Times**		43		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		65		ns
$t_{d(off)}$	R_G = 2Ω (External)		123		ns
t_f			43		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		335		nC
Q_{gs}			58		nC
Q_{gd}			212		nC
R_{thJC}				0.23	°C/W
R_{thCS}	(TO-247&TO-3P)		0.25		°C/W

Safe Operating Area Specification

Symbol	Test Conditions	Min.	Typ.	Max.	
SOA	V_{DS} = 480V, I_D = 0.6A, T_C = 75°C, t_p = 3s	288			W

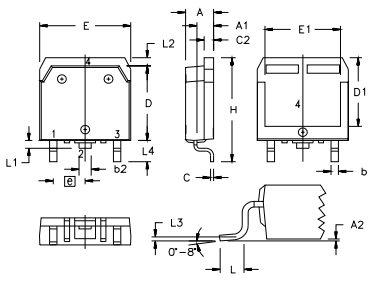
Source-Drain Diode

Characteristic Values
(T_J = 25°C, unless otherwise specified)

Symbol	Test Conditions	Min.	Typ.	Max.	
I_S	V_{GS} = 0V			30	A
I_{SM}	Repetitive, pulse width limited by T_{JM}			120	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = I_S, -di/dt = 100A/μs, V_R = 100V		710		ns

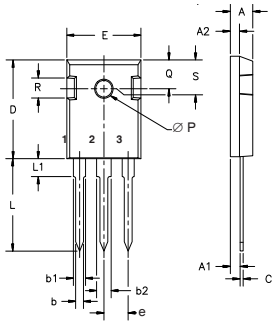
Note 1: Pulse test, t ≤ 300μs; duty cycle, d ≤ 2%.

TO-268 (IXTT) Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

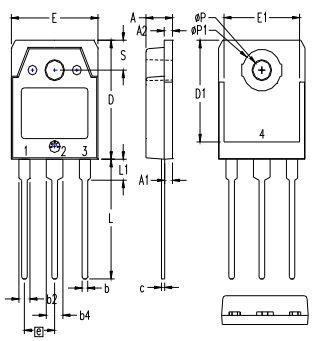
TO-247 (IXTH) Outline



Terminals: 1 - Gate 2 - Drain
3 - Source Tab - Drain

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	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
S	6.15 BSC		242 BSC	

TO-3P (IXTQ) Outline



1 – GATE
2 – DRAIN (COLLECTOR)
3 – SOURCE (EMITTER)
4 – DRAIN (COLLECTOR)

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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

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.

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IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,850,072 4,881,106 4,931,844 5,017,508 5,034,796 5,049,961 5,063,307 5,187,117 5,237,481 5,381,025 5,486,715 6,162,665 6,259,123 B1 6,306,728 B1 6,404,065 B1 6,534,343 6,583,505 6,683,344 6,710,405 B2 6,710,463 6,727,585 6,759,692 6,771,478 B2 7,005,734 B2 7,063,975 B2 7,071,537 7,157,338B2

Fig. 1. Output Characteristics @ 25ºC

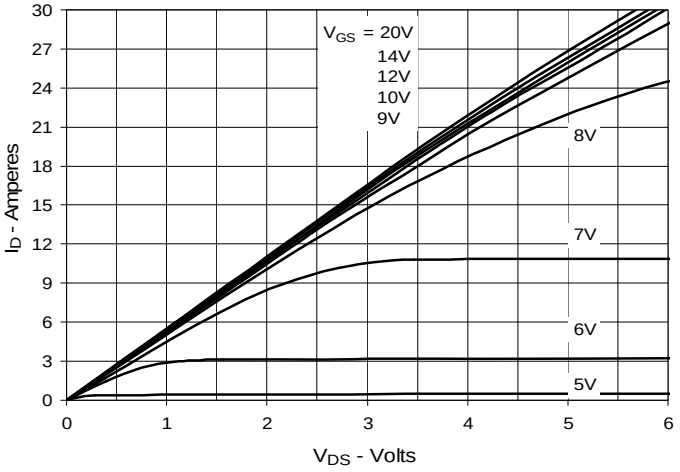


Fig. 2. Extended Output Characteristics @ 25ºC

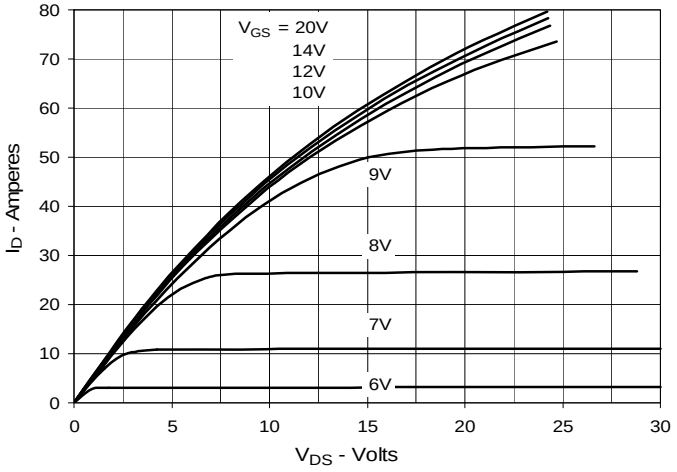


Fig. 3. Output Characteristics @ 125ºC

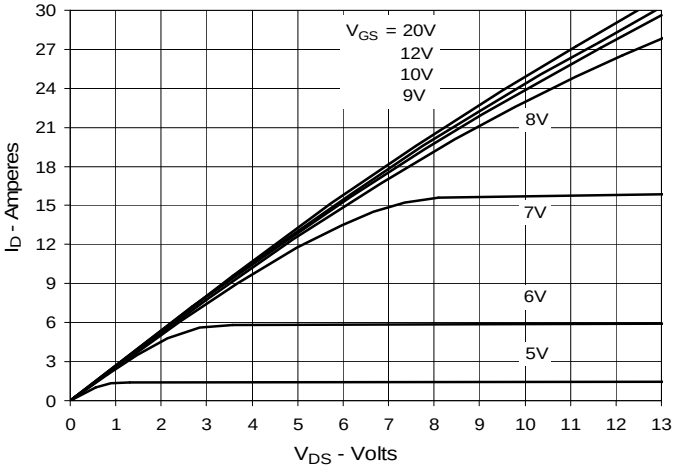


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 15A Value vs. Junction Temperature

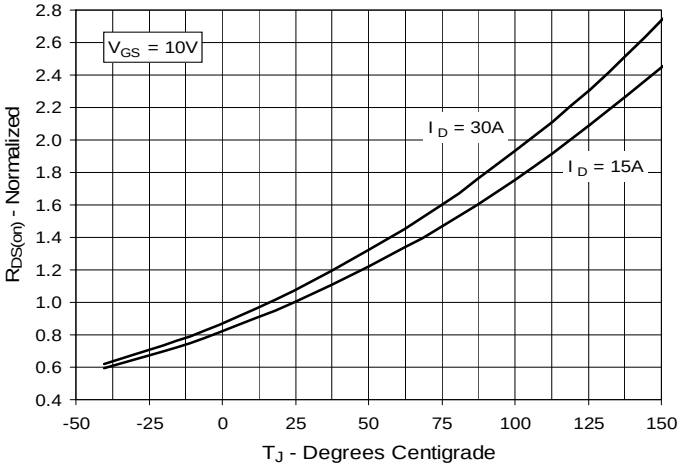


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 15A Value vs. Drain Current

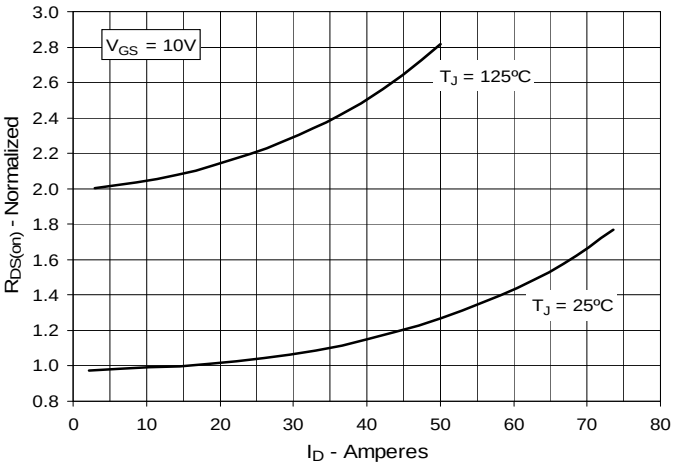
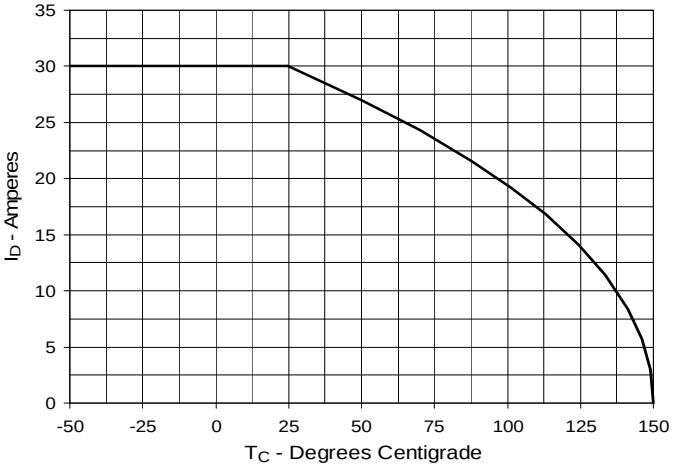


Fig. 6. Maximum Drain Current vs. Case Temperature



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Fig. 7. Input Admittance

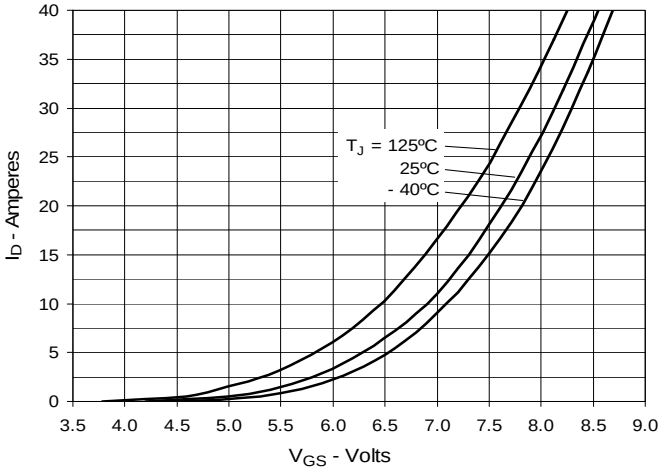


Fig. 8. Transconductance

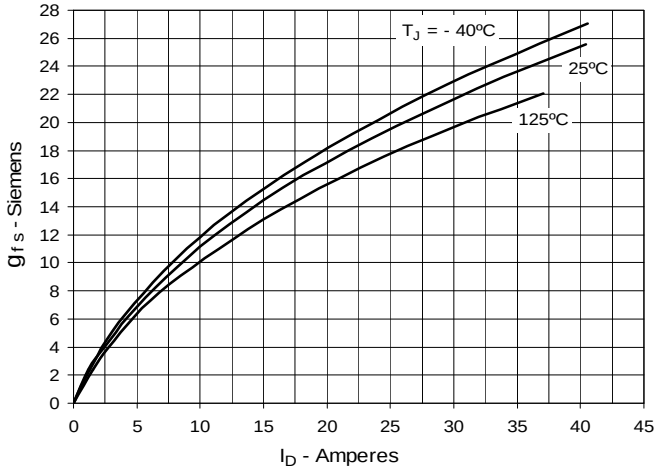


Fig. 9. Forward Voltage Drop of Intrinsic Diode

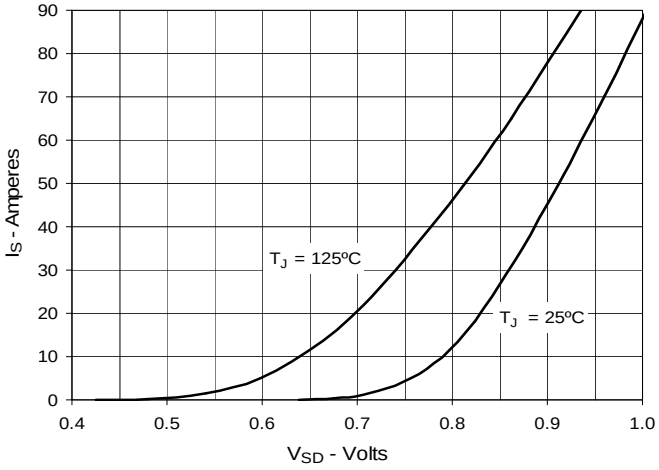


Fig. 10. Gate Charge

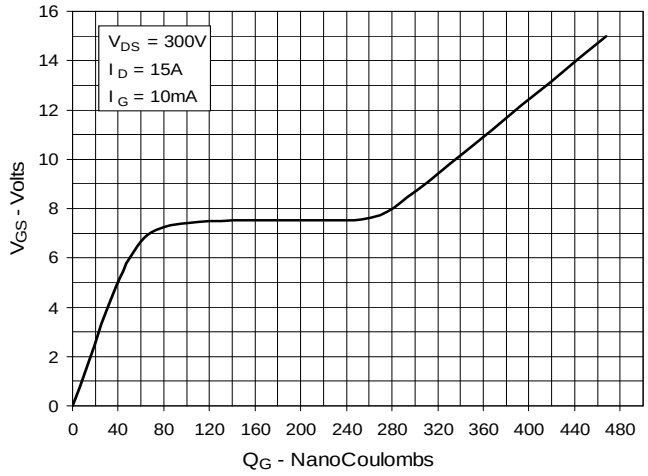


Fig. 11. Capacitance

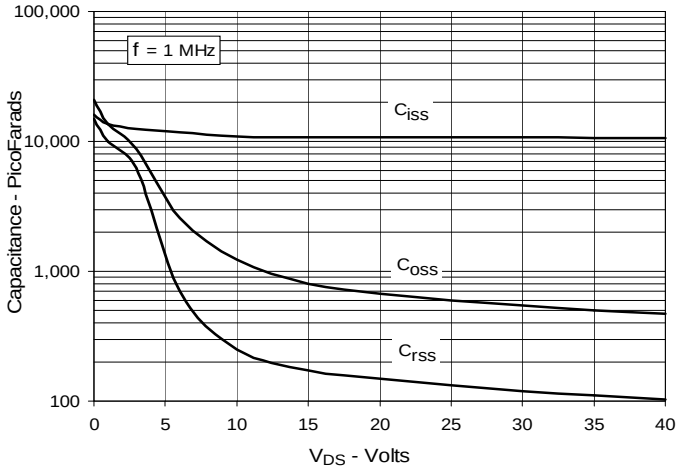
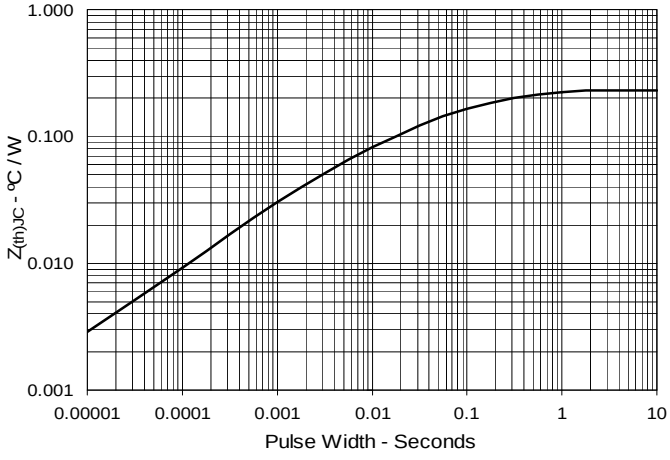


Fig. 12. Maximum Transient Thermal Impedance



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

Fig. 13. Forward-Bias Safe Operating Area @ T_C = 25ºC

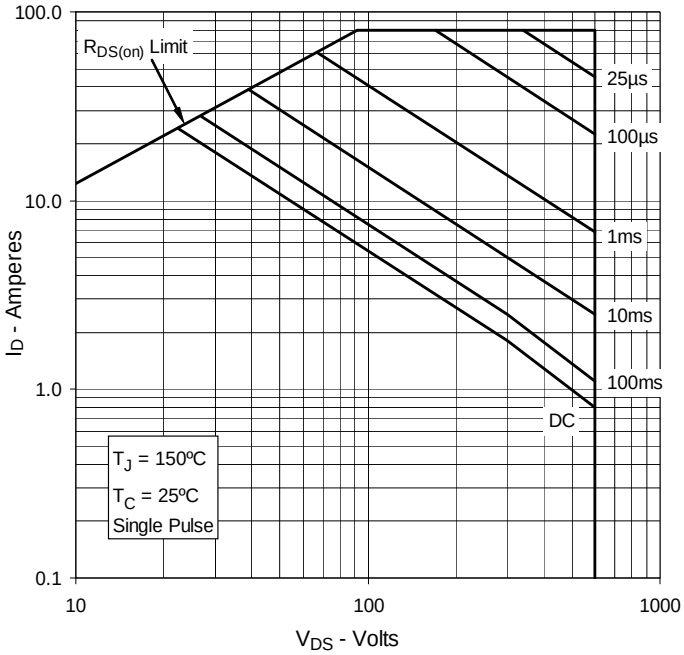
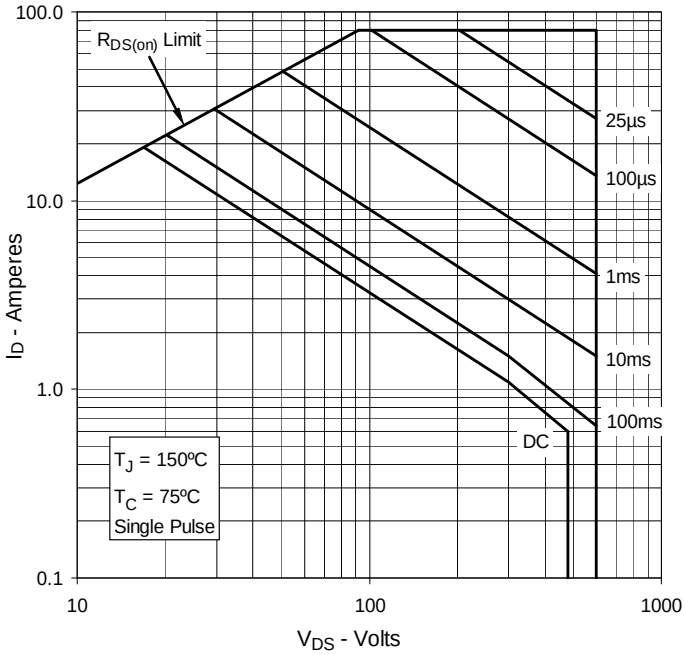


Fig. 14. Forward-Bias Safe Operating Area @ T_C = 75ºC



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