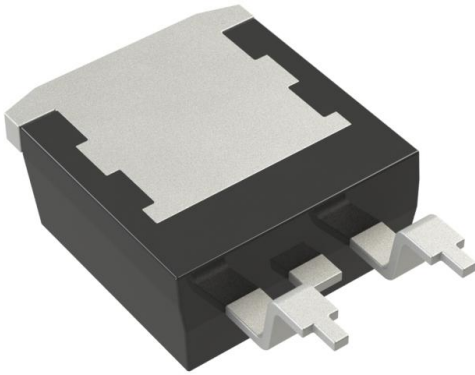


# IXFA6N120P Datasheet

[www.digi-electronics.com](http://www.digi-electronics.com)



<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	IXFA6N120P-DG
Manufacturer	<a href="#">IXYS</a>
Manufacturer Product Number	IXFA6N120P
Description	MOSFET N-CH 1200V 6A TO263
Detailed Description	N-Channel 1200 V 6A (Tc) 250W (Tc) Surface Mount TO-263AA (IXFA)



Tel: +00 852-30501935

RFQ Email: [Info@DiGi-Electronics.com](mailto:Info@DiGi-Electronics.com)

DiGi is a global authorized distributor of electronic components.

## Purchase and inquiry

Manufacturer Product Number:

IXFA6N120P

Series:

HiPerFET™, Polar

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

1200 V

Drive Voltage (Max Rds On, Min Rds On):

10V

Vgs(th) (Max) @ Id:

5V @ 1mA

Vgs (Max):

±30V

FET Feature:

-

Operating Temperature:

-55°C ~ 150°C (Tj)

Supplier Device Package:

TO-263AA (IXFA)

Base Product Number:

IXFA6N120

Manufacturer:

IXYS

Product Status:

Active

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

6A (Tc)

Rds On (Max) @ Id, Vgs:

2.4Ohm @ 500mA, 10V

Gate Charge (Qg) (Max) @ Vgs:

92 nC @ 10 V

Input Capacitance (Ciss) (Max) @ Vds:

2830 pF @ 25 V

Power Dissipation (Max):

250W (Tc)

Mounting Type:

Surface Mount

Package / Case:

TO-263-3, D2PAK (2 Leads + Tab), TO-263AB

## Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

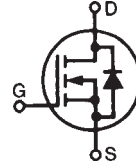
EAR99



# Polar™ HiPerFET™ Power MOSFET

N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode

## IXFA6N120P IXFP6N120P IXFH6N120P



Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	1200	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ , $R_{GS} = 1\text{M}\Omega$	1200	V
$V_{GSS}$	Continuous	$\pm 30$	V
$V_{GSM}$	Transient	$\pm 40$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	6	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$	18	A
$I_A$	$T_C = 25^\circ\text{C}$	3	A
$E_{AS}$	$T_C = 25^\circ\text{C}$	300	mJ
$dv/dt$	$I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$	10	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	250	W
$T_J$		-55 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		-55 ... +150	$^\circ\text{C}$
$T_L$	Maximum Lead Temperature for Soldering	300	$^\circ\text{C}$
$T_{SOLD}$	1.6 mm (0.062in.) from Case for 10s	260	$^\circ\text{C}$
$F_C$	Mounting Force (TO-263)	10..65 / 2.2..14.6	N/lb
$M_d$	Mounting Torque (TO-247 & TO-220)	1.13 / 10	Nm/lb.in
<b>Weight</b>	TO-263	2.5	g
	TO-220	3.0	g
	TO-247	6.0	g

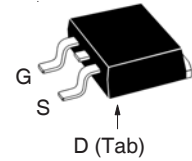
Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0\text{V}$ , $I_D = 250\mu\text{A}$	1200		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 1\text{mA}$	2.5		5.0 V
$I_{GSS}$	$V_{GS} = \pm 30\text{V}$ , $V_{DS} = 0\text{V}$			$\pm 100$ nA
$I_{DSS}$	$V_{DS} = V_{DSS}$ , $V_{GS} = 0\text{V}$ $T_J = 125^\circ\text{C}$			10 $\mu\text{A}$ 1 mA
$R_{DS(on)}$	$V_{GS} = 10\text{V}$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1			2.75 $\Omega$

$$V_{DSS} = 1200\text{V}$$

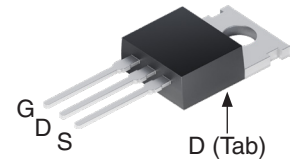
$$I_{D25} = 6\text{A}$$

$$R_{DS(on)} \leq 2.75\Omega$$

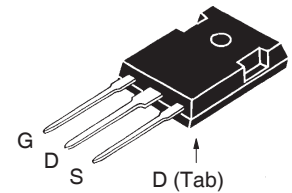
### TO-263 AA (IXFA)



### TO-220AB (IXFP)



### TO-247 (IXFH)



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

### Features

- International Standard Packages
- Dynamic  $dv/dt$  Rating
- Avalanche Rated
- Fast Intrinsic Diode
- Low  $Q_G$  &  $R_{DS(on)}$
- Low Drain-to-Tab Capacitance
- Low Package Inductance

### Advantages

- Easy to Mount
- Space Savings

### Applications

- DC-DC Converters
- Battery Chargers
- Switch-Mode and Resonant-Mode Power Supplies
- Uninterrupted Power Supplies
- AC Motor Drives
- High Speed Power Switching Applications



IXFA6N120P

IXFP6N120P

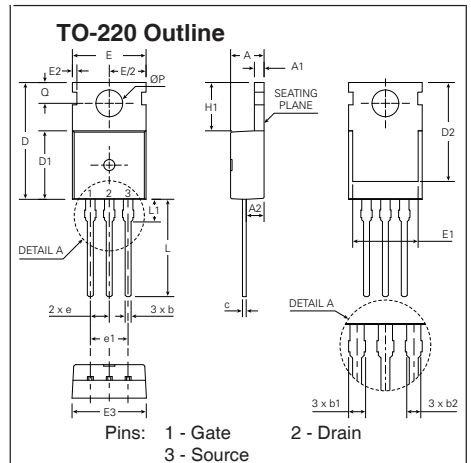
IXFH6N120P

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max
$g_{fs}$	$V_{DS} = 20\text{V}, I_D = 0.5 \cdot I_{D25}$ , Note 1	3.0	5.0	S
$R_{Gi}$	Gate Input Resistance		1.8	$\Omega$
$C_{iss}$	$V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$		2830	pF
$C_{oss}$		150	pF	
$C_{rss}$		30	pF	
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 3\Omega$ (External)		24	ns
$t_r$		11	ns	
$t_{d(off)}$		60	ns	
$t_f$		14	ns	
$Q_{g(on)}$	$V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$		92	nC
$Q_{gs}$		15	nC	
$Q_{gd}$		50	nC	
$R_{thJC}$				0.50 $^\circ\text{C/W}$
$R_{thCS}$	TO-220		0.50	$^\circ\text{C/W}$
$R_{thCS}$	TO-247		0.21	$^\circ\text{C/W}$

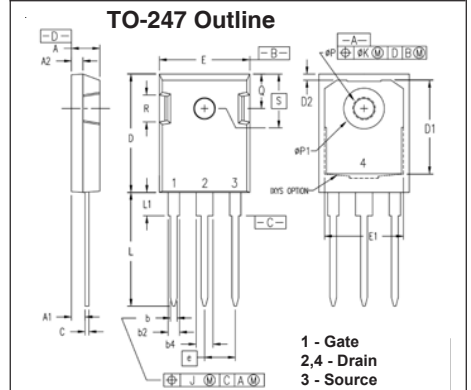
Source-Drain Diode

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max
$I_S$	$V_{GS} = 0\text{V}$			6 A
$I_{SM}$	Repetitive, Pulse Width Limited by $T_{JM}$			24 A
$V_{SD}$	$I_F = I_S, V_{GS} = 0\text{V}$ , Note 1			1.4 V
$t_{rr}$	$I_F = 3\text{A}, V_{GS} = 0\text{V}$ $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}$			300 ns
$I_{RM}$		7.8	A	
$Q_{RM}$		1.1	$\mu\text{C}$	

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

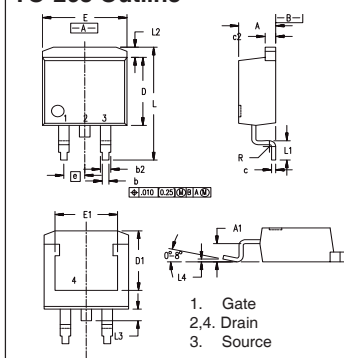


Symbol	Inches			Millimeters		
	Min.	Typical	Max.	Min.	Typical	Max
A	0.169	0.177	0.185	4.30	4.50	4.70
A1	0.049	0.051	0.055	1.25	1.30	1.40
A2	0.087	0.094	0.102	2.20	2.40	2.60
b	0.028	0.031	0.035	0.70	0.80	0.90
b1	0.056	0.060	0.064	1.42	1.52	1.62
b2	0.046	0.050	0.054	1.17	1.27	1.37
c	0.018	0.020	0.024	0.45	0.50	0.60
D	0.610	0.618	0.626	15.50	15.70	15.90
D1	0.354	0.362	0.370	9.00	9.20	9.40
D2	0.516	0.524	0.531	13.10	13.30	13.50
E	0.382	0.390	0.400	9.70	9.90	10.10
E1		0.346			8.80	
E2		0.024			0.60	
E3	0.386	0.394	0.402	9.80	10.00	10.20
e		0.100			2.54 BSC	
e1		0.200			5.08 BSC	
H1	0.248	0.256	0.264	6.30	6.50	6.70
L	0.507	0.515	0.523	12.88	13.08	13.28
L1		0.118			3.00	
OP	0.134	0.142	0.150	3.40	3.60	3.80
Q	0.106	0.110	0.114	2.70	2.80	2.90



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.70	5.30	0.185	0.209
A1	2.21	2.59	0.087	0.102
A2	1.50	2.49	0.059	0.098
b	0.99	1.40	0.039	0.055
b2	1.65	2.39	0.065	0.094
b4	2.59	3.43	0.102	0.135
c	0.38	0.89	0.015	0.035
D	20.79	21.45	0.819	0.845
D1	13.07	-	0.515	-
D2	0.51	1.35	0.020	0.053
E	15.48	16.24	0.610	0.640
E1	13.45	-	0.53	-
E2	4.31	5.48	0.170	0.216
e	5.45 BSC		0.215 BSC	
L	19.80	20.30	0.078	0.800
L1	-	4.49	-	0.177
OP	3.55	3.65	0.140	0.144
OP1	-	7.39	-	0.290
Q	5.38	6.19	0.212	0.244
S	6.14 BSC		0.242 BSC	

TO-263 Outline



Dim.	Millimeter		Inches	
	Min.	Max.	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
L4	0	0.13	0	.005

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

LF MOSFETs and IGBTs are covered by one or more of the following U.S. patents:	4,835,592	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065B1	6,683,344	6,727,585	7,005,734B2	7,157,338B2
	4,860,072	5,017,508	5,063,307	5,381,025	6,259,123B1	6,534,343	6,710,405B2	6,759,692	7,063,975B2	
	4,881,106	5,034,796	5,187,117	5,486,715	6,306,728B1	6,583,505	6,710,463	6,771,478B2	7,071,537	



Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$

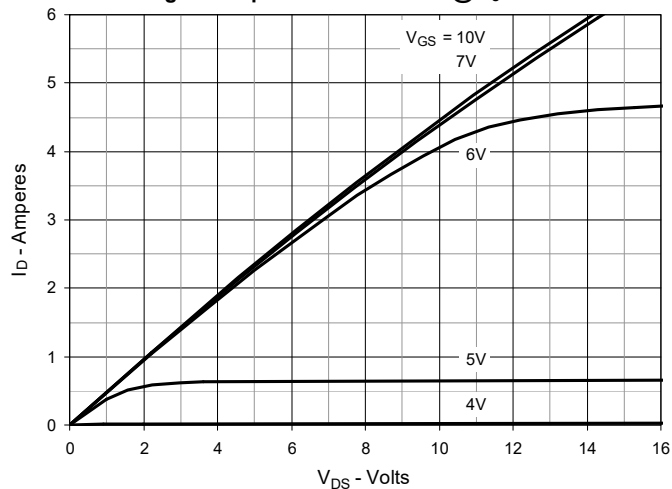


Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$

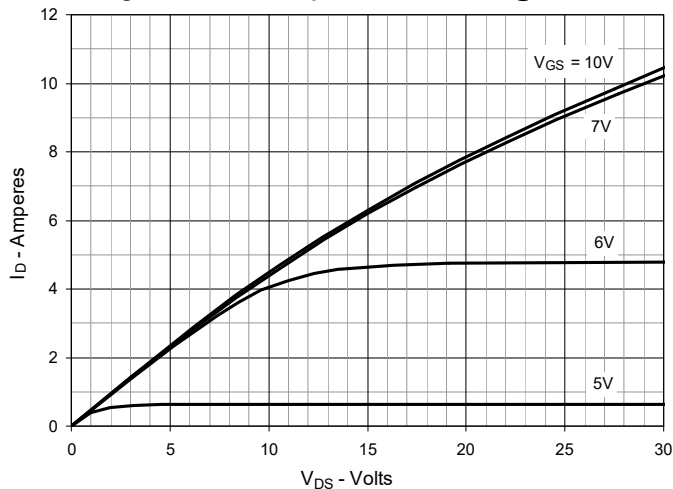


Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$

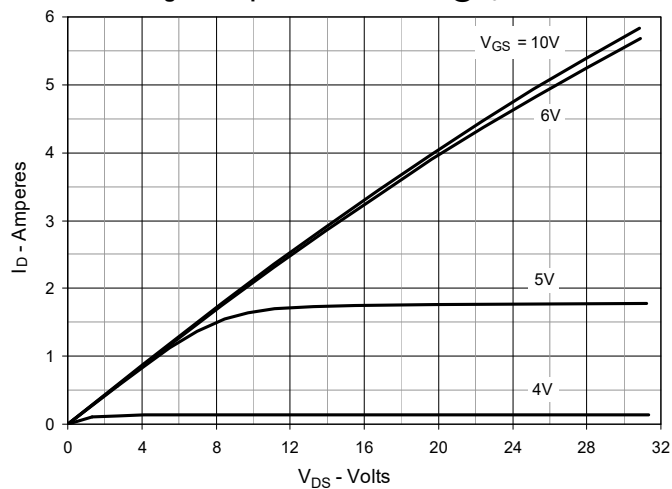


Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 3A$  Value vs. Junction Temperature

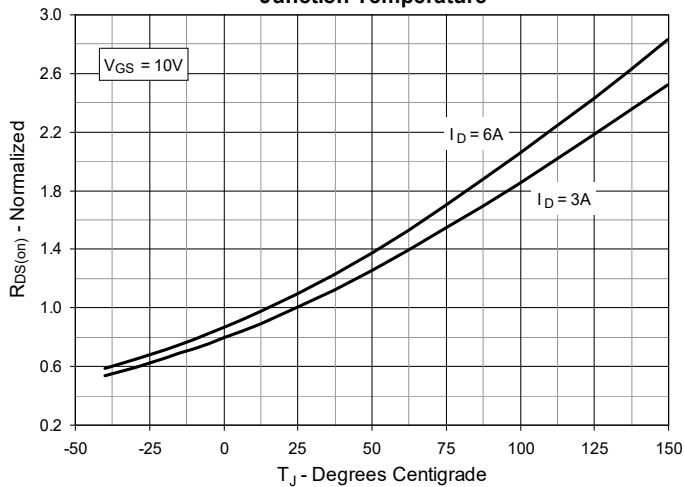


Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 3A$  Value vs. Drain Current

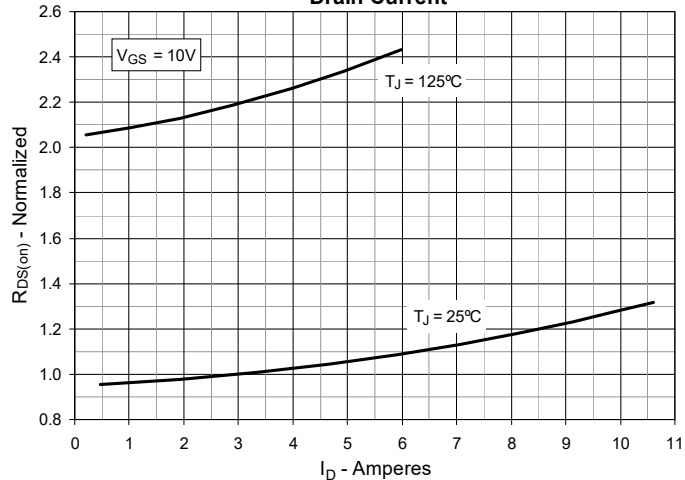


Fig. 6. Maximum Drain Current vs. Case Temperature

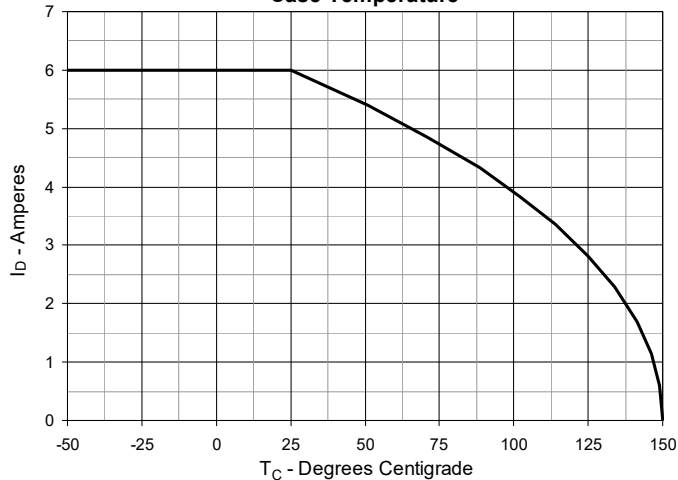




Fig. 7. Input Admittance

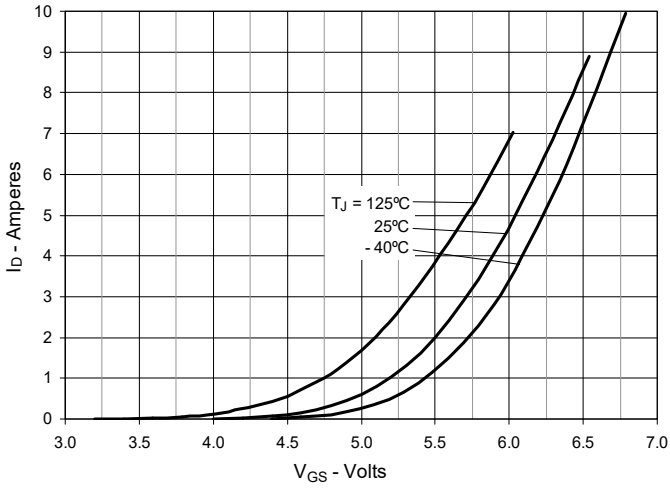


Fig. 8. Transconductance

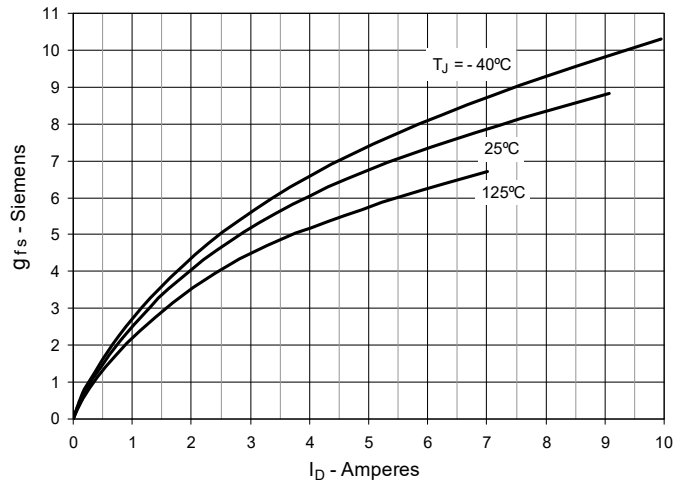


Fig. 9. Forward Voltage Drop of Intrinsic Diode

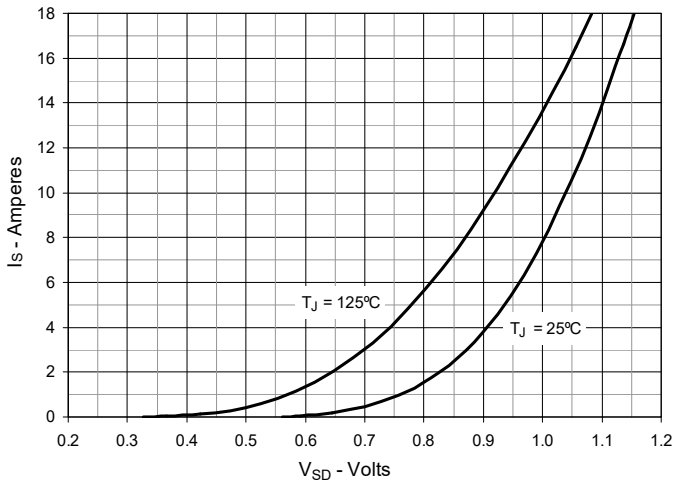


Fig. 10. Gate Charge

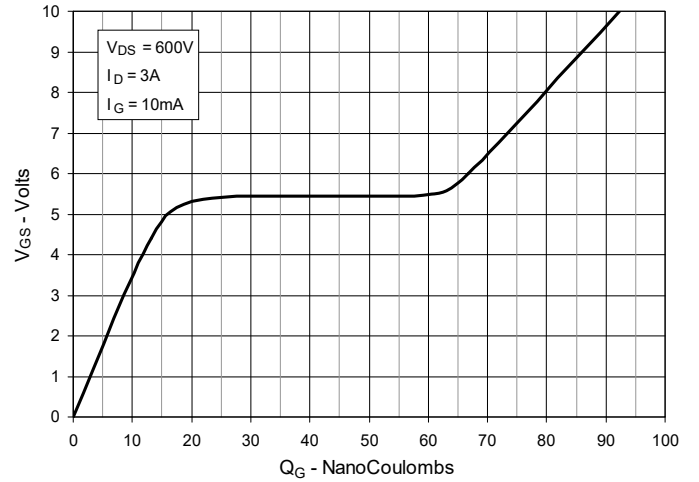


Fig. 11. Capacitance

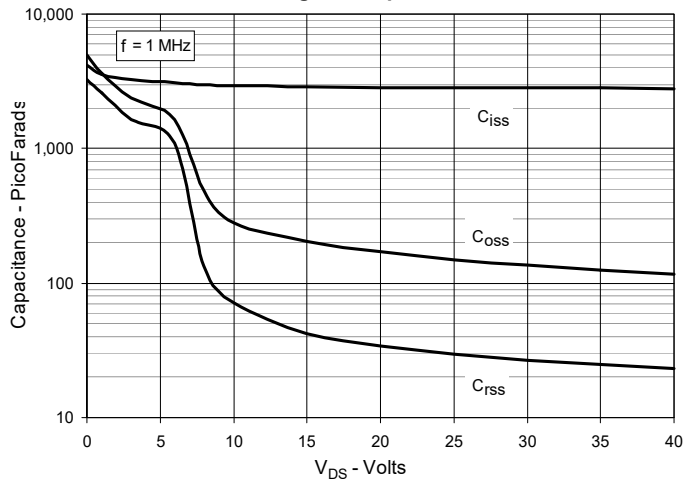


Fig.12. Forward-Bias Safe Operating Area

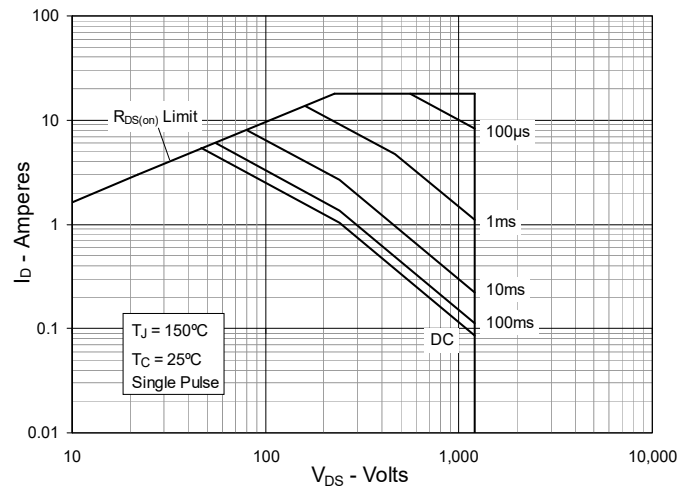
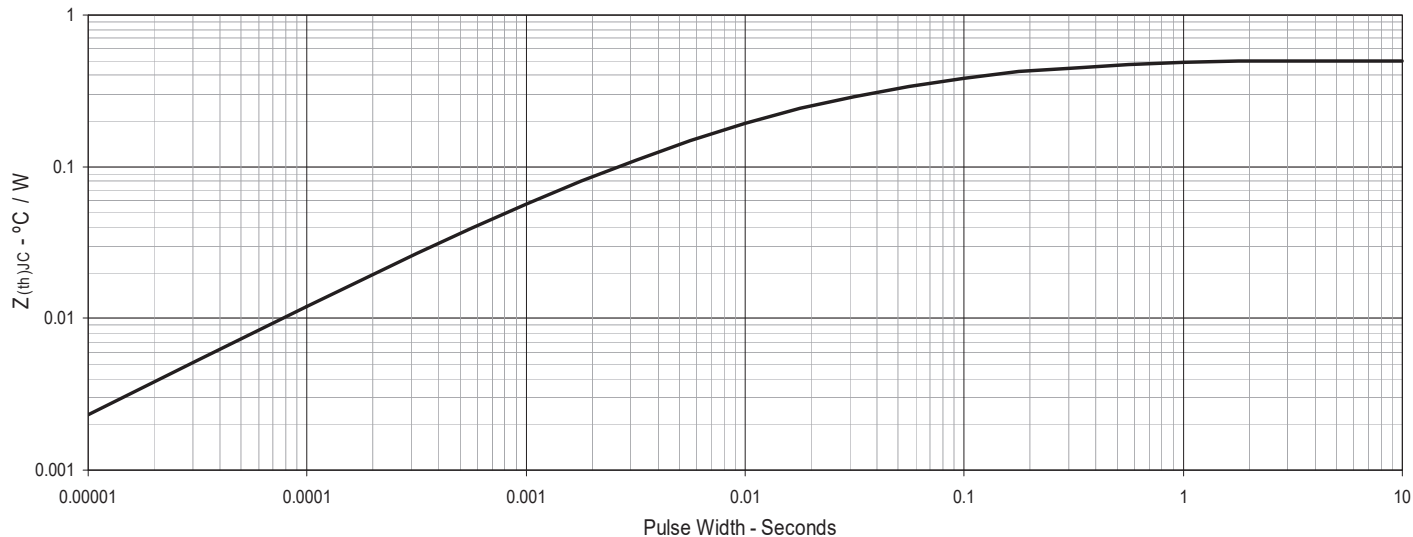


Fig. 13. Maximum Transient Thermal Impedance

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Part of:



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