

SQPF4N120

1200V 4A N-Channel Enhancement Mode Power MOSFET

Features

- Low on-Resistance: $R_{DS(on)}=3.0\Omega(\text{typ.})$
- Special Process Technology for high ESD Capability
- 100% Avalanche Test
- Good Stability and Uniformity with High E_{AS}

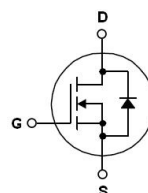
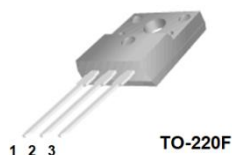
Description

The SQPF4N120 is an N-Channel enhancement mode power MOSFET, it has low static on-resistance and high avalanche energy strength. This device provide excellent switching performance for switched mode power supplies, active power factor correction and electronic lamp ballasts.

Applications

- Switched Mode Power Supplies
- Active Power Factor Correction, Electronic Ballasts

Package Type & Internal Circuit



Absolute Maximum Ratings @ $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Ratings	Unit
V_{DSS}	Drain to Source Voltage	1200	V
V_{GSS}	Gate to Source Voltage	± 30	V
I_D	Drain Current	$T_C=25^\circ\text{C}$	4
		$T_C=100^\circ\text{C}$	2.5
I_{DM}	Pulsed Drain Current (Note1)	12	A
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	65
	Derate above 25°C	0.52	W/ $^\circ\text{C}$
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	700	mJ
T_J	Operating Junction Temperature Range	$-55\sim+150$	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	$-55\sim+150$	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{th(J-C)}$	Thermal Resistance, Junction to case	1.92	$^\circ\text{C/W}$
$R_{th(J-A)}$	Thermal Resistance, Junction to Ambient	70	$^\circ\text{C/W}$

**Electrical Characteristics** @T_C=25 °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =1mA	1200	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	3.5	-	4.5	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =2A	-	3.0	4.5	Ω
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =V _{DSS} , V _{GS} =0V	-	-	10	uA
I _{GSS}	Gate to Source Leakage Current	V _{GS} =V _{GSS} , V _{DS} =0V	-	-	±100	nA

D-S Diode Characteristics and Maximum Rating @T_C=25 °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Maximum Drain to Source Diode Forward Current		-	-	4.0	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} =0V, I _S =4A	-	0.9	1.2	V
T _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S =4A,	-	510	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt=-100A/us	-	3.2	-	nC

Switching Characteristics @T_C=25 °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
t _{d(on)}	Turn-on Delay Time	I _D =4A, V _{DD} =600V, R _G =5Ω (Note 3)	-	9.0	-	ns
t _r	Rise Time		-	8.0	-	ns
t _{d(off)}	Turn-off Delay Time		-	20	-	ns
t _f	Fall Time		-	10.0	-	ns
C _{ies}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, f=1.0MHz	-	1410	-	pF
C _{oes}	Output Capacitance		-	112	-	pF
C _{rss}	Reverse Transfer Capacitance		-	5.8	-	pF
Q _g	Total Gate Charge	I _D =4A, V _{DD} =960V V _{GS} =10V (Note 3)	-	41	-	nC
Q _{gs}	Gate to Source Charge		-	11	-	nC
Q _{gd}	Gate to Drain Charge		-	17	-	nC

Note:

1. Repetitive rating: pulse-width limited by maximum junction temperature
2. V_{DD}=100V, L=20mH, R_G=25Ω, V_G=20V, stating T_J=25°C
3. Essentially independent of operating temperature typical characteristics

Typical Performance Characteristics

Fig. 1. Typical on-Region Characteristics

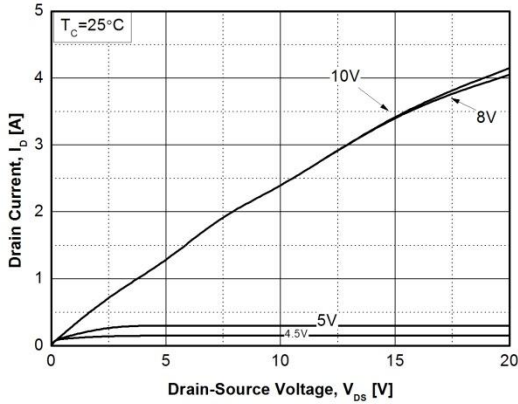


Fig. 2. Typical Transfer Characteristics

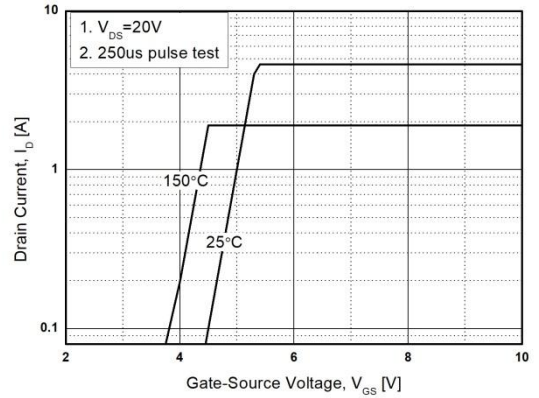
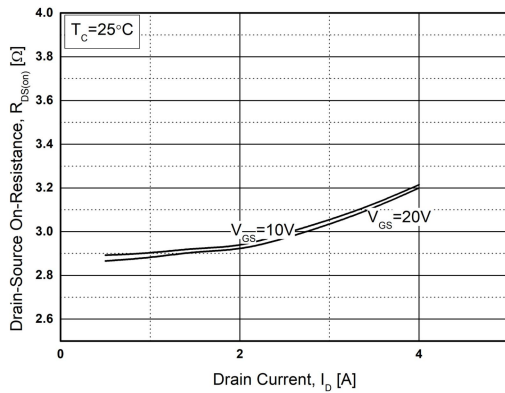
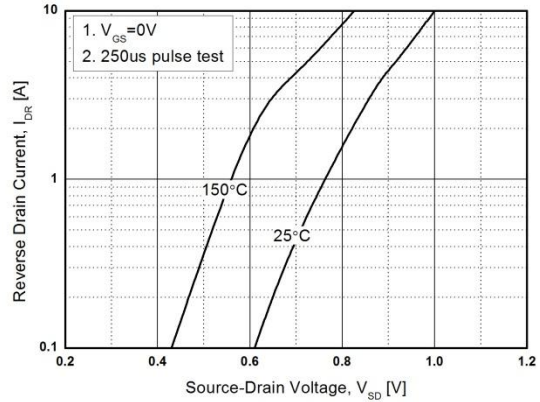

Fig. 3. Static on-Resistance vs. I_D

Fig. 4. Body Diode Forward Voltage vs. I_{DR}


Fig. 5. Capacitance Characteristics

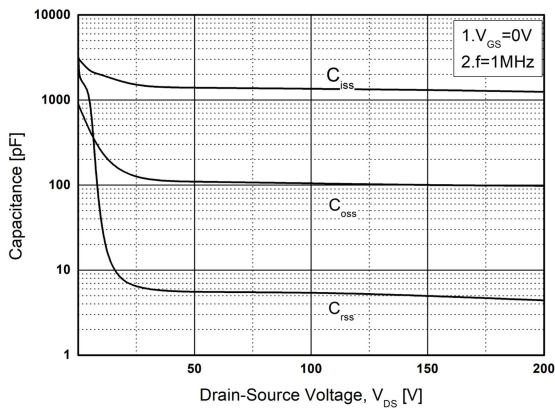
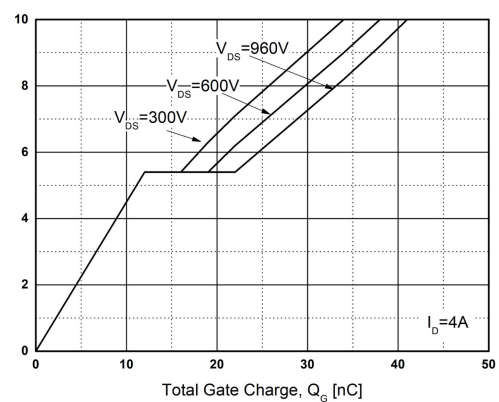


Fig. 6. Gate Charge Characteristics



Typical Performance Characteristics

Fig. 7. Breakdown Voltage vs. Temperature

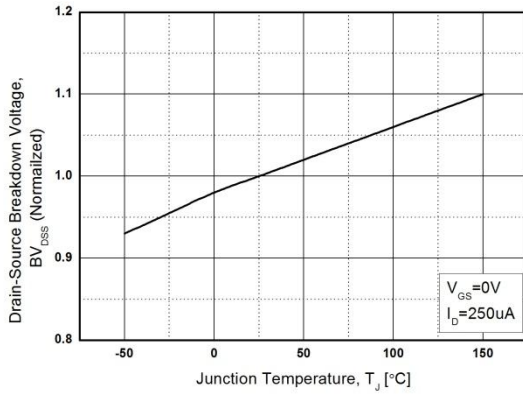


Fig. 8. Static on-Resistance vs. Temperature

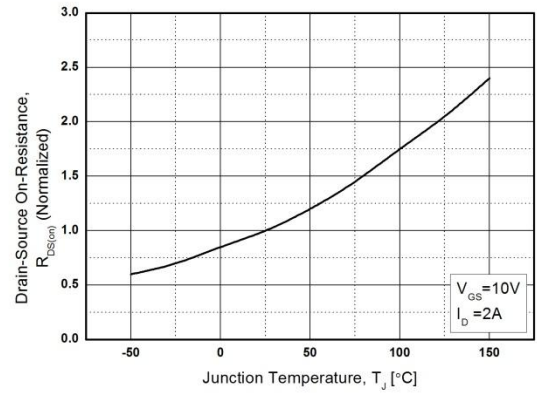


Fig. 9. Maximum Safe Operating Area

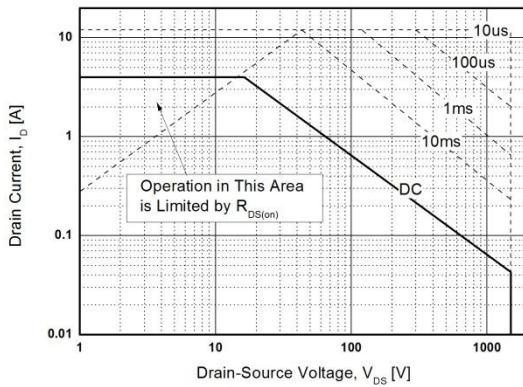


Fig. 10. Maximum Drain Current vs. Temperature

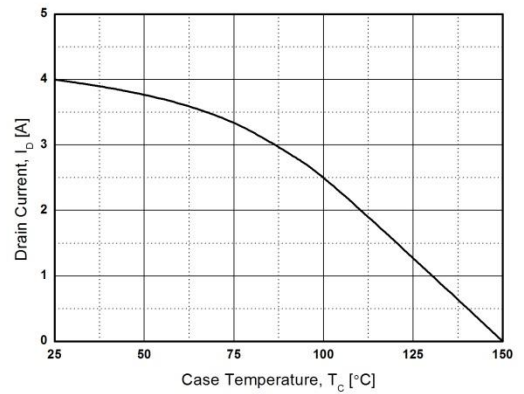
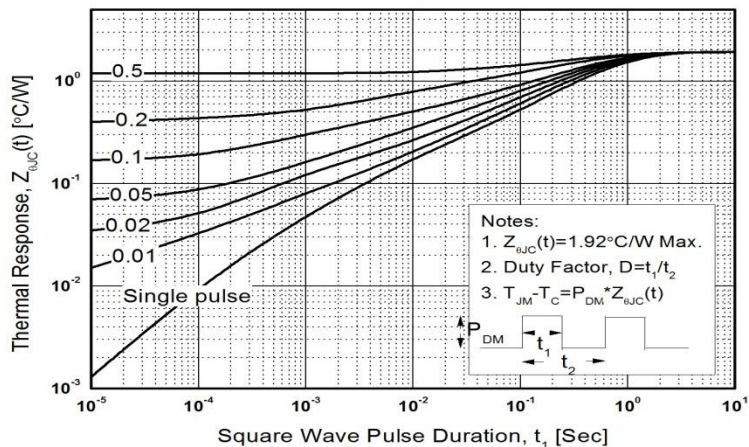


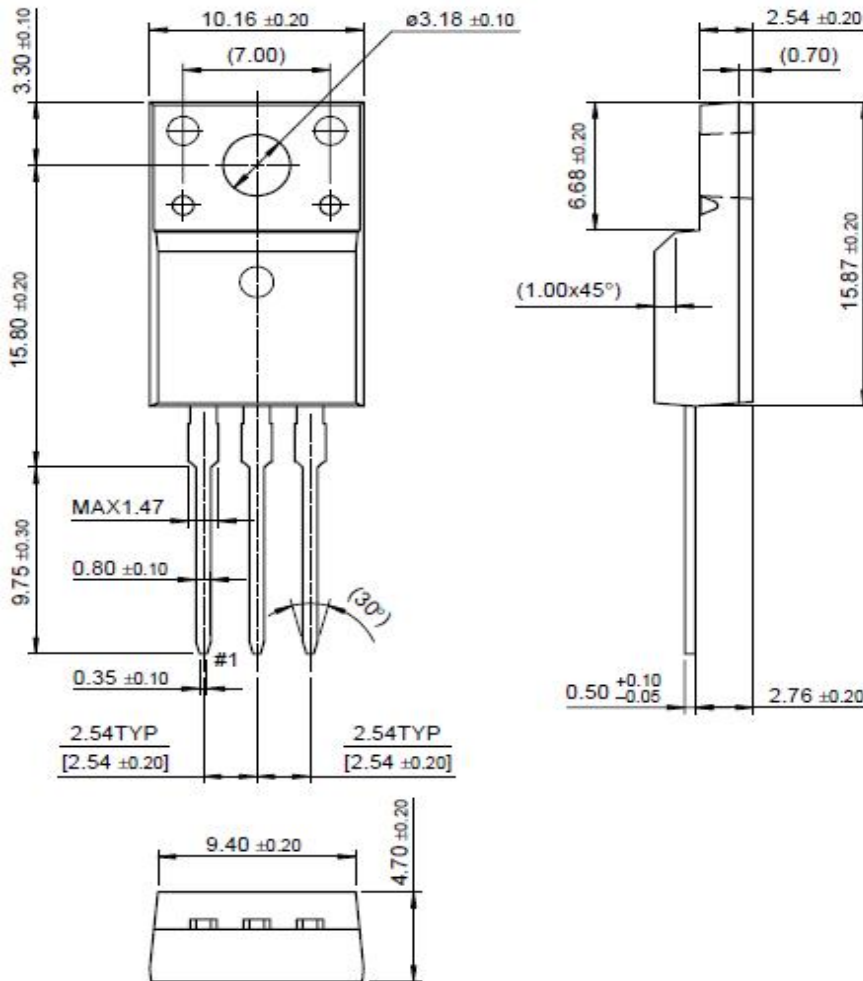
Fig. 11. Transient Thermal Response Curve



Package Dimensions

TO-220F

(Dimensions in Millimeters)



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