



SPN120T15

N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SPN120T15 is the N-Channel enhancement mode power field effect transistor which is produced using super high cell density DMOS trench technology. This high density process is especially tailored to minimize on-state resistance. These devices are particularly suitable for synchronous rectifier application, Motor control power management and other Power Tool circuits. It has been optimized for low gate charge, low $R_{DS(ON)}$ and fast switching speed.

FEATURES

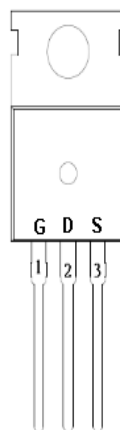
- ◆ 150V/120A, $R_{DS(ON)}=10.5\text{m}\Omega@V_{GS}=10\text{V}$
- ◆ High density cell design for extremely low $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ TO-220-3L/TO-220F-3L package design

APPLICATIONS

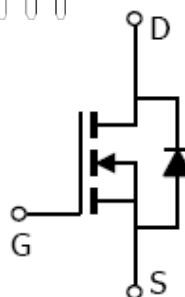
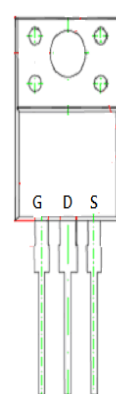
- AC/DC Synchronous Rectifier
- Load Switch
- UPS
- Power Tool
- Motor Control

PIN CONFIGURATION

TO-220



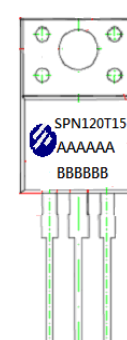
TO-220F



PART MARKING



A : Lot Code
B : Date Code



A: Lot Code
B: Date Code
(YYMMDD)



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PIN DESCRIPTION

Pin	Symbol	Description
1	G	Gate
2	D	Drain
3	S	Source

ORDERING INFORMATION

Part Number	Package	Part Marking
SPN120T15T220TGB	TO-220-3L	SPN120T15
SPN120T15T220FTGB	TO-220F-3L	SPN120T15

※ SPN120T15T220TGB : Tube ; Pb – Free ; Halogen – Free

※ SPN120T15T220FTGB : Tube ; Pb – Free ; Halogen - Free

ABSOLUTE MAXIMUM RATINGS

(TA=25°C Unless otherwise noted)

Parameter		Symbol	Typical	Unit
Drain-Source Voltage		V _{DSS}	150	V
Gate –Source Voltage		V _{GSS}	±20	V
Continuous Drain Current(T _J =150°C)	T _C =25°C	I _D	120	A
	T _C =100°C		85	
Pulsed Drain Current		I _{DM}	400	A
Avalanche Energy, Single Pulse @ L=1mH, T _C =25°C		E _{AS}	540	mJ
Power Dissipation @ T _C =25°C		P _D	333	W
Operating Junction Temperature		T _J	-55/175	°C
Storage Temperature Range		T _{STG}	-55/175	°C
Thermal Resistance-Junction to Ambient		R _{θJA}	60	°C/W
Thermal Resistance-Junction to Case		R _{θJC}	0.45	°C/W



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ELECTRICAL CHARACTERISTICS

(T_A=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250μA	150			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	
Gate Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =150V, V _{GS} =0V T _J =25°C			1	μA
		V _{DS} =150V, V _{GS} =0V T _J =100°C			100	
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A		8.8	10.5	mΩ
Forward Transconductance	g _{fs}	V _{DS} =5V, I _D =20A		90		S
Gate Resistance	R _G	V _{GS} =0V, V _{DS} =Open, f=1MHz		0.7		Ω
Diode Forward Voltage	V _{SD}	I _S =20A, V _{GS} =0V		0.9	1.2	V
Dynamic						
Total Gate Charge	Q _g	V _{DS} =75V, V _{GS} =10V I _D =20A		66		nC
Gate-Source Charge	Q _{gs}			11		
Gate-Drain Charge	Q _{gd}			24		
Input Capacitance	C _{iss}	V _{DS} =75V, V _{GS} =0V f=1MHz		4770		pF
Output Capacitance	C _{oss}			340		
Reverse Transfer Capacitance	C _{rss}			92		
Turn-On Time	t _{d(on)}	V _{DD} =75V, V _{GS} =10V I _D =20A, R _G =10Ω		17		nS
	t _r			56		
Turn-Off Time	t _{d(off)}			30		
	t _f			28		



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TYPICAL CHARACTERISTICS

Fig 1. Typical Output Characteristics

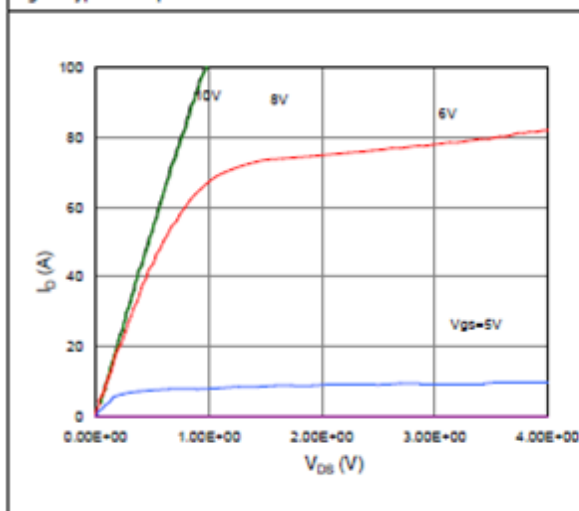


Figure 2. On-Resistance vs. Gate-Source Voltage

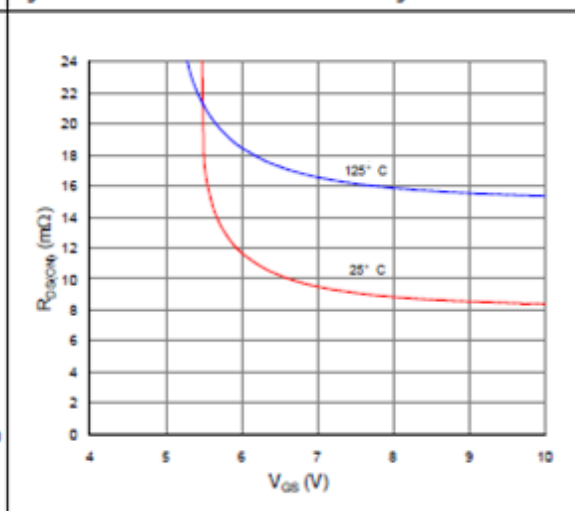


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

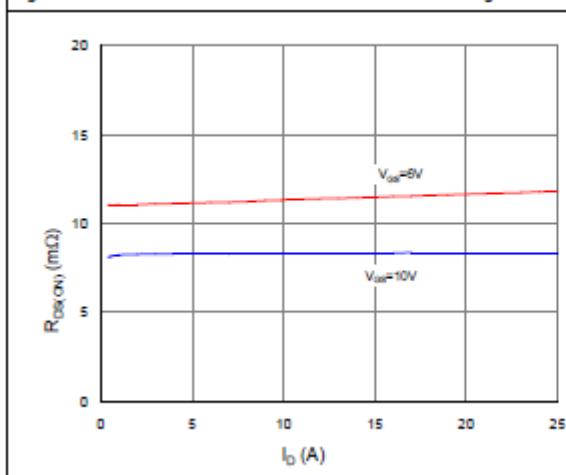


Figure 4. Normalized On-Resistance vs. Junction Temperature

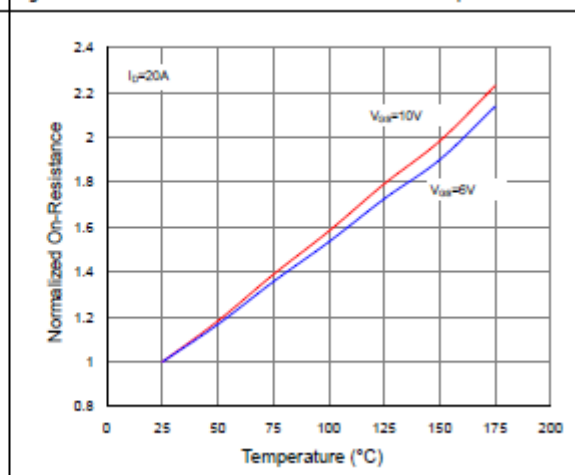


Figure 5. Typical Transfer Characteristics

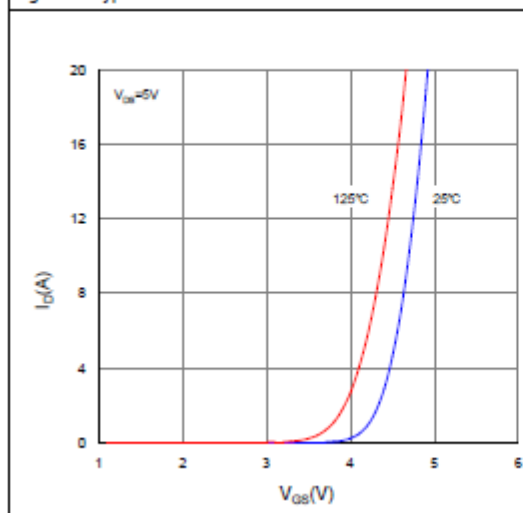
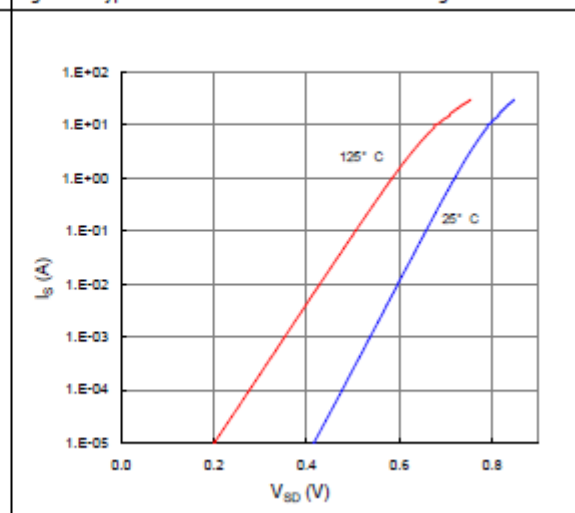


Figure 6. Typical Source-Drain Diode Forward Voltage





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TYPICAL CHARACTERISTICS

Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

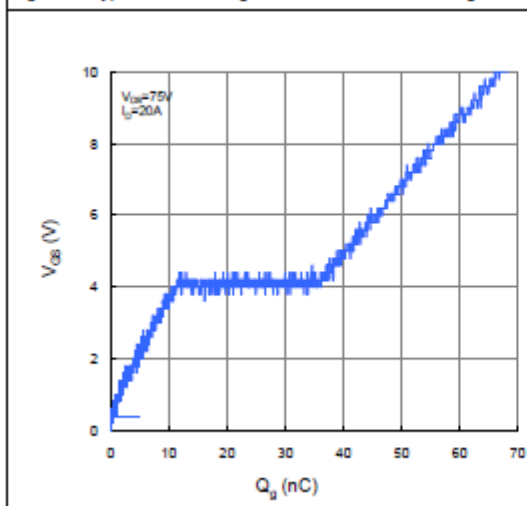


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

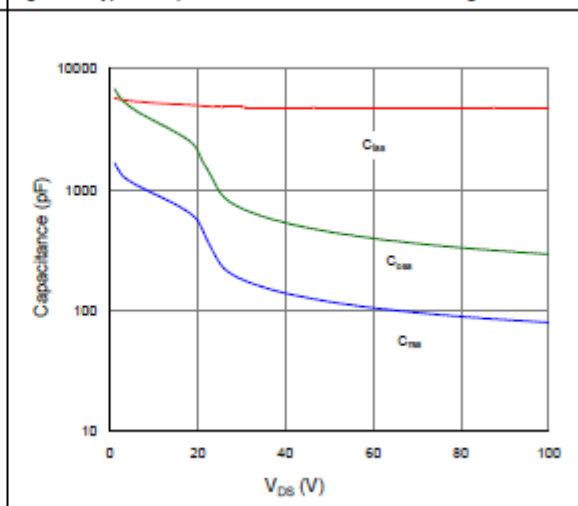


Figure 9. Maximum Safe Operating Area

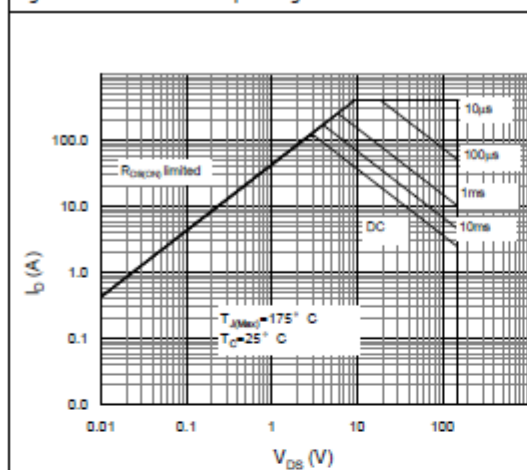


Figure 10. Maximum Drain Current vs. Case Temperature

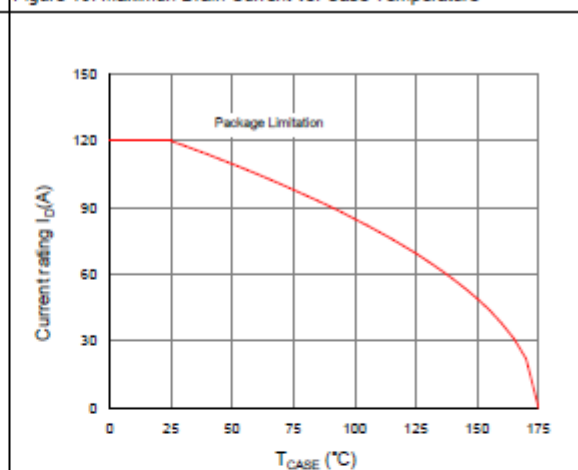
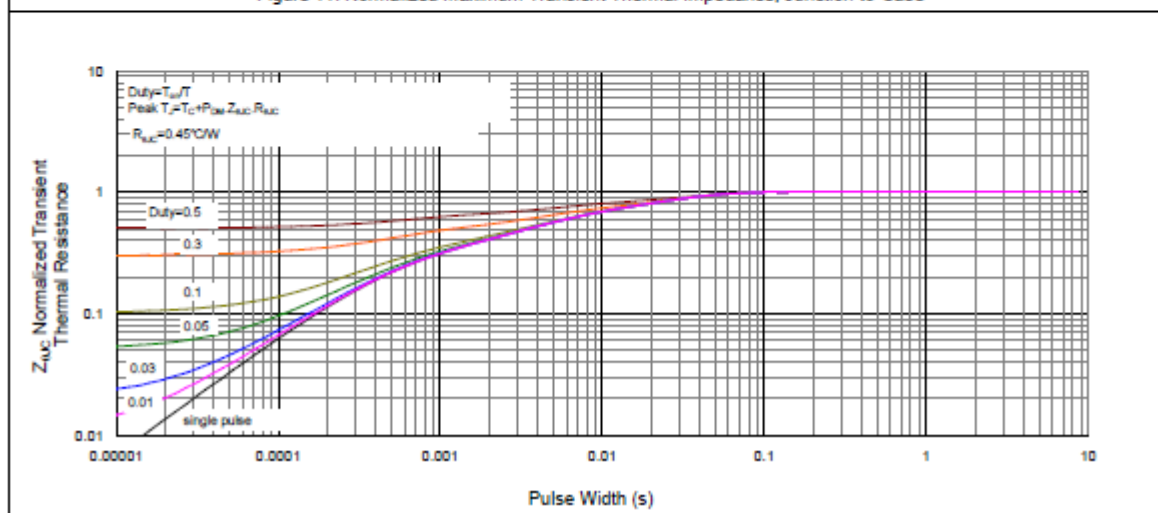


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case





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