



SPN120T20

N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SPN120T20 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

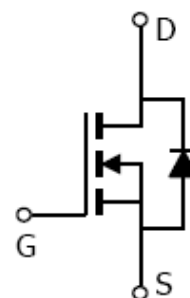
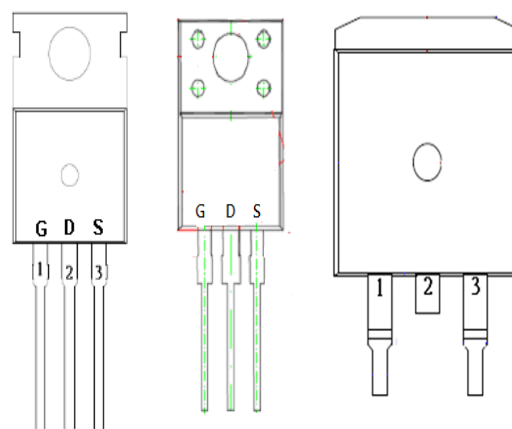
- ◆ 200V/132A, $R_{DS(ON)}=11m\Omega@V_{GS}=10V$
- ◆ High density cell design for extremely low $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ TO-220-3L/TO-220F-3L/TO-263-2L package design

APPLICATIONS

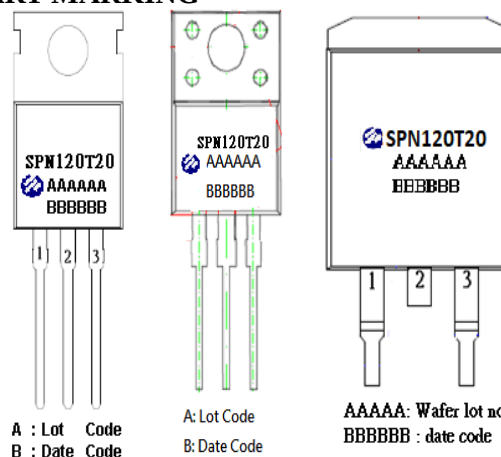
- AC/DC Synchronous Rectifier
- Load Switch
- UPS
- Power Tool
- Motor Control

PIN CONFIGURATION

TO-220-3L TO-220F-3L TO-263-2L



PART MARKING





SPN120T20

N-Channel Enhancement Mode MOSFET

PIN DESCRIPTION

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

ORDERING INFORMATION

Part Number	Package	Part Marking
SPN120T20T220TGB	TO-220-3L	SPN120T20
SPN120T20T220FTGB	TO-220F-3L	SPN120T20
SPN120T20T262RGB	TO-263-2L	SPN120T20

- ※ SPN120T20T220TGB : Tube ; Pb – Free ; Halogen – Free
- ※ SPN120T20T220FTGB : Tube ; Pb – Free ; Halogen – Free
- ※ SPN120T20T262RGB : Tape Reel ; Pb – Free ; Halogen – Free

ABSOLUTE MAXIMUM RATINGS

(TA=25°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	V _{DSS}	200	V
Gate –Source Voltage	V _{GSS}	±20	V
Continuous Drain Current (Silicon Limited)	I _D	132	A
		93	
Pulsed Drain Current	I _{DM}	370	A
Avalanche Energy, Single Pulse @ L=0.4mH, Tc=25°C	E _{AS}	720	mJ
Power Dissipation @ Tc=25°C	P _D	429	W
Operating Junction Temperature	T _J	-55/175	°C
Storage Temperature Range	T _{STG}	-55/175	°C
Thermal Resistance-Junction to Case	R _{θJC}	0.35	°C/W

Note :

The maximum current rating is package limited at 120A for TO-263-2L and TO-220-3L
The maximum current rating is package limited at 78A for TO-220F-3L



SPN120T20

N-Channel Enhancement Mode MOSFET

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	200			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2.0	3.0	4.0	
Gate Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =160V, V _{GS} =0V T _J =25°C			1	μA
		V _{DS} =160V, V _{GS} =0V T _J =100°C			100	
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A		9.4	11	mΩ
Forward Transconductance	g _{fs}	V _{DS} =5V, I _D =20A		70		S
Gate Resistance	R _G	V _{GS} =0V, V _{DS} =Open, f=1MHz		4.0		Ω
Diode Forward Voltage	V _{SD}	I _F =20A, V _{GS} =0V		0.9		V
Dynamic						
Total Gate Charge	Q _g	V _{DS} =100V, V _{GS} =10V I _D =20A		56		nC
Gate-Source Charge	Q _{gs}			18		
Gate-Drain Charge	Q _{gd}			5		
Input Capacitance	C _{iss}	V _{DS} =100V, V _{GS} =0V f=1MHz		4970		pF
Output Capacitance	C _{oss}			420		
Reverse Transfer Capacitance	C _{rss}			7.5		
Turn-On Time	t _{d(on)}	V _{DD} =100V, V _{GS} =10V I _D =20A, R _G =10Ω		16		nS
	t _r			22		
Turn-Off Time	t _{d(off)}			38		
	t _f			10		
Reverse Recovery Time	t _{rr}	V _R =100V, I _F =20A, dI _F /dt=100A/μS		140		nS
Reverse Recovery Charge	Q _{rr}			630		nC



SPN120T20

N-Channel Enhancement Mode MOSFET

TYPICAL CHARACTERISTICS

Fig 1. Typical Output Characteristics

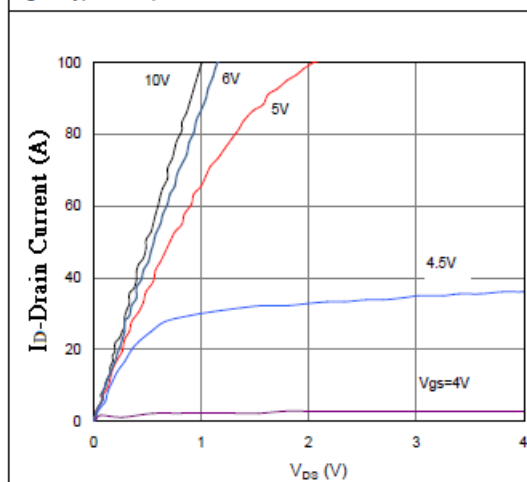


Figure 2. On-Resistance vs. Gate-Source Voltage

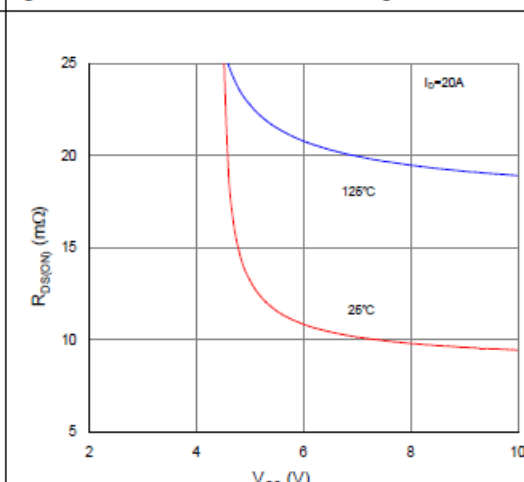


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

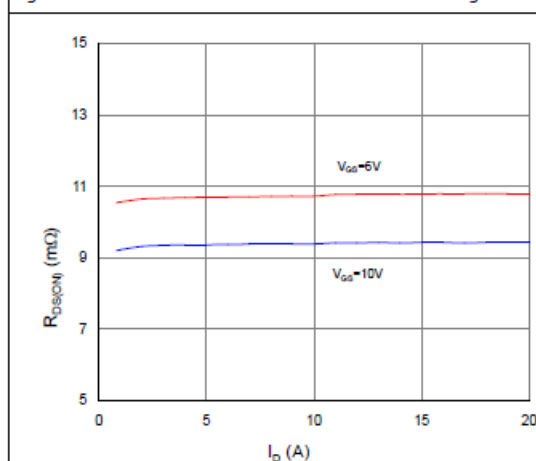


Figure 4. Normalized On-Resistance vs. Junction Temperature

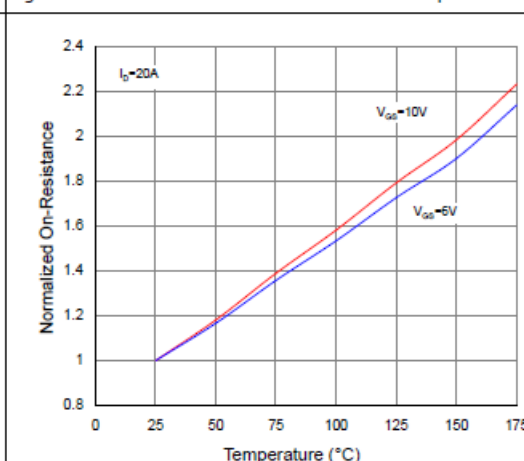


Figure 5. Typical Transfer Characteristics

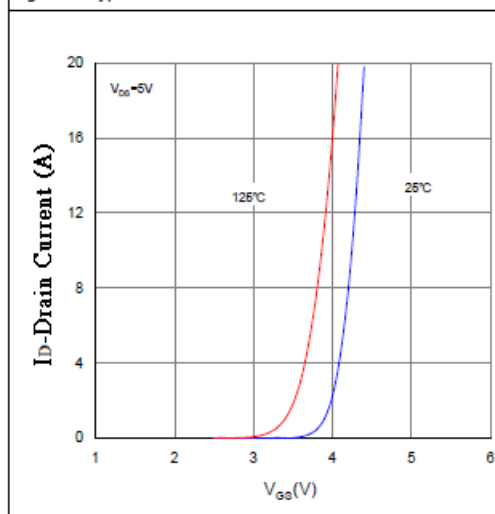
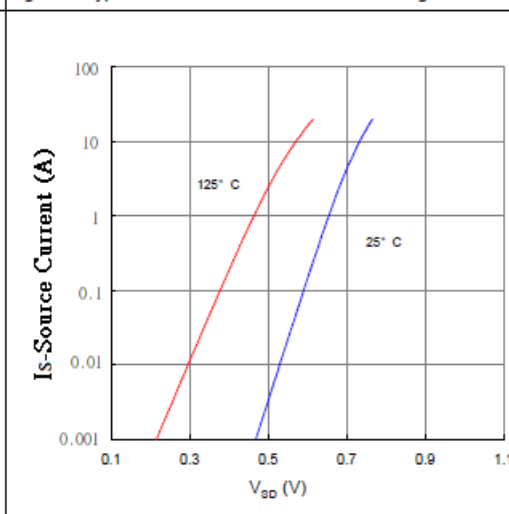


Figure 6. Typical Source-Drain Diode Forward Voltage





SPN120T20

N-Channel Enhancement Mode MOSFET

TYPICAL CHARACTERISTICS

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

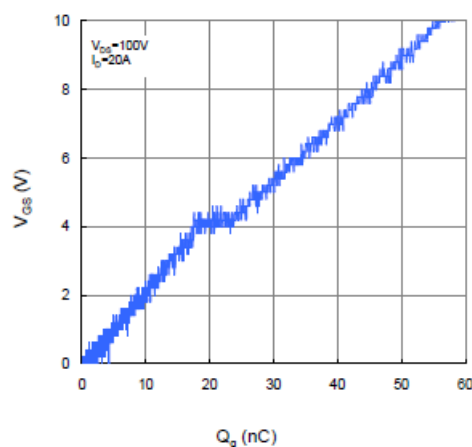


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

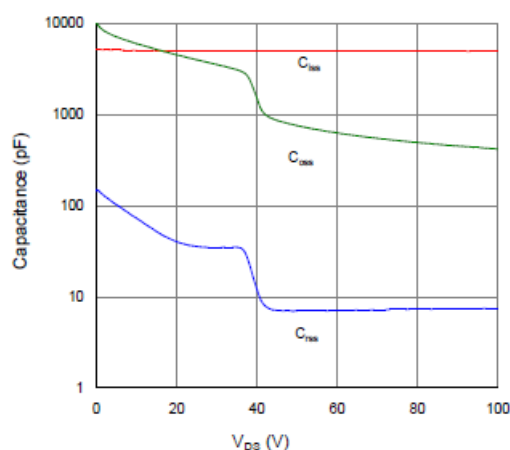


Figure 9. Maximum Safe Operating Area

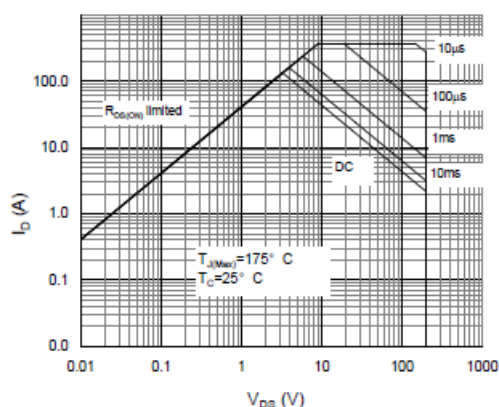


Figure 10. Maximum Drain Current vs. Case Temperature

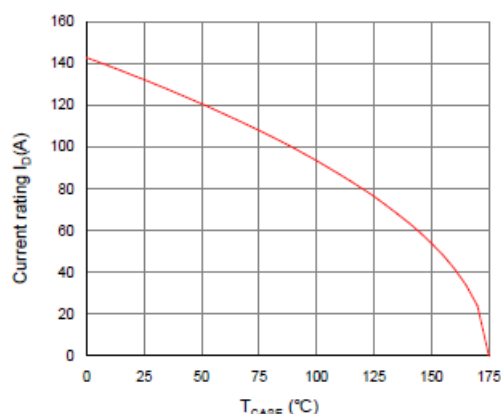
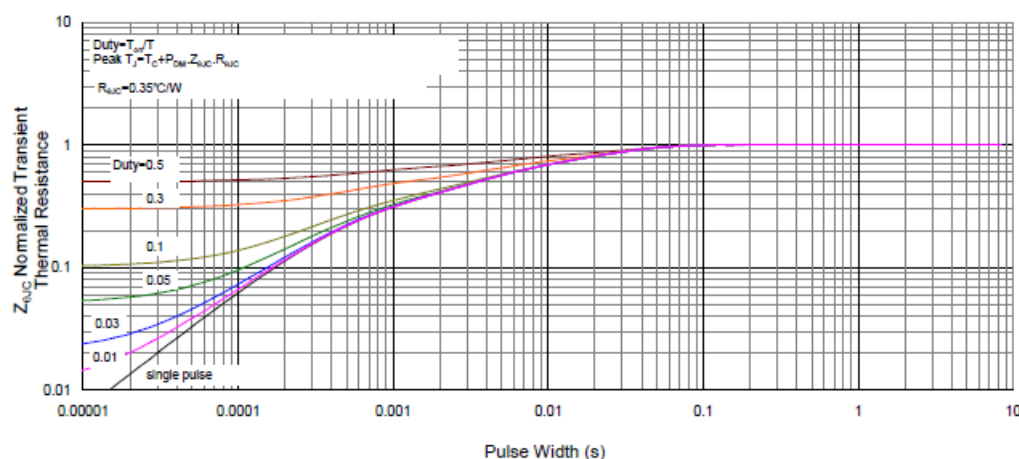


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case





SPN120T20

N-Channel Enhancement Mode MOSFET

Information provided is alleged to be exact and consistent. SYNC Power Corporation presumes no responsibility for the penalties of use of such information or for any violation of patents or other rights of third parties which may result from its use. No license is granted by allegation or otherwise under any patent or patent rights of SYNC Power Corporation. Conditions mentioned in this publication are subject to change without notice. This publication surpasses and replaces all information previously supplied. SYNC Power Corporation products are not authorized for use as critical components in life support devices or systems without express written approval of SYNC Power Corporation.

©The SYNC Power logo is a registered trademark of SYNC Power Corporation

©2021 SYNC Power Corporation – Printed in Taiwan – All Rights Reserved

SYNC Power Corporation

7F-2, No.3-1, Park Street

NanKang District (NKSP), Taipei, Taiwan 115

Phone: 886-2-2655-8178

Fax: 886-2-2655-8468

©<http://www.syncpower.com>