SPN90T12
N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SPN90T12 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. The SPN90T12 has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for low gate charge, low $R_{DS(ON)}$ and fast switching speed.

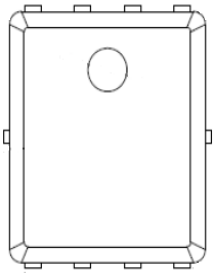
APPLICATIONS

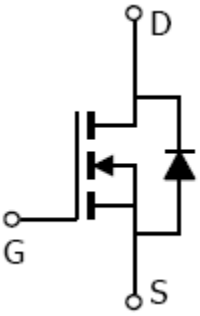
- DC/DC Converter
- Load Switch
- SMPS Secondary Side Synchronous Rectifier
- Motor Control
- Power Tool

FEATURES

- 120V/90A,$R_{DS(ON)}$=8.0 mΩ@V_{GS}=10V
- 120V/90A,$R_{DS(ON)}$=11 mΩ@V_{GS}=4.5V
- Super high density cell design for extremely low $R_{DS\ (ON)}$
- Exceptional on-resistance and maximum DC current capability
- PPAK5x6-8L package design

PIN CONFIGURATION(PPAK5x6-8L)





PART MARKING

A : Lot Code
B : Date Code
(YY / MM / DD)

SPN90T12
N-Channel Enhancement Mode MOSFET

PIN DESCRIPTION

Pin	Symbol	Description
1	S	Source
2	S	Source
3	S	Source
4	G	Gate
5	D	Drain
6	D	Drain
7	D	Drain
8	D	Drain

ORDERING INFORMATION

Part Number	Package	Part Marking
SPN90T12DN8RGB	PPAK5x6-8L	SPN90T12

※ SPN90T12DN8RGB : Tape Reel ; Pb – Free ; Halogen - Free

ABSOULTE MAXIMUM RATINGS

(T_A=25℃ Unless otherwise noted)

Parameter		Symbol	Typical	Unit
Drain-Source Voltage		V_{DSS}	120	V
Gate –Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (Silicon Limited)	T_C=25℃	I_D	90	A
	T_C=100℃		55	
Pulsed Drain Current		I_{DM}	300	A
Single Pulse Avalanche Energy (T_C=25℃, L=0.4mH.)		E_{AS}	450	mJ
Power Dissipation	T_C=25℃	P_D	83	W
Operating Junction Temperature		T_J	-55/150	℃
Storage Temperature Range		T_{STG}	-55/150	℃
Thermal Resistance-Junction to Case		$R_{\theta JC}$	1.5	℃/W

SPN90T12
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ELECTRICAL CHARACTERISTICS

(T_A=25℃ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V,I_D=250uA	120			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	1.4	2.0	2.4	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=96V,V_{GS}=0V T_J=25℃,			1	uA
		V_{DS}=96V,V_{GS}=0V, T_J=100℃			100	
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=20A		6.8	8.0	mΩ
		V_{GS}=4.5V,I_D=20A		8.5	11	
Forward Transconductance	gfs	V_{DS}=5V,I_D=20A		75		S
Gate resistance	Rg	V_{DS}=0V,V_{GS}=0V f=1MHz		2.56		Ω
Diode Forward Voltage	V_{SD}	I_S=20A,V_{GS} =0V		0.9	1.2	V
Dynamic						
Total Gate Charge	Qg (10V)	V_{DS}=60V,V_{GS}=10V I_D=20A		48		nC
Total Gate Charge	Qg (4.5V)			23		
Gate-Source Charge	Q_{gs}			11		
Gate-Drain Charge	Q_{gd}			9		
Input Capacitance	C_{iss}	V_{DS}=60V,V_{GS}=0V f=1MHz		3515		pF
Output Capacitance	C_{oss}			385		
Reverse Transfer Capacitance	C_{rss}			11.5		
Turn-On Time	$t_{d(on)}$	V_{DD}=60V, I_D=20A,V_{GS}=10V R_G=10Ω		15		nS
	t_r			8		
Turn-Off Time	$t_{d(off)}$			30		
	t_f			9		
Reverse Recovery Time	trr	V_R=60V, I_F=20A, dI_F/dt=500A/μs		45		nS
Reverse Recovery Charge	Qrr			270		nC

TYPICAL CHARACTERISTICS

Fig 1. Typical Output Characteristics

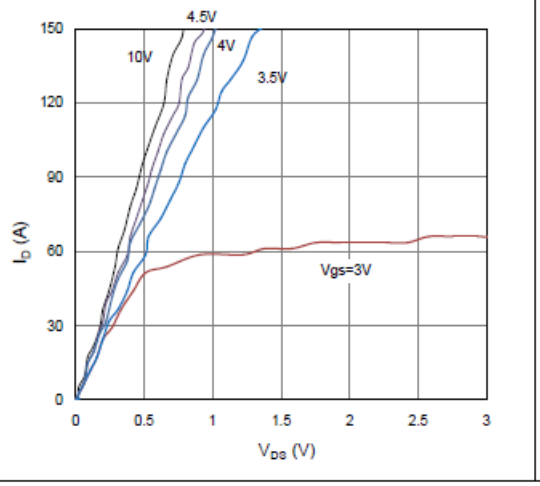


Figure 2. On-Resistance vs. Gate-Source Voltage

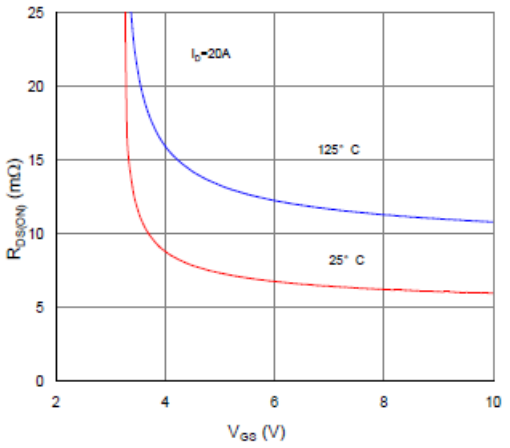


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

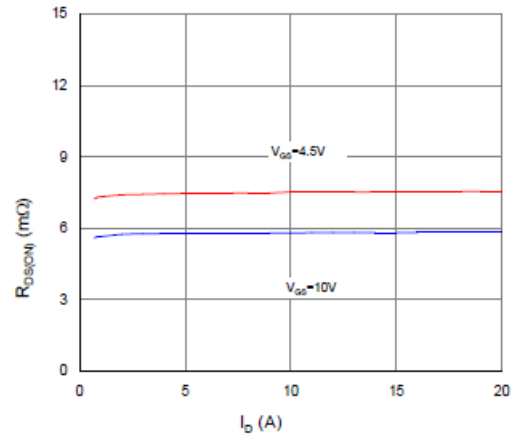


Figure 4. Normalized On-Resistance vs. Junction Temperature

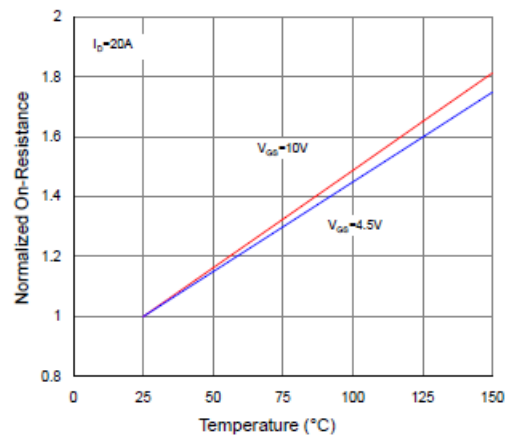


Figure 5. Typical Transfer Characteristics

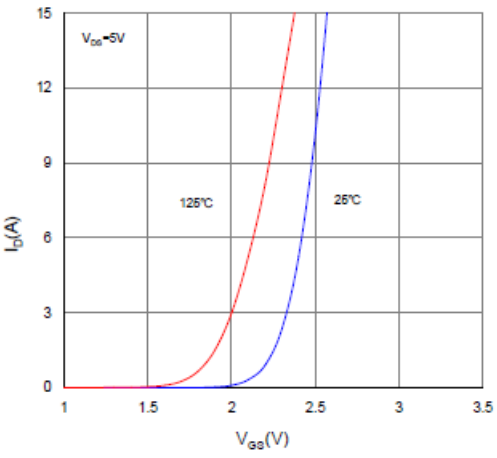
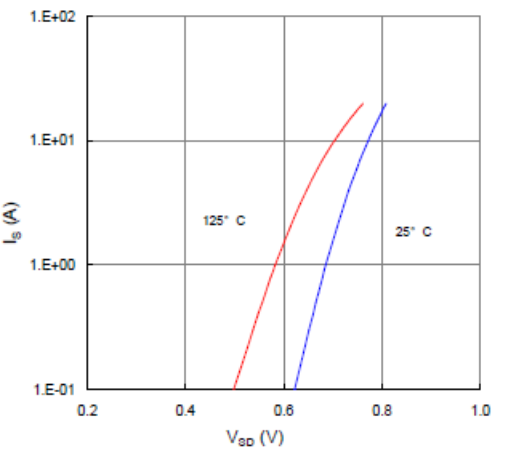


Figure 6. Typical Source-Drain Diode Forward Voltage



TYPICAL CHARACTERISTICS

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

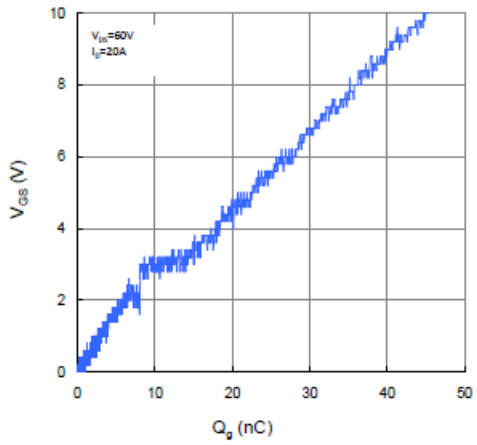


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

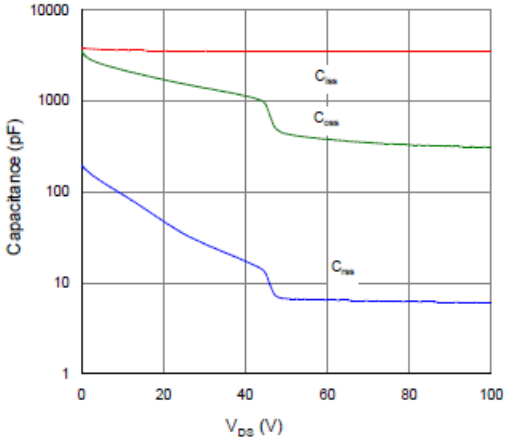


Figure 9. Maximum Safe Operating Area

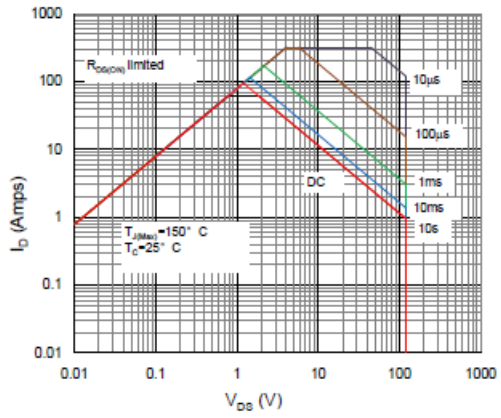


Figure 10. Maximun Drain Current vs. Case Temperature

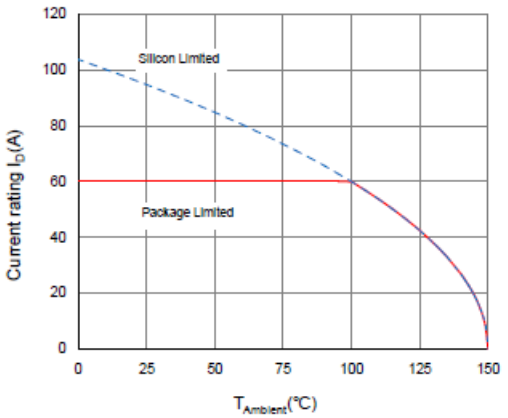
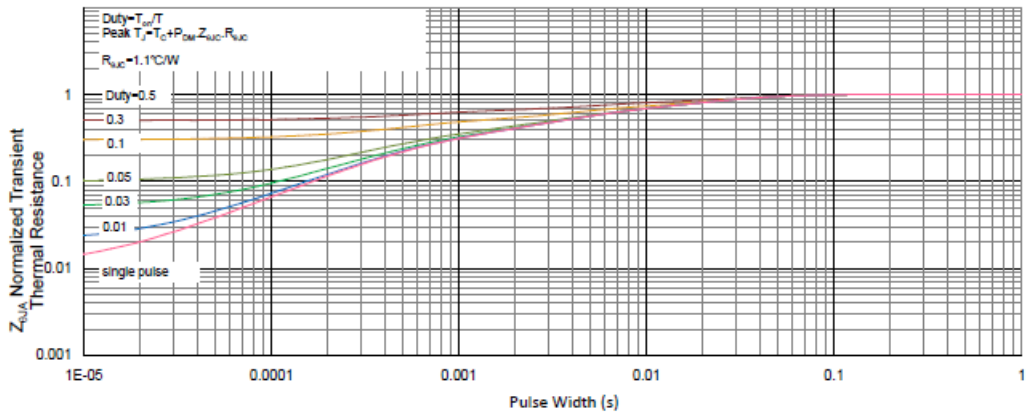


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient



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