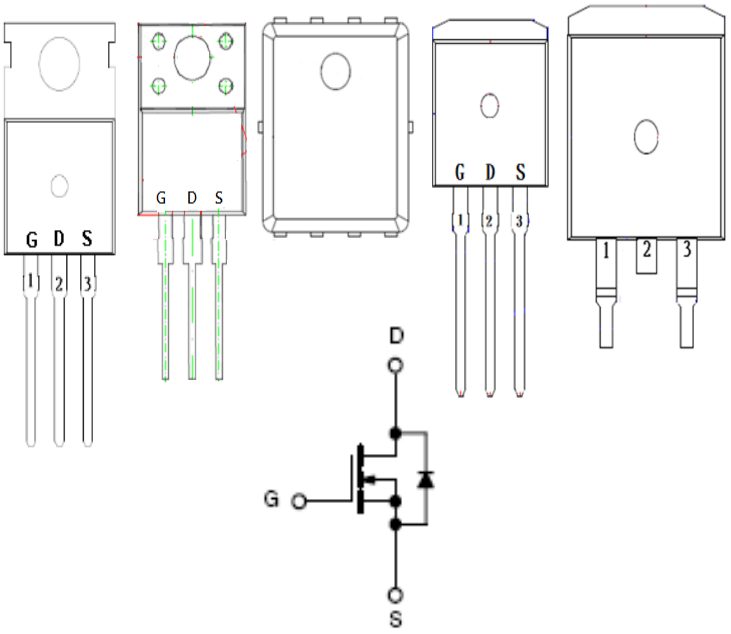
SPN125T10
N-Channel Enhancement Mode MOSFET

DESCRIPTION
The SPN125T10 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.

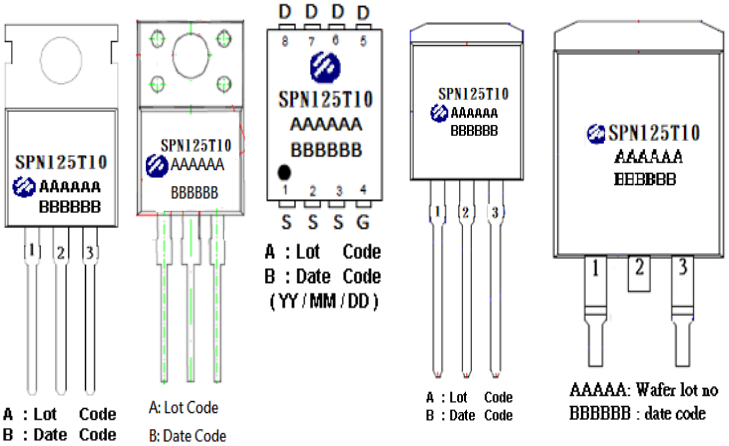
APPLICATIONS
- DC/DC Converter
- Load Switch
- SMPS Secondary Side Synchronous Rectifier
- Motor Control
- Power Tool

FEATURES
- 100V/112A, $R_{DS(ON)}$=4.2mΩ@V_{GS}=10V
- Super high density cell design for extremely low R_{DS} (ON)
- Exceptional on-resistance and maximum DC current capability
- TO-220-3L/TO-220F-3L/PPAK5x6-8L/TO-262-3L/ TO-263-2L package design

PIN CONFIGURATION
TO-220 TO-220F PPAK5x6 TO-262 TO-263



PART MARKING



TO-220-3L/TO-220F-3L/TO-262-3L/TO-263-2L PIN DESCRIPTION

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

PPAK5x6-8L 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
SPN125T10T220TGB	TO-220-3L	SPN125T10
SPN125T10T220FTGB	TO-220F-3L	SPN125T10
SPN125T10T263TGB	TO-262-3L	SPN125T10
SPN125T10DN8RGB	PPAK5x6-8L	SPN125T10
SPN125T10T262RGB	TO-263-2L	SPN125T10

※ SPN125T10T220TGB : Tube ; Pb – Free ; Halogen – Free
※ SPN125T10T220FTGB : Tube ; Pb – Free ; Halogen – Free
※ SPN125T10T263TGB : Tube ; Pb – Free ; Halogen – Free
※ SPN125T10DN8RGB : Tape&Reel ; Pb – Free ; Halogen – Free
※ SPN125T10T262RGB : Tape&Reel ; Pb – Free ; Halogen - Free

SPN125T10
N-Channel Enhancement Mode MOSFET

ABSOULTE MAXIMUM RATINGS

(T_A=25℃ Unless otherwise noted)

Parameter		Symbol	Typical	Unit
Drain-Source Voltage		V_{DSS}	100	V
Gate–Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (Silicon Limited) (TO-220/TO-220F/TO-262)	T_C=25℃	I_D	161	A
	T_C=100℃		114	
Continuous Drain Current (Silicon Limited) (PPAK5x6)	T_C=25℃	I_D	112	A
	T_C=100℃		60	
Pulsed Drain Current		I_{DM}	400	A
Power Dissipation (T_C=25℃)	TO-220/TO-262/TO-263	P_D	104	W
Power Dissipation (T_C=25℃)	TO-220F	P_D	93	W
Power Dissipation (T_C=25℃)	PPAK5x6	P_D	83	W
Avalanche Energy with Single Pulse (Tj=25℃ , L=0.1mH)		E_{AS}	180	mJ
Operating Junction Temperature		T_J	-55/150	℃
Storage Temperature Range		T_{STG}	-55/150	℃
Thermal Resistance-Junction to Case (TO-220/TO-220F/TO-262)		$R_{\theta JC}$	1.2	℃/W
Thermal Resistance-Junction to Case (PPAK5x6)		$R_{\theta JC}$	1.5	℃/W
Thermal Resistance-Junction to Ambient (TO-220/TO-220F/TO-262)		$R_{\theta JA}$	60	℃/W
Thermal Resistance-Junction to Ambient (PPAK5x6)		$R_{\theta JA}$	50	℃/W

Note :

The maximum current rating is package limited at 130A for TO-262-3L and TO-263-2L
The maximum current rating is package limited at 120A for TO-220-3L
The maximum current rating is package limited at 78A for TO-220F-3L
The maximum current rating is package limited at 80A for PPAK5x6-8L

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	100			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	2	3	4	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=80V,V_{GS}=0V T_J=25℃			1	uA
		V_{DS}=80V,V_{GS}=0V T_J=100℃			100	
Drain-Source On-Resistance (TO-220,TO-262,PPAK5x6)	$R_{DS(on)}$	V_{GS}=10V,I_D=20A			4.2	mΩ
Drain-Source On-Resistance (TO-220F)	$R_{DS(on)}$	V_{GS}=10V,I_D=20A			4.8	mΩ
Forward Transconductance	g_{fs}	V_{DS}=5V,I_D=20A		50		S
Gate Resistance	R_G	V_{GS}=0V,V_{DS} open, f=1MHz		1.3		Ω
Diode Forward Voltage	V_{SD}	I_S=20A,V_{GS}=0V		0.9	1.2	V
Dynamic						
Total Gate Charge (10V)	Q_g	V_{DS}=50V,V_{GS}=10V I_D=20A		75		nC
Gate-Source Charge	Q_{gs}			10		
Gate-Drain Charge	Q_{gd}			34		
Input Capacitance	C_{iss}	V_{DS}=50V,V_{GS}=0V f=1MHz		3650		pF
Output Capacitance	C_{oss}			1110		
Reverse Transfer Capacitance	C_{rss}			43		
Turn-On Time	$t_{d(on)}$	V_{DD}=50V,I_D=20A V_{GS}=10V,R_G=10Ω		13		nS
	t_r			19		
Turn-Off Time	$t_{d(off)}$			45		
	t_f			27		
Reverse Recovery Time	trr	V_R=50V, I_F=20A, d I_F/dt=500A/uS		50		nS
Reverse Recovery Charge	Qrr			275		nC

TYPICAL CHARACTERISTICS

Fig 1. Typical Output Characteristics

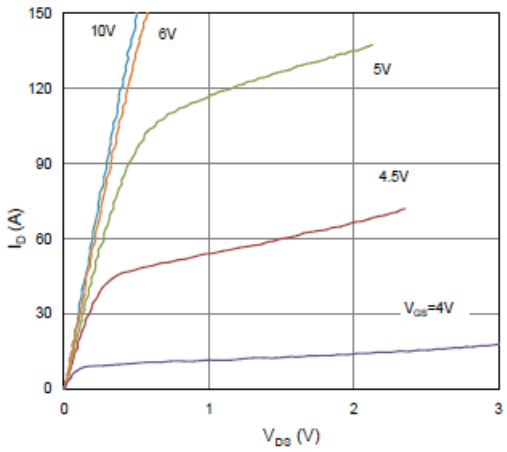


Figure 2. On-Resistance vs. Gate-Source Voltage

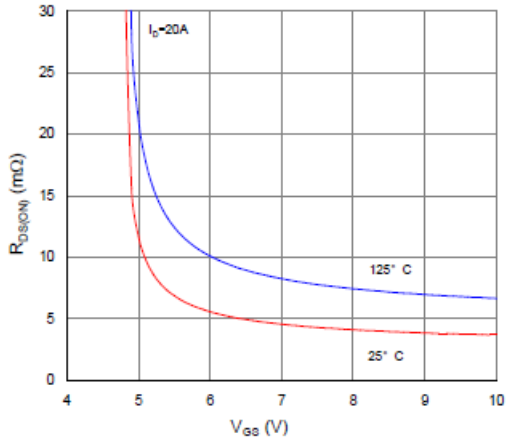


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

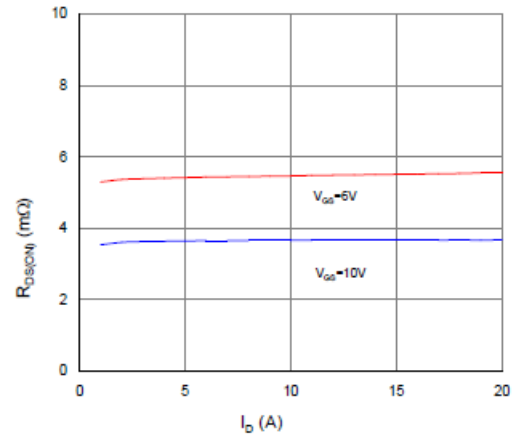


Figure 4. Normalized On-Resistance vs. Junction Temperature

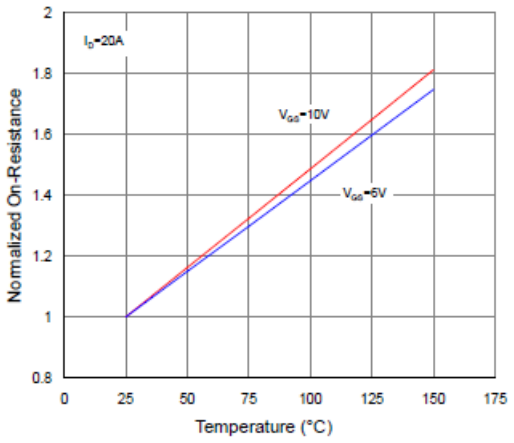


Figure 5. Typical Transfer Characteristics

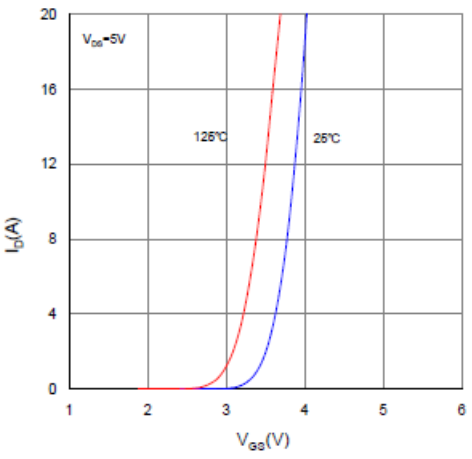
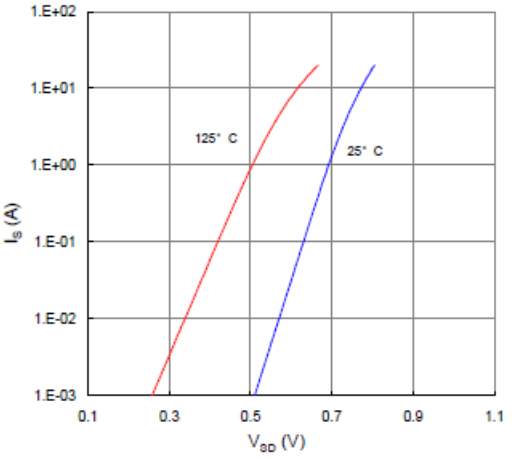


Figure 6. Typical Source-Drain Diode Forward Voltage



TYPICAL CHARACTERISTICS

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

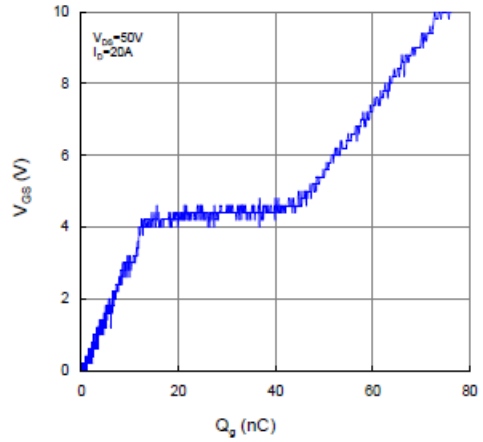


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

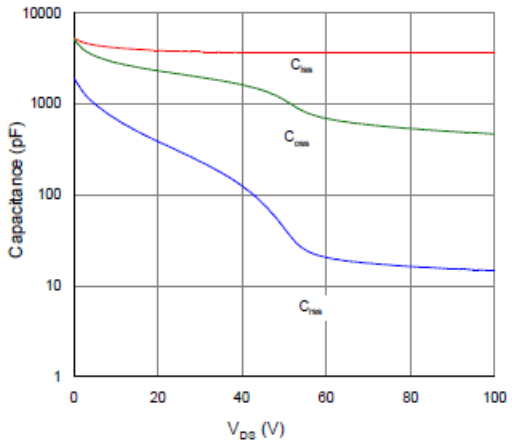


Figure 9. Maximum Safe Operating Area

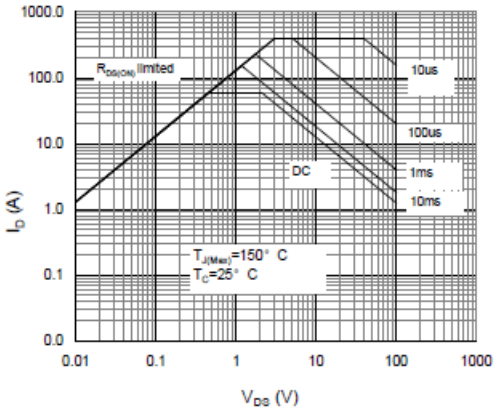


Figure 10. Maximun Drain Current vs. Case Temperature

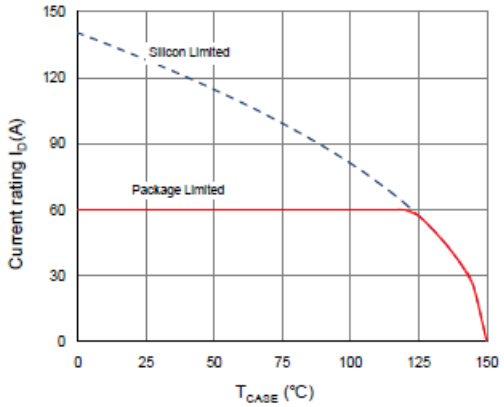
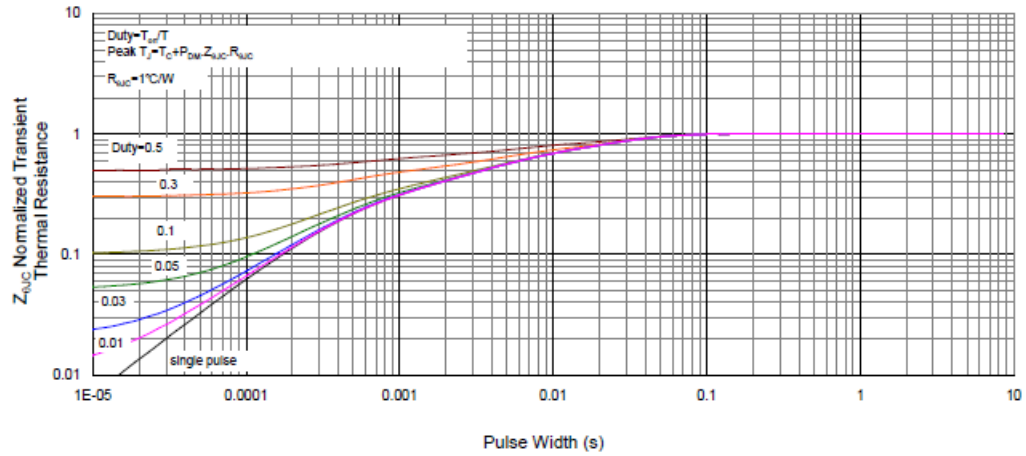


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case



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