SPN70T10
N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SPN70T10 is the N-Channel logic enhancement mode power field effect transistor which is produced using 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

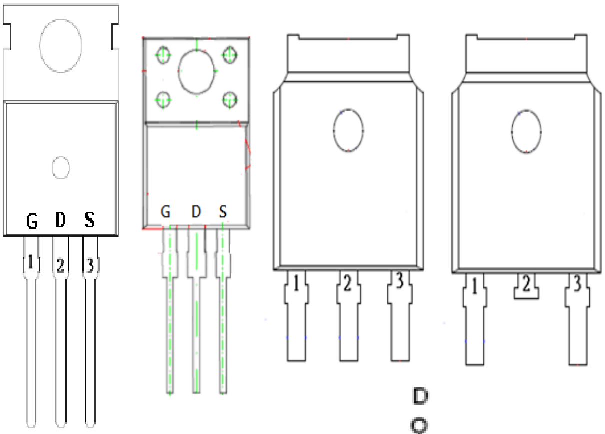
- DC/DC Converter
- Load Switch
- SMPS Secondary Side Synchronous Rectifier
- Power Tool
- Motor Control

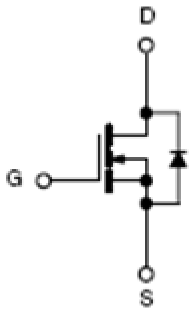
FEATURES

- ◆ 100V/70A, $R_{DS(ON)}$=12mΩ@V_{GS}=10V
- ◆ 100V/70A, $R_{DS(ON)}$=15mΩ@V_{GS}=4.5V
- ◆ 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/TO-251S-3L/TO-252-2L package design

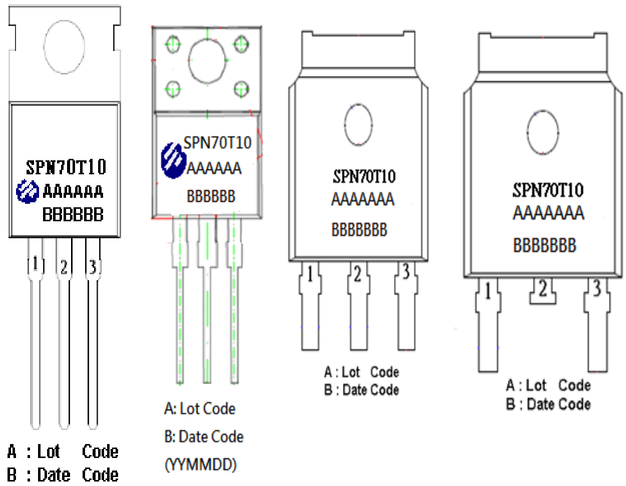
PIN CONFIGURATION

TO-220 TO-220F TO-251 TO-252





PART MARKING



PIN DESCRIPTION

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

ORDERING INFORMATION

Part Number	Package	Part Marking
SPN70T10T220TGB	TO-220-3L	SPN70T10
SPN70T10T220FTGB	TO-220F-3L	SPN70T10
SPN70T10ST251TGB	TO-251S-3L	SPN70T10
SPN70T10T252RGB	TO-252-2L	SPN70T10

※ SPN70T10T220TGB : Tube ; Pb – Free ; Halogen – Free
※ SPN70T10T220FTGB : Tube ; Pb – Free ; Halogen – Free
※ SPN70T10ST251TGB : Tube ; Pb – Free ; Halogen - Free
※ SPN70T10T252RGB : Tape Reel ; Pb – Free ; Halogen – Free

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)	T_C=25℃	I_D	70	A
	T_C=70℃		52	
Continuous Drain Current(Silicon Limited) (PPAK5x6)	T_C=25℃	I_D	62	A
	T_C=70℃		40	
Pulsed Drain Current		I_{DM}	190	A
Power Dissipation@ Tc=25℃	TO-220	P_D	104	W
Power Dissipation@ Tc=25℃	TO-251S/TO-252/TO-220F		93	
Avalanche Energy with Single Pulse (Tj=25℃, L =0.1mH , I_D=27A , V_{DS} =100V.)		E_{AS}	148	mJ
Operating Junction Temperature		T_J	-55/150	℃
Storage Temperature Range		T_{STG}	-55/150	℃
Thermal Resistance-Junction to Case (TO-220/TO-220F)		$R_{\theta JC}$	1.2	℃/W
Thermal Resistance-Junction to Case (TO-251S/TO-252)		$R_{\theta JC}$	1.35	℃/W

Note :

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 70A for TO-251S-3L and TO-252-2L

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	1.4	1.9	2.4	V
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	uA
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=20A		9.5	12	mΩ
		V_{GS}=4.5V,I_D=20A		11.5	15	mΩ
Gate Resistance	R_G	V_{GS}=0V,V_{DS}=Open, f=1MHz		1.5		Ω
Diode Forward Voltage	V_{SD}	I_F=20A,V_{GS} =0V		0.9	1.2	V
Dynamic						
Total Gate Charge	Q_g(10V)	V_{DS}=50V,V_{GS}=10V I_D=14A		29		nC
Total Gate Charge	Q_g(4.5V)			14		nC
Gate-Source Charge	Q_{gs}			5		nC
Gate-Drain Charge	Q_{gd}			5		nC
Input Capacitance	C_{iss}	V_{DD}=50V,V_{GS}=0V f=1MHz		2275		pF
Output Capacitance	C_{oss}			162		pF
Reverse Transfer Capacitance	C_{rss}			7.9		pF
Turn-On Time	$t_{d(on)}$	V_{DD}=50V, I_D=14A,V_{GS}=10V R_G=10Ω		8		nS
	t_r			3		nS
Turn-Off Time	$t_{d(off)}$			26		nS
	t_f			4		nS
Reverse Recovery Time	trr	V_R=50V, I_F=12A, d I_F/dt=500A/uS		33		nS
Reverse Recovery Charge	Qrr			157		nC

SPN70T10
N-Channel Enhancement Mode MOSFET

TYPICAL CHARACTERISTICS

Fig 1. Typical Output Characteristics

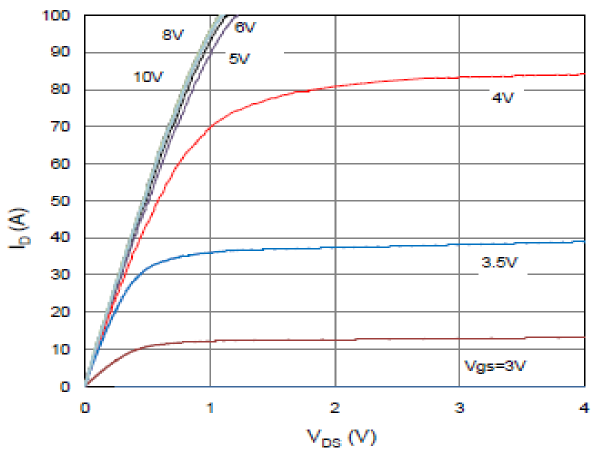


Figure 2. On-Resistance vs. Gate-Source Voltage

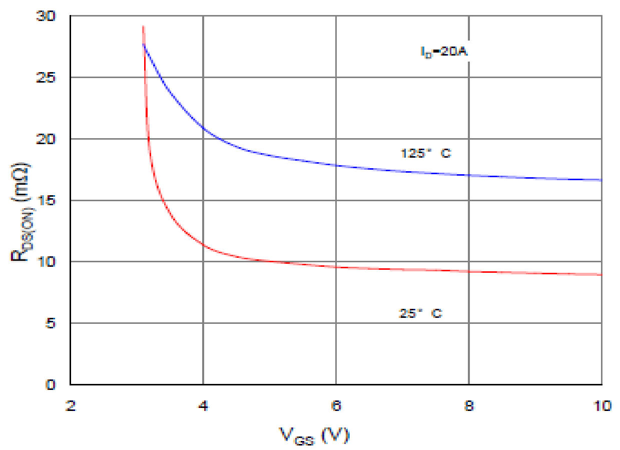


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

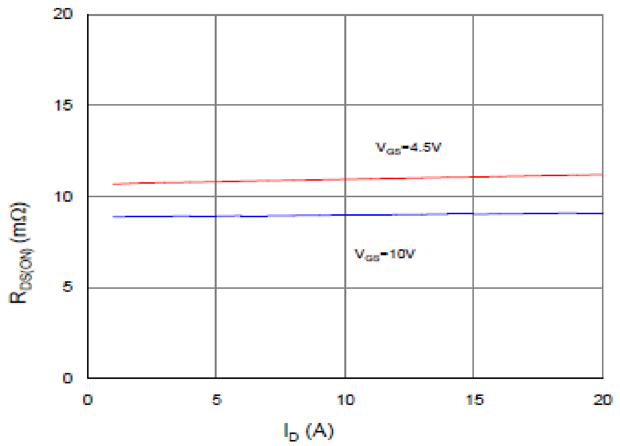


Figure 4. Normalized On-Resistance vs. Junction Temperature

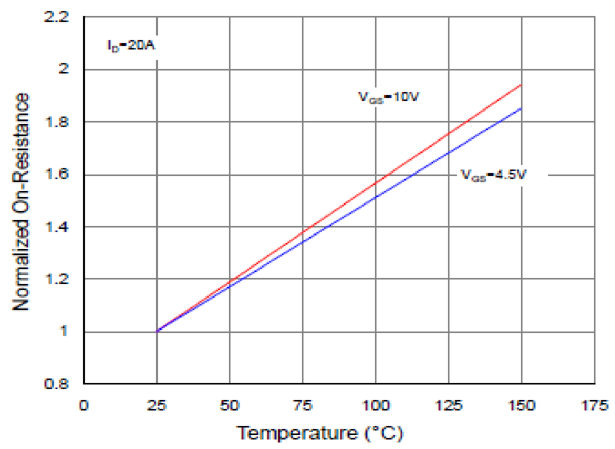


Figure 5. Typical Transfer Characteristics

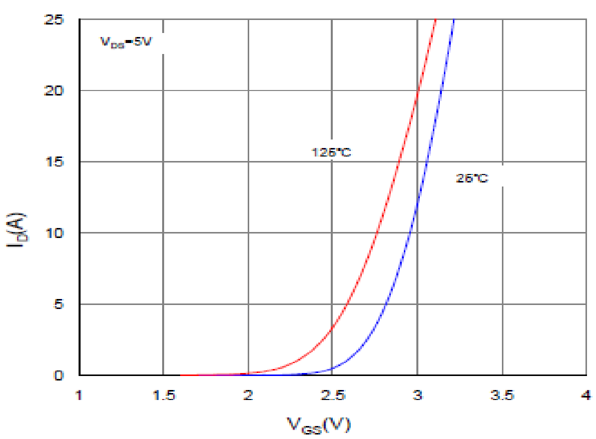
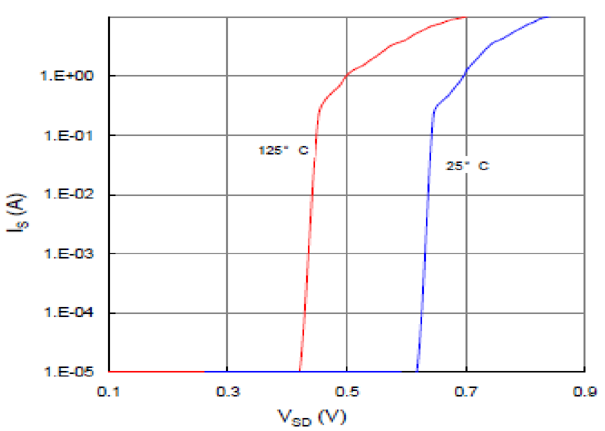


Figure 6. Typical Source-Drain Diode Forward Voltage



TYPICAL CHARACTERISTICS

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

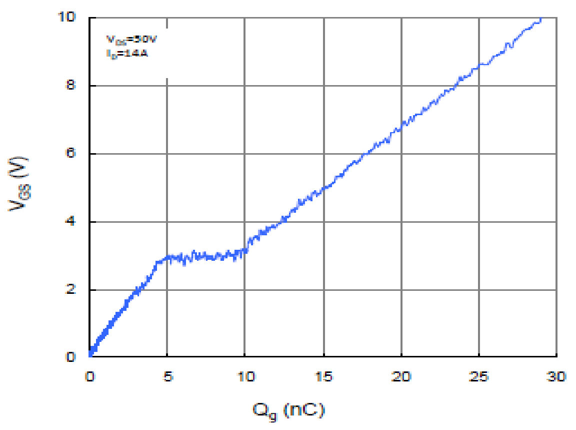


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

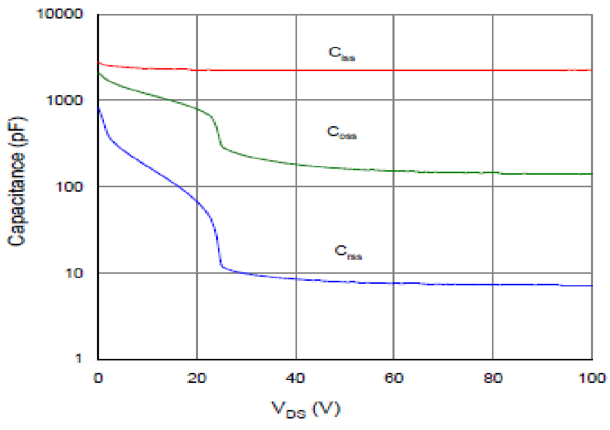


Figure 9. Maximum Safe Operating Area

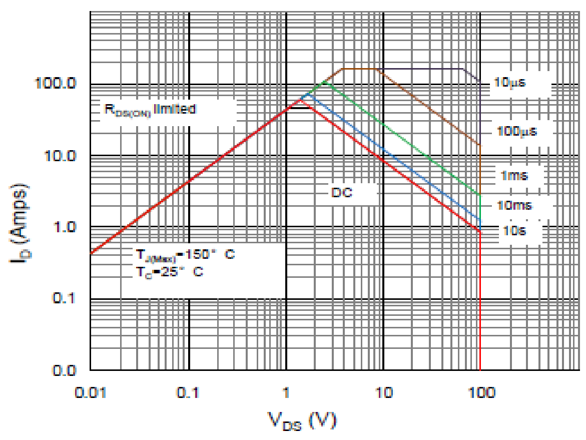


Figure 10. Maximun Drain Current vs. Case Temperature

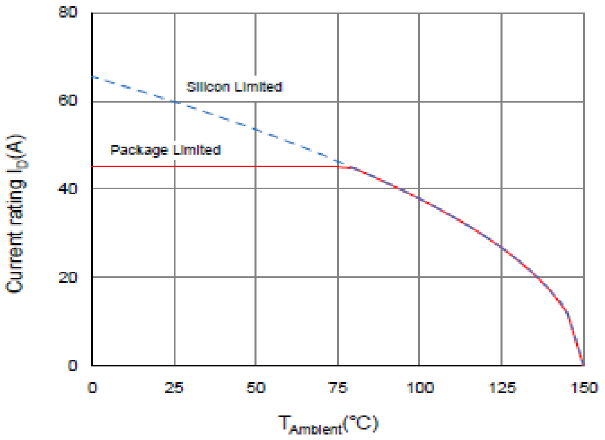
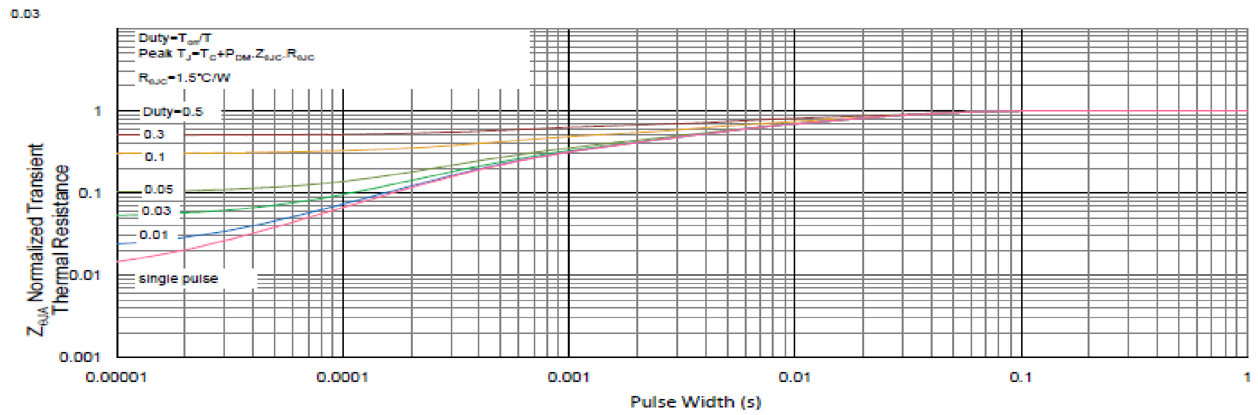


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient



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