



# SPN75T10 N-Channel Enhancement Mode MOSFET

## DESCRIPTION

The SPN75T10 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.

## FEATURES

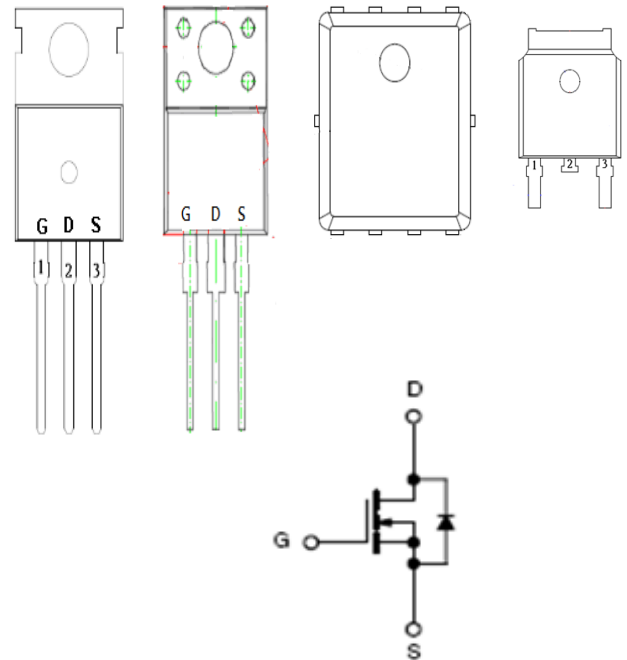
- ◆ 100V/80A,  $R_{DS(ON)}=9.2m\Omega@V_{GS}=10V$
- ◆ 100V/80A,  $R_{DS(ON)}=14m\Omega@V_{GS}=4.5V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ TO-220-3L/TO-220F-3L/TO-252-2L/PPAK5x6-8L package design

## APPLICATIONS

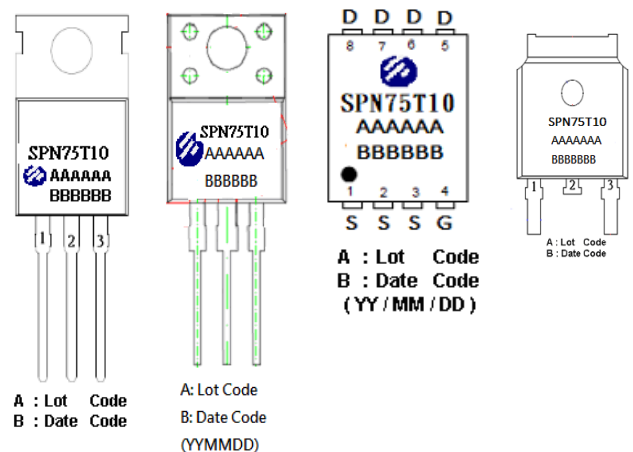
- DC/DC Converter
- Load Switch
- SMPS Secondary Side Synchronous Rectifier
- Power Tool
- Motor Control

## PIN CONFIGURATION

TO-220-3L TO-220F-3L PPAK5x6-8L TO252-2L



## PART MARKING





# SPN75T10

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### TO-220/TO-220F/TO-252 PIN DESCRIPTION

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

### PPAK5x6 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
SPN75T10T220TGB	TO-220-3L	SPN75T10
SPN75T10T220FTGB	TO-220F-3L	SPN75T10
SPN75T10T252RGB	TO-252-2L	SPN75T10
SPN75T10DN8RGB	PPAK5x6-8L	SPN75T10

- ※ SPN75T10T220TGB : Tube ; Pb – Free ; Halogen – Free
- ※ SPN75T10T220FTGB : Tube ; Pb – Free ; Halogen – Free
- ※ SPN75T10T252RGB : Tape Reel ; Pb – Free ; Halogen – Free
- ※ SPN75T10DN8RGB : Tape Reel ; Pb – Free ; Halogen – Free



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### ABSOLUTE MAXIMUM RATINGS

( $T_A=25^{\circ}\text{C}$  Unless otherwise noted)

Parameter		Symbol	Typical	Unit
Drain-Source Voltage		$V_{DSS}$	100	V
Gate –Source Voltage		$V_{GSS}$	+20/-12	V
Continuous Drain Current(Silicon Limited)	$T_C=25^{\circ}\text{C}$	$I_D$	80	A
	$T_C=100^{\circ}\text{C}$		50.6	
Pulsed Drain Current		$I_{DM}$	320	A
Power Dissipation@ $T_C=25^{\circ}\text{C}$	TO-220	$P_D$	156	W
Power Dissipation@ $T_C=25^{\circ}\text{C}$	TO-220F/TO-252		145	
Power Dissipation@ $T_C=25^{\circ}\text{C}$	PPAK5x6		135	
Avalanche Energy with Single Pulse ( $T_J=25^{\circ}\text{C}$ , $L=0.1\text{mH}$ , $I_{AS}=65\text{A}$ , $V_{DD}=50\text{V}$ , $V_{GS}=10\text{V}$ )		$E_{AS}$	211	mJ
Operating Junction Temperature		$T_J$	-55/150	$^{\circ}\text{C}$
Storage Temperature Range		$T_{STG}$	-55/150	$^{\circ}\text{C}$
Thermal Resistance-Junction to Ambient		$R_{\theta JA}$	62	$^{\circ}\text{C}/\text{W}$
Thermal Resistance-Junction to Case		$R_{\theta JC}$	0.8	$^{\circ}\text{C}/\text{W}$

#### Note :

The maximum current rating is limited at 78A for TO-220F-3L

The maximum current rating is limited at 70A for TO-252-2L

The maximum current rating is limited at 80A for PPAK5x6-8L

The maximum current rating is limited at 80A for TO-220-3L



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### ELECTRICAL CHARACTERISTICS

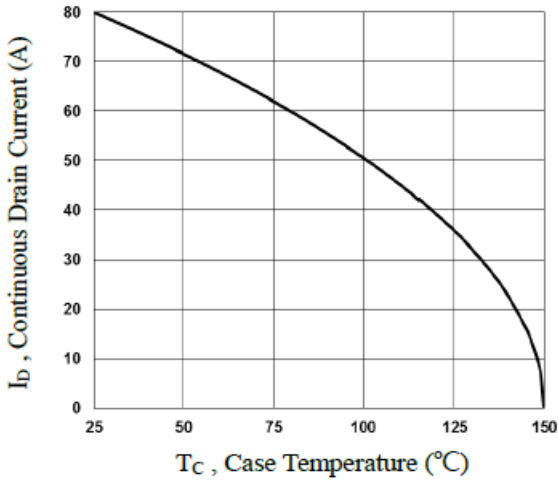
(TA=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	100			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0		2.5	V
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=+20V/-12V$			±100	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=80V, V_{GS}=0V$ $T_J=25^\circ C$			1	uA
		$V_{DS}=80V, V_{GS}=0V$ $T_J=125^\circ C$			10	
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=15A$		7.6	9.2	mΩ
		$V_{GS}=4.5V, I_D=8A$		10.8	14	
Diode Forward Voltage	$V_{SD}$	$I_S=1A, V_{GS}=0V, T_J=25^\circ C$			1	V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=80V, V_{GS}=10V$ $I_D=8.5A$		39.7	80	nC
Gate-Source Charge	$Q_{gs}$			5.4	10	
Gate-Drain Charge	$Q_{gd}$			11.2	22	
Input Capacitance	$C_{iss}$	$V_{DD}=25V, V_{GS}=0V$ $f=1MHz$		2550	5100	pF
Output Capacitance	$C_{oss}$			685	1370	
Reverse Transfer Capacitance	$C_{rss}$			42	84	
Turn-On Time	$t_{d(on)}$	$V_{DD}=50V,$ $I_D=1A, V_{GS}=10V$ $R_G=6\Omega$		14.6	30	nS
	$t_r$			21.5	44	
Turn-Off Time	$t_{d(off)}$			54	108	
	$t_f$			84.3	168	

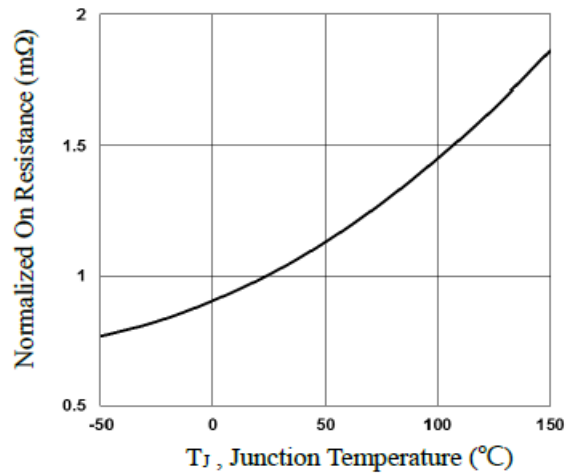


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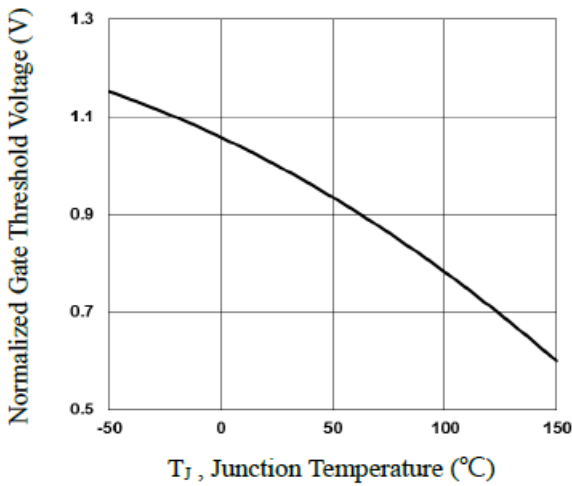
## TYPICAL CHARACTERISTICS



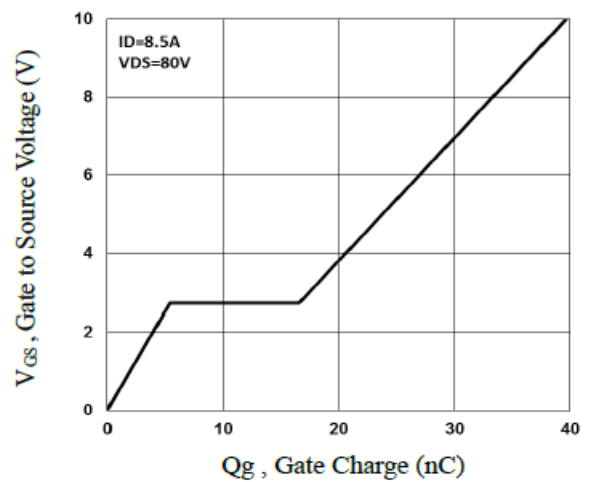
**Fig.1 Continuous Drain Current vs.  $T_C$**



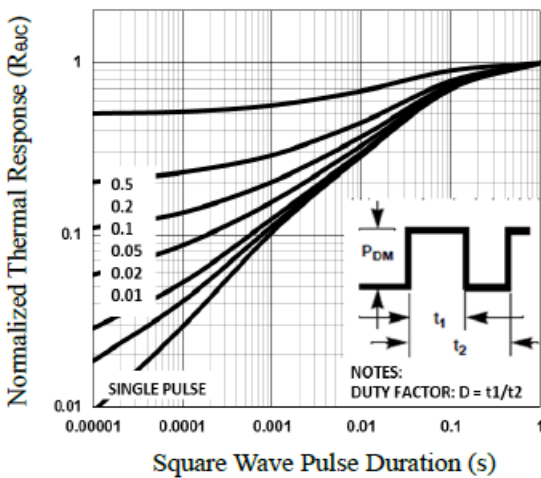
**Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_J$**



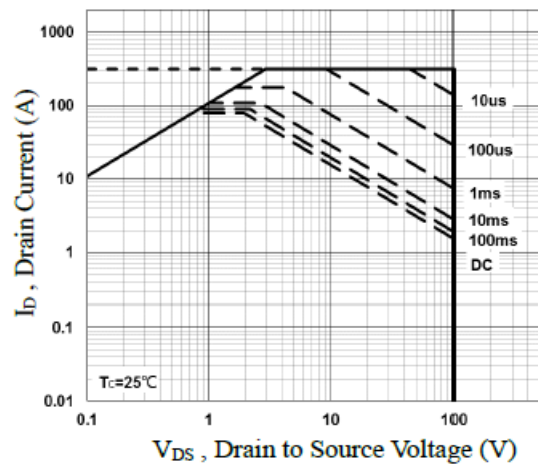
**Fig.3 Normalized  $V_{th}$  vs.  $T_J$**



**Fig.4 Gate Charge Characteristics**



**Fig.5 Normalized Transient Impedance**



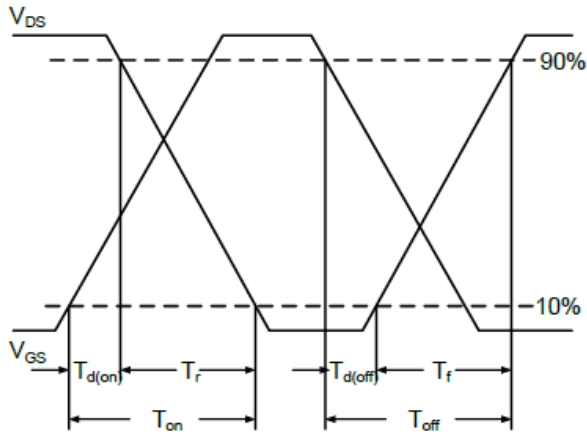
**Fig.6 Maximum Safe Operation Area**



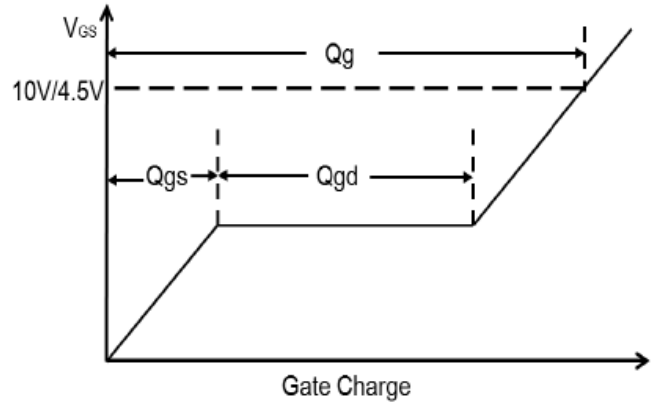
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### TYPICAL CHARACTERISTICS



**Fig.7 Switching Time Waveform**



**Fig.8 Gate Charge Waveform**



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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

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