



SPN30T10

N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SPN30T10 is the N-Channel logic enhancement mode power field effect transistor which is produced using super high cell density DMOS trench technology. SPN30T10 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.

FEATURES

- ◆ 100V/20A, $R_{DS(ON)}=45m\Omega@V_{GS}= 10V$
- ◆ 100V/15A , $R_{DS(ON)}=50m\Omega@V_{GS}= 4.5V$
- ◆ High density cell design for extremely low RDS (ON)
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ TO-252/PPAK5x6 package design

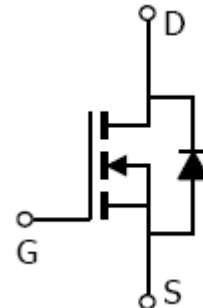
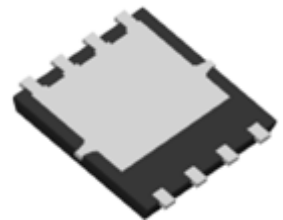
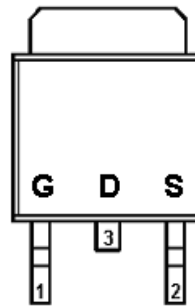
APPLICATIONS

- High Frequency Small Power System
- DC/DC Converter
- Load Switch

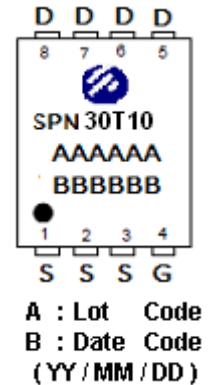
PIN CONFIGURATION

TO-252

PPAK5x6



PART MARKING





SPN30T10

N-Channel Enhancement Mode MOSFET

TO-252 PIN DESCRIPTION

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

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
SPN30T10T252RGB	TO-252	SPN30T10
SPN30T10DN8RGB	PPAK5x6	SPN30T10

※ SPN30T10T252RGB : Tape& Reel ; Pb – Free ; Halogen – Free

※ SPN30T10DN8RGB : Tape&Reel ; Pb – Free ; Halogen - Free



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ABSOLUTE MAXIMUM RATINGS

(T_A=25°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit	
Drain-Source Voltage	V _{DSS}	100	V	
Gate –Source Voltage	V _{GSS}	±20	V	
Continuous Drain Current(T _J =150°C)	I _D	T _C =25°C	22	A
		T _C =70°C	16	
Pulsed Drain Current	I _{DM}	45	A	
Avalanche Current	I _{AS}	27	A	
Power Dissipation @ T _c =25°C (TO-252)	P _D	52	W	
Power Dissipation@ T _c =25°C (PPAK5X6)		40		
Operating Junction Temperature	T _J	150	°C	
Storage Temperature Range	T _{STG}	-55/150	°C	
Thermal Resistance-Junction to Ambient (PPAK5x6)	R _{θJA}	46	°C/W	
Thermal Resistance-Junction to Ambient (TO-252)	R _{θJA}	62	°C/W	



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ELECTRICAL CHARACTERISTICS

(TA=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	100			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1		2.5	V
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=80V, V_{GS}=0V$			10	uA
		$V_{DS}=80V, V_{GS}=0V$ $T_J=125^\circ C$			100	
On-State Drain Current	$I_{D(on)}$	$V_{DS}\geq 5V, V_{GS}=10V$	22			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$			45	mΩ
		$V_{GS}=4.5V, I_D=15A$			50	mΩ
Forward Transconductance	g_{fs}	$V_{DS}=5V, I_D=3A$		68		S
Diode Forward Voltage	V_{SD}	$I_S=1A, V_{GS}=0V$			1.2	V
Dynamic						
Total Gate Charge	Q_g	$V_{DS}=15V, V_{GS}=4.5V$ $I_D=15A$		55		nC
Gate-Source Charge	Q_{gs}			7.5		
Gate-Drain Charge	Q_{gd}			7		
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V$ $f=1MHz$		3850		pF
Output Capacitance	C_{oss}			137		
Reverse Transfer Capacitance	C_{rss}			82		
Turn-On Time	$t_{d(on)}$	$V_{DD}=50V, I_D=1A,$ $V_{GEN}=10V$ $R_G=3.3\Omega$		19		nS
	t_r			4		
Turn-Off Time	$t_{d(off)}$			84		
	t_f			5		



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TYPICAL CHARACTERISTICS

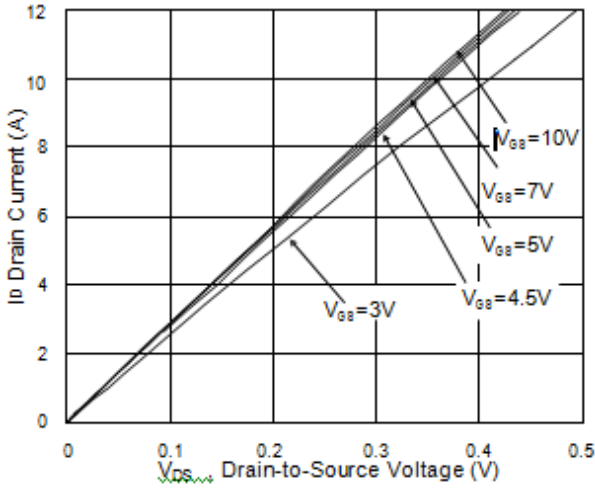


Fig. 1 Typical Output Characteristics

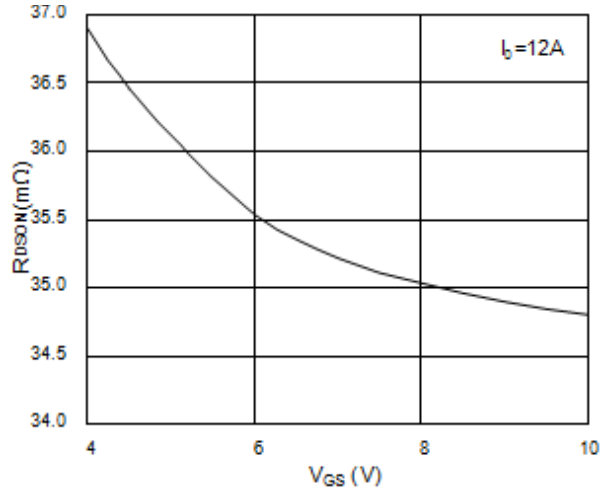


Fig. 2 On-Resistance vs. Gate Voltage

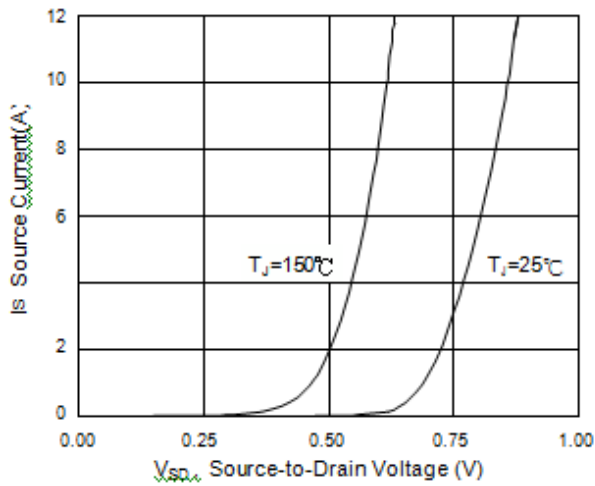


Fig. 3 Forward Characteristics of Reverse Diodes

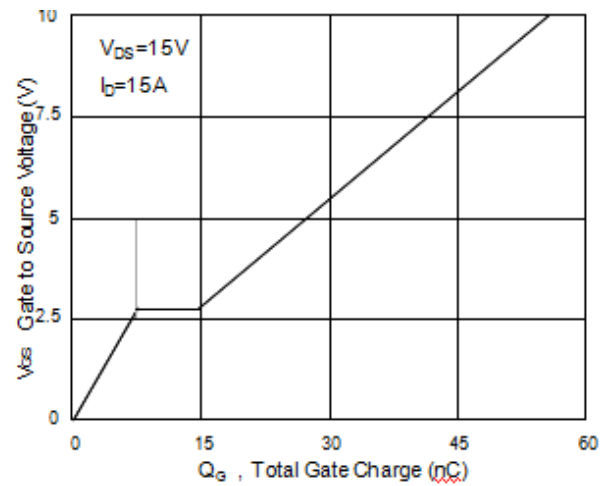


Fig. 4 Gate Charge Characteristics

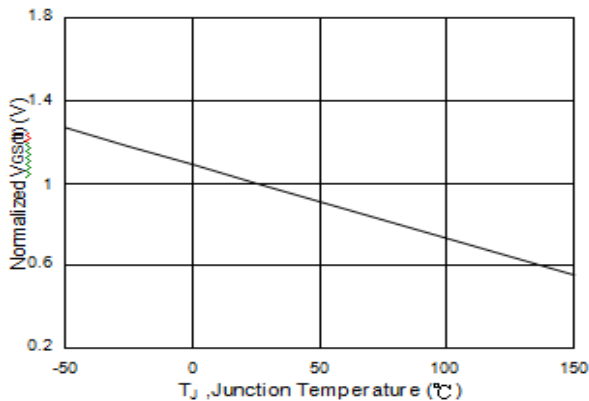


Fig. 5 V_{GS} vs. Junction Temperature

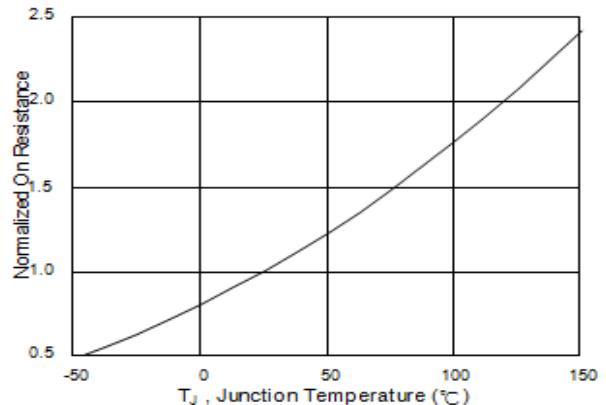


Fig. 6 On-resistance vs. Junction Temperature



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TYPICAL CHARACTERISTICS

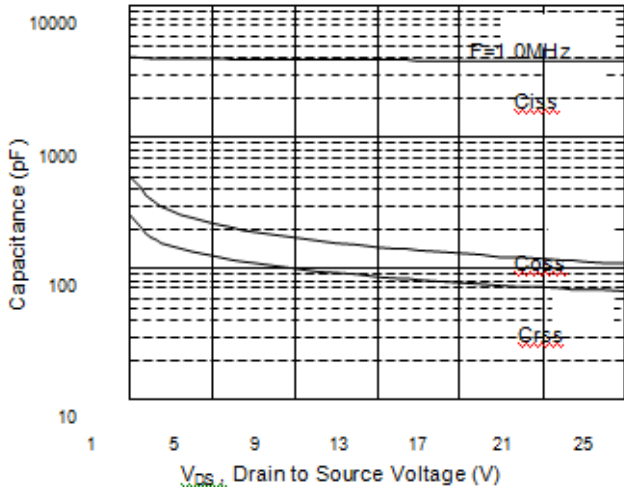


Fig. 7 Typical Capacitance Characteristics

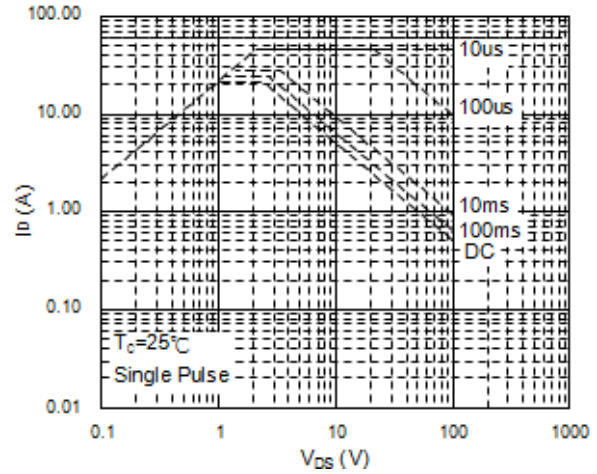


Fig. 8 Maximum Safe Operation Area

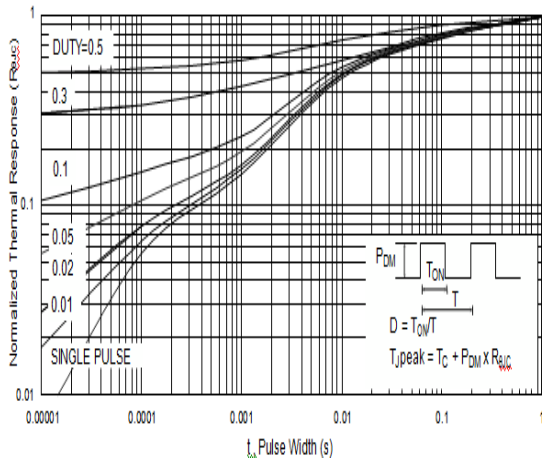


Fig. 9 Effective Transient Thermal Impedance

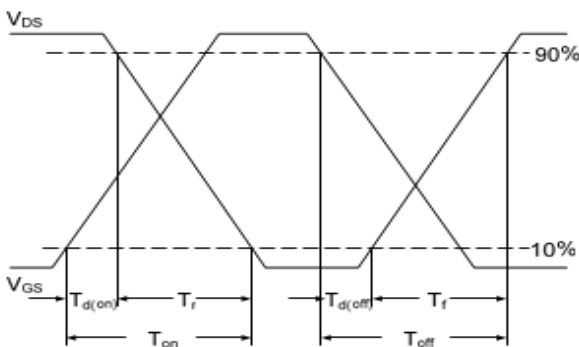


Fig. 10 Switching Time Waveform

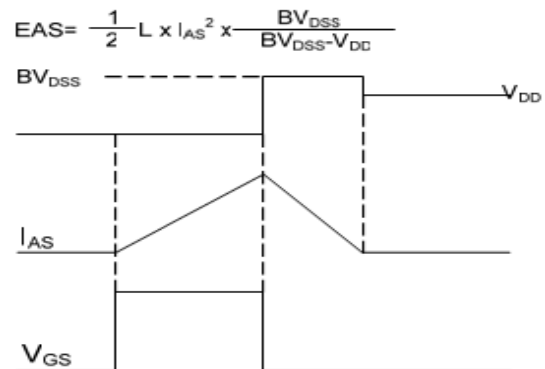


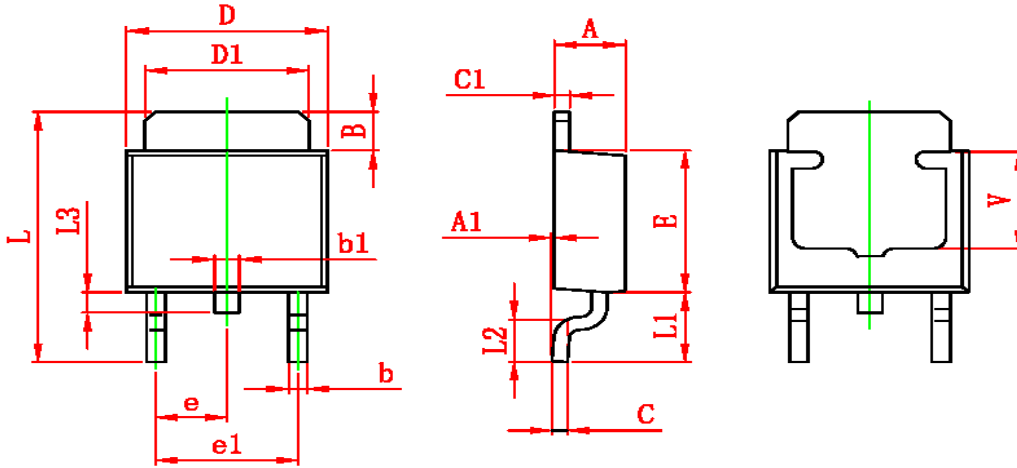
Fig. 11 Unclamped Inductive Waveform



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TO-252 PACKAGE OUTLINE



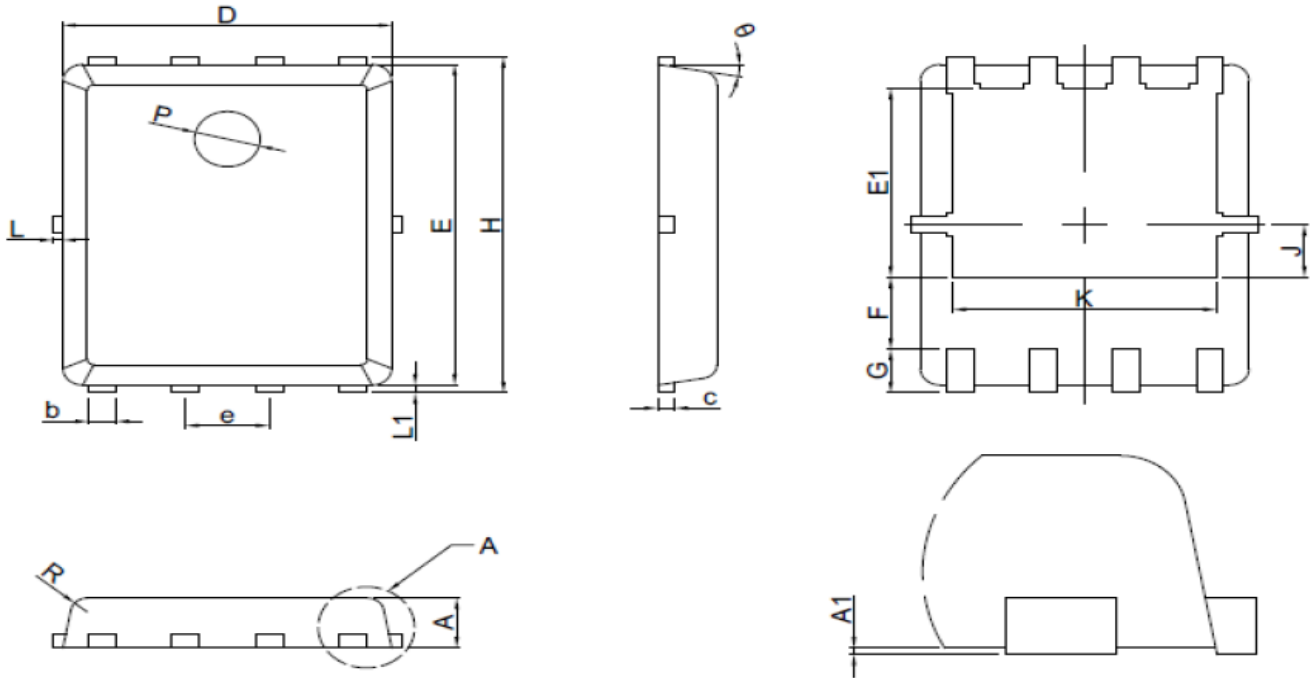
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP		0.091 TYP	
e1	4.500	4.700	0.177	0.185
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.350	0.650	0.014	0.026
V	3.80 REF		0.150 REF	



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PPAK5x6 PACKAGE OUTLINE



SYMBOL	MILLIMETERS		
	MIN	NOM	MAX
A	0.8	0.95	1.1
A1	0.00	0.03	0.05
b	0.33	0.41	0.51
c	0.254 REF		
D	4.80	4.95	5.10
F	1.40 REF		
E	5.70	5.80	5.90
e	1.27 BSC		
H	5.90	6.05	6.20
L1	0.06	0.13	0.20
G	0.60 REF		
J	0.95 BSC		
K	4.00 REF		
L	---	----	0.20
P	1.00 REF		
E1	3.40REF		
E2	0.95 REF		
θ	6°	10°	14°
R	0.25REF		



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