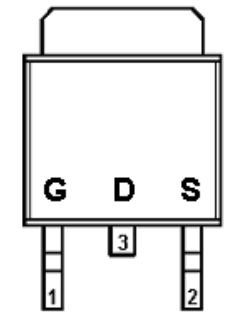
SPN3009
N-Channel Enhancement Mode MOSFET

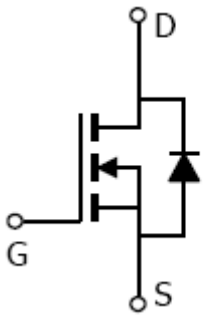
DESCRIPTION
The SPN3009 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. The SPN3009 has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for low gate charge, low $R_{DS(ON)}$ and fast switching speed.

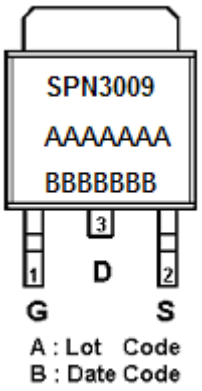
APPLICATIONS
- High Frequency Synchronous Buck Converter
- DC/DC Power System
- Load Switch

FEATURES
- 30V/30A, $R_{DS(ON)}$= 7.5mΩ@V_{GS}=10V
- 30V/15A,$R_{DS(ON)}$= 11.0mΩ@V_{GS}=4.5V
- Super high density cell design for extremely low RDS (ON)
- Exceptional on-resistance and maximum DC current capability
- TO-252 package design

PIN CONFIGURATION
TO-252





PART MARKING


SPN3009
N-Channel Enhancement Mode MOSFET

PIN DESCRIPTION

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

ORDERING INFORMATION

Part Number	Package	Part Marking
SPN3009T252RGB	TO-252	SPN3009

※ SPN3009T252RGB : Tape Reel ; Pb – Free ; Halogen - Free

ABSOULTE MAXIMUM RATINGS

(T_A=25℃ Unless otherwise noted)

Parameter		Symbol	Typical	Unit
Drain-Source Voltage		V_{DSS}	30	V
Gate –Source Voltage		V_{GSS}	±20	V
Continuous Drain Current	T_A=25℃	I_D	51	A
	T_A=100℃		36	
Pulsed Drain Current		I_{DM}	120	A
Avalanche Current		I_{AS}	34	A
Single Pulse Avalanche Energy		EAS	130	mJ
Power Dissipation	T_A=25℃	P_D	2.42	W
Operating Junction Temperature		T_J	150	℃
Storage Temperature Range		T_{STG}	-55/150	℃
Thermal Resistance-Junction to Ambient (t≦10s)		$R_{\theta JA}$	62	℃/W

ELECTRICAL CHARACTERISTICS

SPN3009
N-Channel Enhancement Mode MOSFET

(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	30			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	1.0		2.5	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V,V_{GS}=0V			1	uA
		V_{DS}=24V,V_{GS}=0V, T_J=55℃			5	
On-State Drain Current	$I_{D(on)}$	V_{DS}≥5V,V_{GS} =10V			51	A
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}= 10V,I_D=30A		7.5	9	mΩ
		V_{GS}=4.5V,I_D=15A		11	13.5	
Forward Transconductance	gfs	V_{DS}=5V,I_D=30A		42		S
Diode Forward Voltage	V_{SD}	I_S=1A,V_{GS} =0V			1	V
Single Pulse Avalanche Energy	EAS	V_{DD}=25V, L=0.1mH, I_{AS}=20A	45			mJ
Dynamic						
Total Gate Charge	Q_g	V_{DS}=15V,V_{GS}=4.5V I_D= 15A		10.6		nC
Gate-Source Charge	Q_{gs}			4.2		
Gate-Drain Charge	Q_{gd}			4		
Input Capacitance	C_{iss}	V_{DS}=15VV_{GS}=0V f=1MHz		1127		pF
Output Capacitance	C_{oss}			194		
Reverse Transfer Capacitance	C_{rss}			78		
Turn-On Time	$t_{d(on)}$	V_{DD}=15V, I_D=15A,V_{GEN}=10V R_G=3.3Ω		6.4	13	nS
	t_r			70	127	
Turn-Off Time	$t_{d(off)}$			22.5	45	
	t_f			8	18	

TYPICAL CHARACTERISTICS

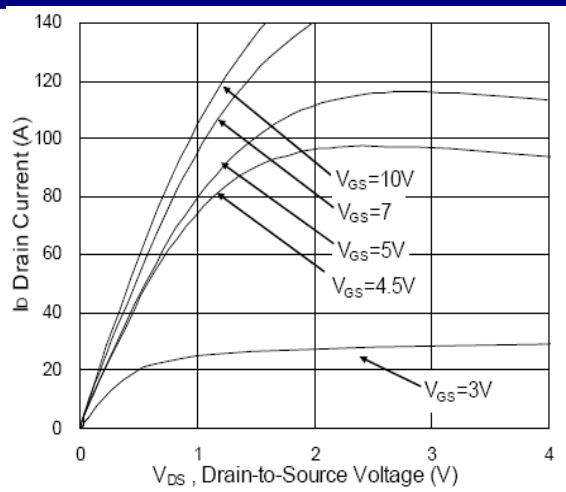


Fig. 1 Typical Output Characteristics

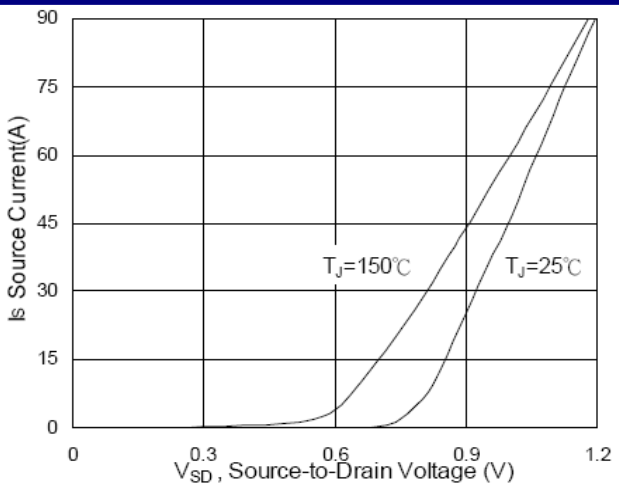


Fig. 2 Transfer Characteristics

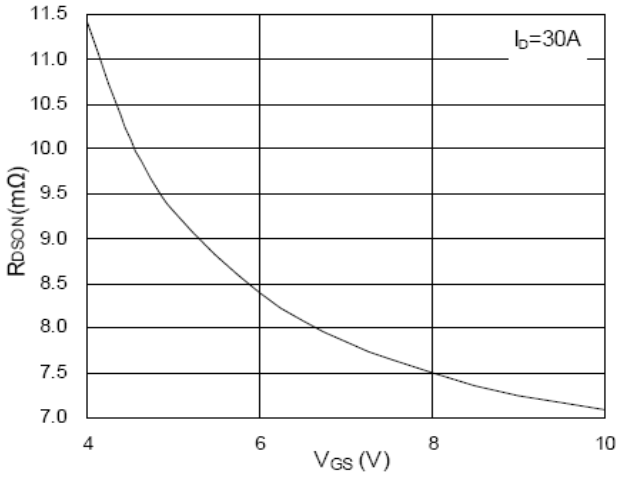


Fig. 3 On-Resistance vs Gate voltage

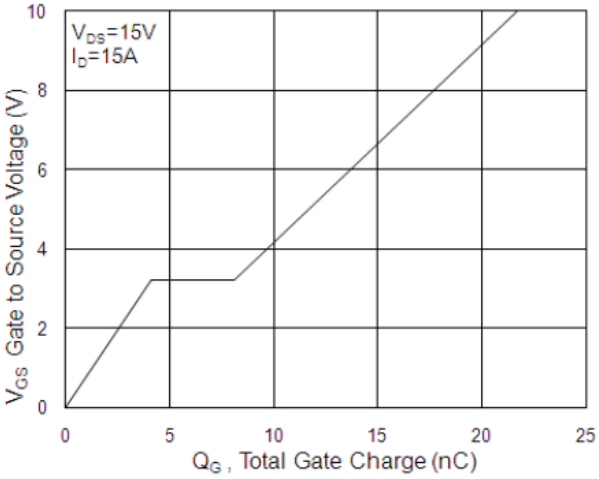


Fig. 4 Gate Charge Characteristics

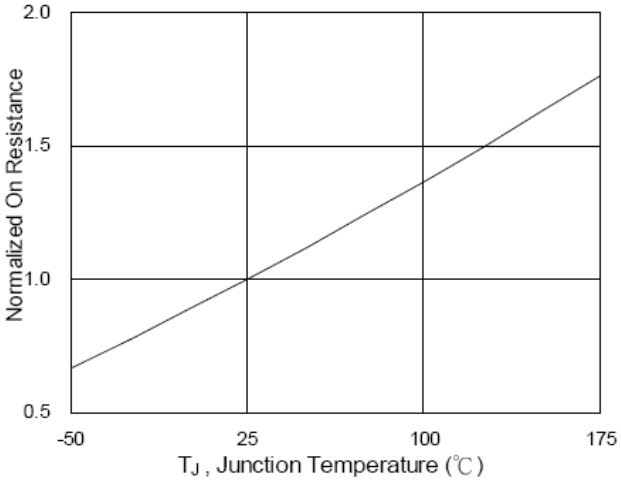


Fig. 5 On-Resistance vs Junction Temp

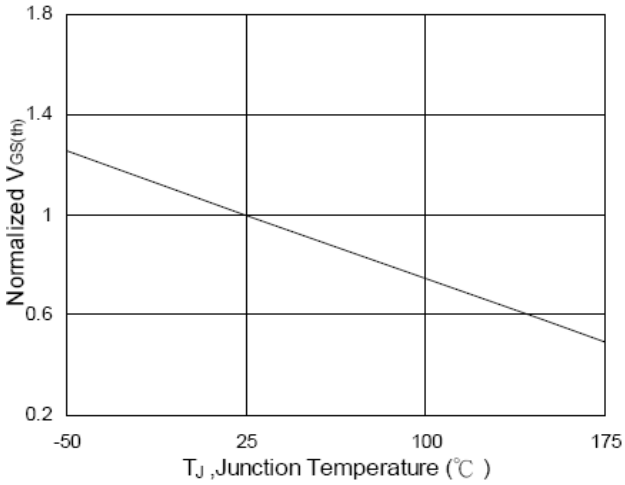


Fig. 6 Vgs vs Junction Temperature

TYPICAL CHARACTERISTICS

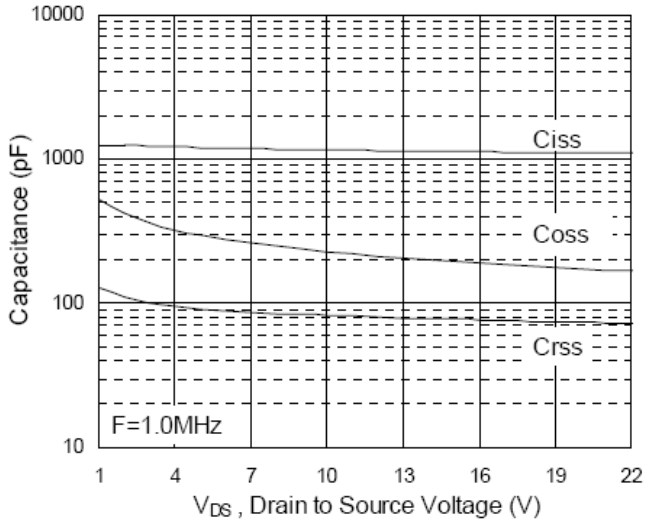


Fig. 7 Typical Capacitance Characteristics

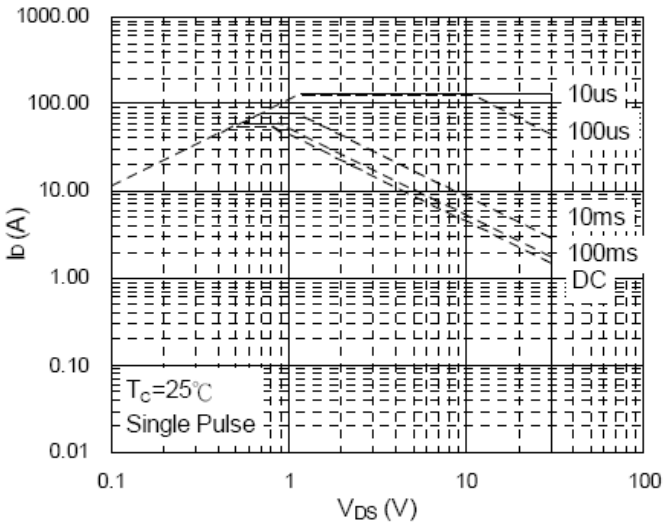


Fig. 8 Maximum Safe Operation Area

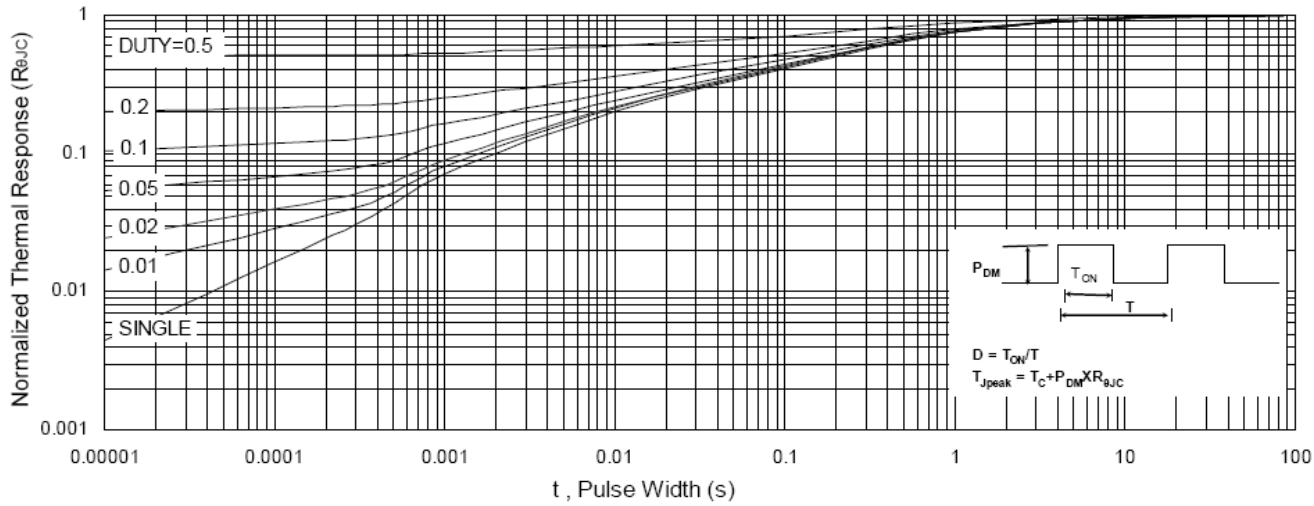


Fig. 9 Effective Transient Thermal Impedance

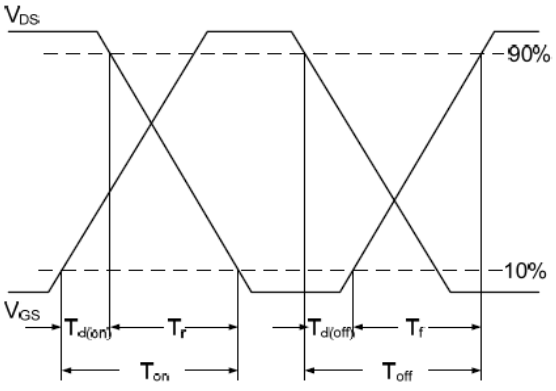


Fig. 10 Switching Time Waveform

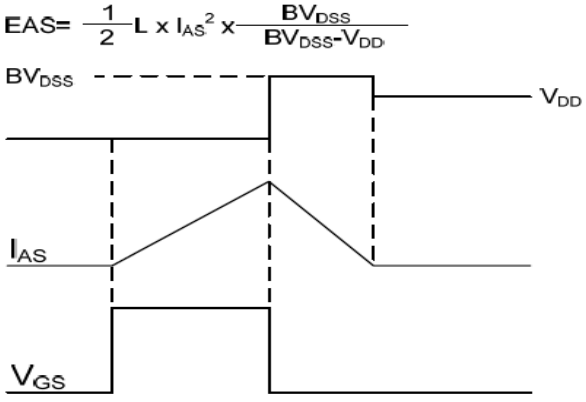
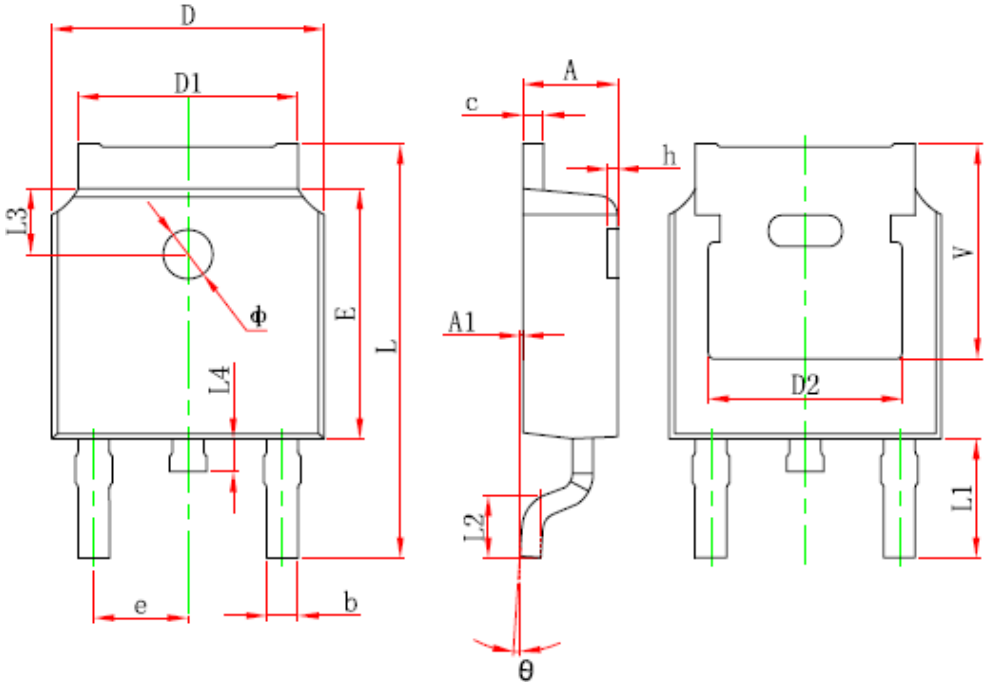


Fig. 11 Unclamped Inductive Waveform

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	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	

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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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