SPN2038
N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SPN2038 is the N-Channel logic enhancement mode power field effect transistor which is produced with high cell density DMOS trench technology. The SPN2038 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

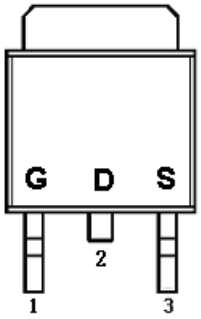
- Power Management in Note book
- Powered System
- DC/DC Converter
- Load Switch

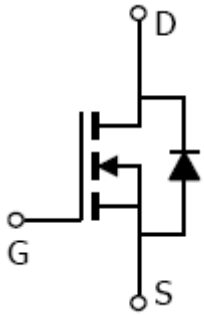
FEATURES

- 20V/14A, $R_{DS(ON)}$=20mΩ@V_{GS}=4.5V
- 20V/7A, $R_{DS(ON)}$=28mΩ@V_{GS}=2.5V
- Super high density cell design for extremely low $R_{DS\ (ON)}$
- Exceptional on-resistance and maximum DC current capability
- TO-252-2L package design

PIN CONFIGURATION

TO-252-2L





PART MARKING

SPN2038
N-Channel Enhancement Mode MOSFET

PIN DESCRIPTION

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

ORDERING INFORMATION

Part Number	Package	Part Marking
SPN2038T252RGB	TO-252-2L	SPN2038

※ SPN2038T252RGB : Tape Reel ; Pb – Free ; Halogen - Free

ABSOULTE MAXIMUM RATINGS

(T_A=25℃ Unless otherwise noted)

Parameter		Symbol	Typical	Unit
Drain-Source Voltage		V_{DSS}	20	V
Gate –Source Voltage		V_{GSS}	±16	V
Continuous Drain Current	T_C=25℃	I_D	28	A
	T_C=100℃		18	
Pulsed Drain Current		I_{DM}	70	A
Power Dissipation	T_C=25℃	P_D	25	W
Operating Junction Temperature		T_J	-55/150	℃
Storage Temperature Range		T_{STG}	-55/150	℃
Thermal Resistance-Junction to Case		$R_{\theta JC}$	5	℃/W

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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	20			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	0.5		1.2	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±16V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=16V,V_{GS}=0V			1	uA
		V_{DS}=16V,V_{GS}=0V T_J=55℃			5	
On-State Drain Current	$I_{D(on)}$	V_{DS}≥5V,V_{GS}=4.5V	28			A
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=4.5V,I_D=14A		0.016	0.020	Ω
		V_{GS}=2.5V,I_D=7A		0.022	0.028	
Forward Transconductance	gfs	V_{DS}=5V,I_D=14A		30		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=14A		9.8		nC
Gate-Source Charge	Q_{gs}			2.1		
Gate-Drain Charge	Q_{gd}			3		
Input Capacitance	C_{iss}	V_{DS}=15,V_{GS}=0V f=1MHz		772		pF
Output Capacitance	C_{oss}			83		
Reverse Transfer Capacitance	C_{rss}			79		
Turn-On Time	$t_{d(on)}$	V_{DD}=10V, I_D≡14A, V_{GS}=4.5V, R_G=3.3Ω		4		nS
	t_r			12.5		
Turn-Off Time	$t_{d(off)}$			20		
	t_f			8		

TYPICAL CHARACTERISTICS

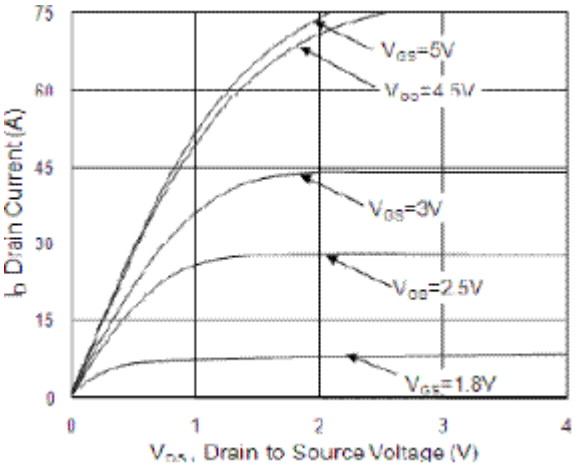

Fig. 1 Typical Output Characteristics

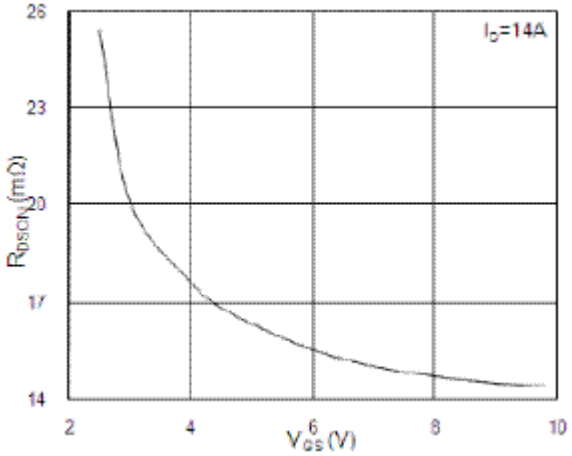

Fig. 2 On-Resistance vs Gate Voltage

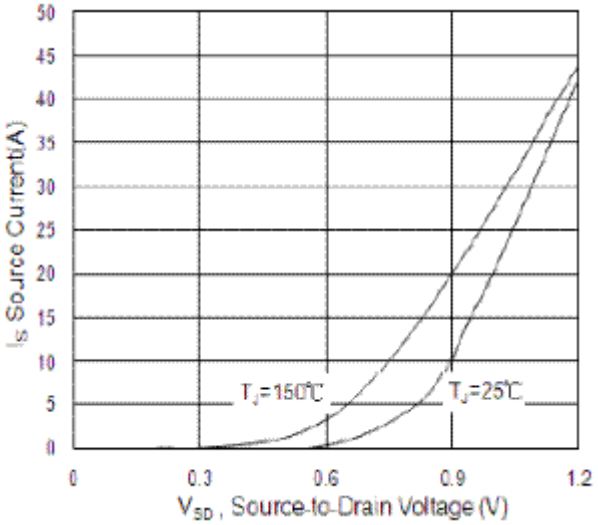

Fig. 3 Forward Characteristics

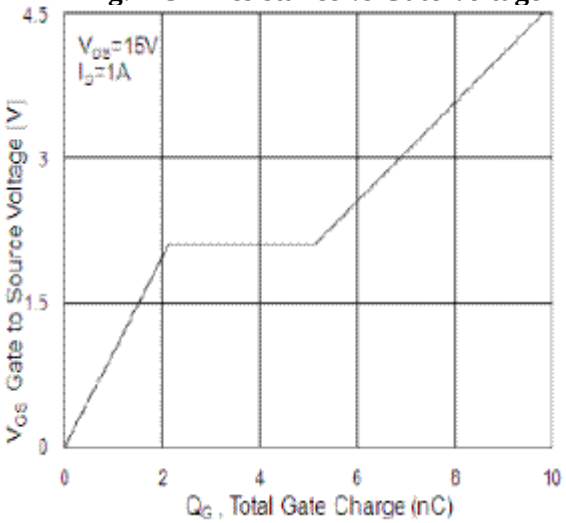

Fig. 4 Total Gate Charge

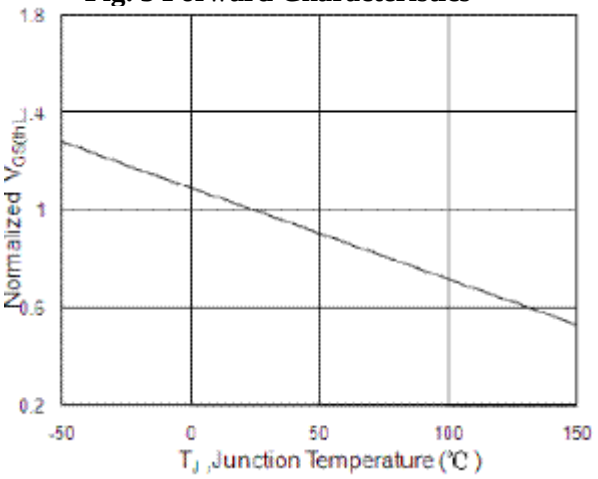

Fig. 5 Vgs vs Temperature

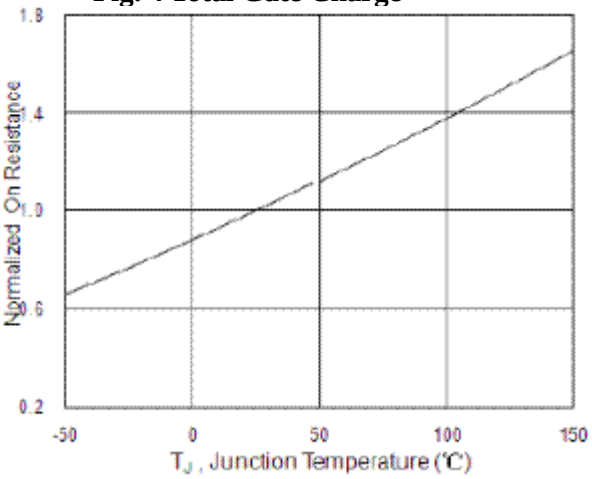

Fig. 6 Rdson vs Temperature

TYPICAL CHARACTERISTICS

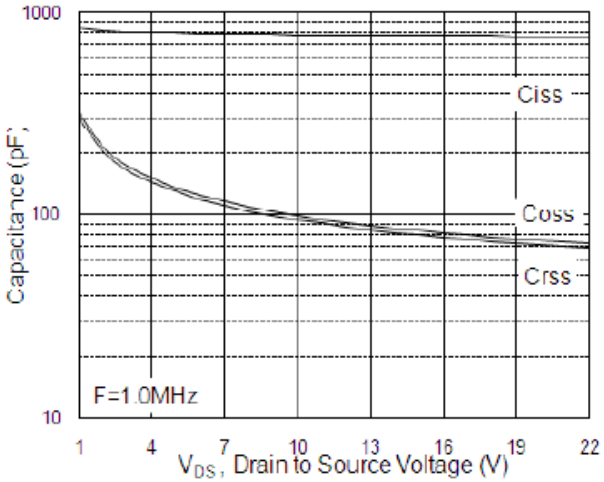

Fig. 7 Capacitance vs Vds

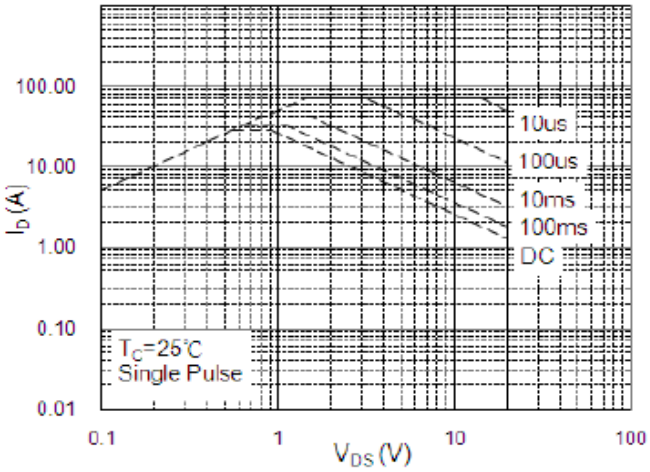

Fig. 8 Safe Operation Region

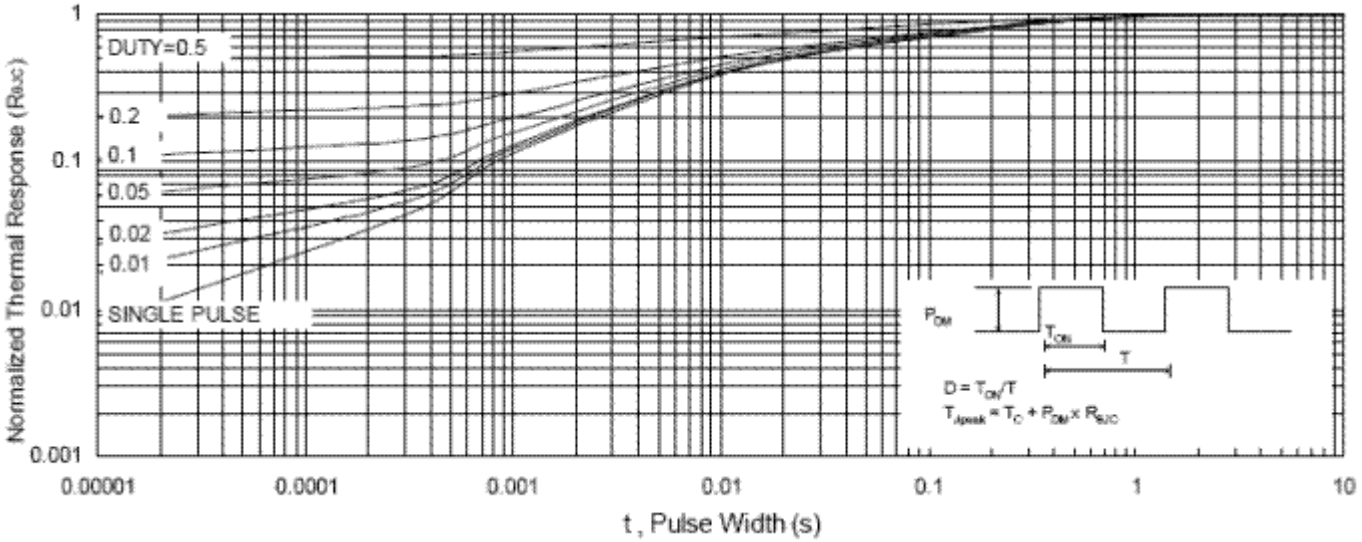

Fig. 9 Maximum Transient Thermal Impedance

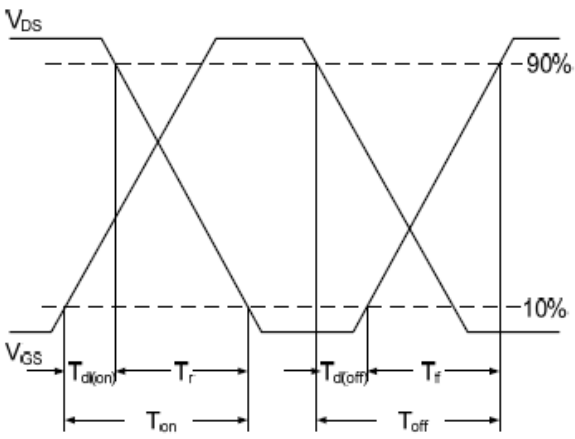

Fig. 10 Switching Time Waveform

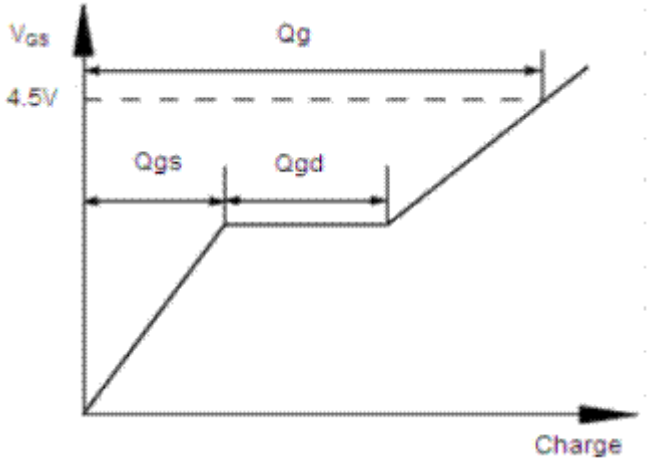

Fig. 11 Gate Charge Waveform

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