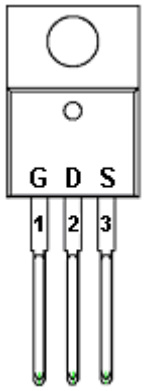
SPN6098
N-Channel Enhancement Mode MOSFET

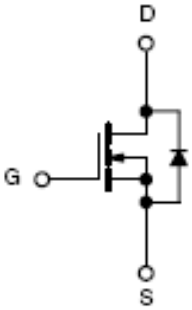
DESCRIPTION
The SPN6098 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance. These devices are particularly suited for most of synchronous buck converter applications.

APPLICATIONS
- DC/DC Converter
- Load Switch
- Synchronous Buck Converter

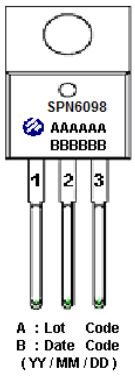
FEATURES
- 60V/60A, $R_{DS(ON)}$= 12mΩ@V_{GS}= 10V
- 60V/60A, $R_{DS(ON)}$= 15.0mΩ@V_{GS}=4.5V
- Super high density cell design for extremely low RDS (ON)
- Exceptional on-resistance and maximum DC current capability
- TO-220-3L package design

PIN CONFIGURATION(TO-220-3L)





PART MARKING



A : Lot Code
B : Date Code
(YY / MM / DD)

SPN6098
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
SPN6098T220TG	TO-220-3L	SPN6098
SPN6098T220TGB	TO-220-3L	SPN6098

※ SPN6098T220TG: Tube ; Pb – Free
※ SPN6098T220TGB: Tube ; Pb – Free; Halogen – Free

ABSOULTE MAXIMUM RATINGS

(T_A=25℃ Unless otherwise noted)

Parameter		Symbol	Typical	Unit
Drain-Source Voltage		V_{DSS}	60	V
Gate –Source Voltage		V_{GSS}	±20	V
Continuous Drain Current(T_J=150℃)	T_A=25℃	I_D	60	A
	T_A=100℃		47	
Pulsed Drain Current		I_{DM}	120	A
Avalanche Current		I_{AS}	38	A
Power Dissipation	T_A=25℃	P_D	62	W
Avalanche Energy with Single Pulse (Tj=25℃, L = 0.1mH , I_{AS} = 38A , V_{DD} = 25V.)		EAS	123	mJ
Operating Junction Temperature		T_J	-55/150	℃
Storage Temperature Range		T_{STG}	-55/150	℃
Thermal Resistance-Junction to Ambient		$R_{\theta JA}$	62	℃/W

SPN6098
N-Channel Enhancement Mode MOSFET

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	60			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}=48V,V_{GS}=0V			1	uA
		V_{DS}=48V,V_{GS}=0V T_J = 55 °C			5	
On-State Drain Current	$I_{D(on)}$	V_{DS}≥5V,V_{GS} =10V	60			A
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}= 10V,I_D=15A		10	12	mΩ
		V_{GS}= 4.5V,I_D=10A		12	15	
Forward Transconductance	gfs	V_{DS}=5V,I_D=15A		47		S
Diode Forward Voltage	V_{SD}	I_S=60A,V_{GS} =0V			1.2	V
Dynamic						
Total Gate Charge	Q_g	V_{DS}=48V,V_{GS}=4.5V I_D= 12A		24		nC
Gate-Source Charge	Q_{gs}			6.9		
Gate-Drain Charge	Q_{gd}			10		
Input Capacitance	C_{iss}	V_{DS}=15V,V_{GS}=0V f=1MHz		3200		pF
Output Capacitance	C_{oss}			210		
Reverse Transfer Capacitance	C_{rss}			145		
Turn-On Time	$t_{d(on)}$	V_{DD}=30V, I_D=2A, V_{GEN}=10V, R_G=3.3Ω		20		nS
	t_r			4		
Turn-Off Time	$t_{d(off)}$			84.5		
	t_f			6.5		

TYPICAL CHARACTERISTICS

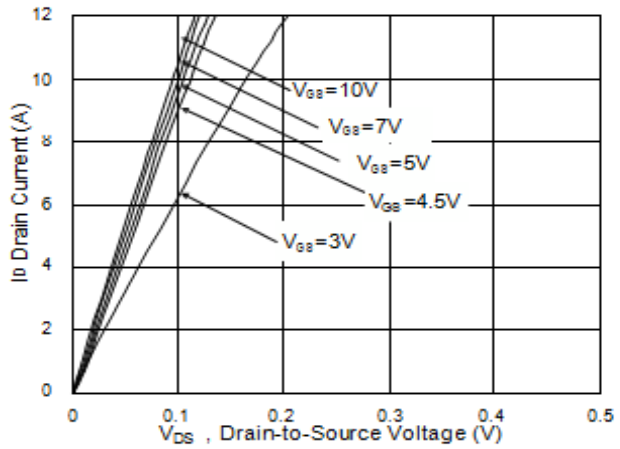


Fig. 1 Typical Output Characteristics

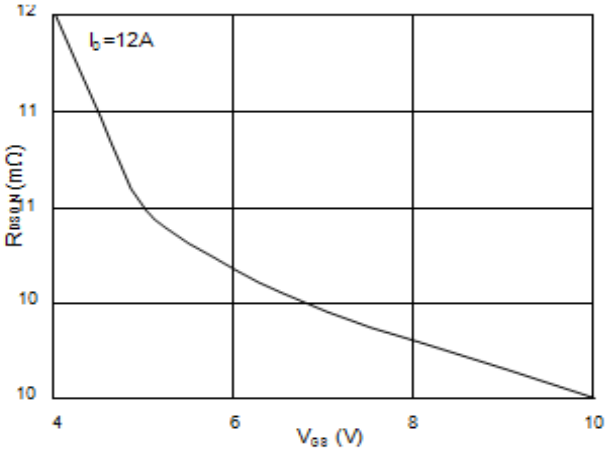


Fig. 2 On-Resistance vs. Gate Voltage

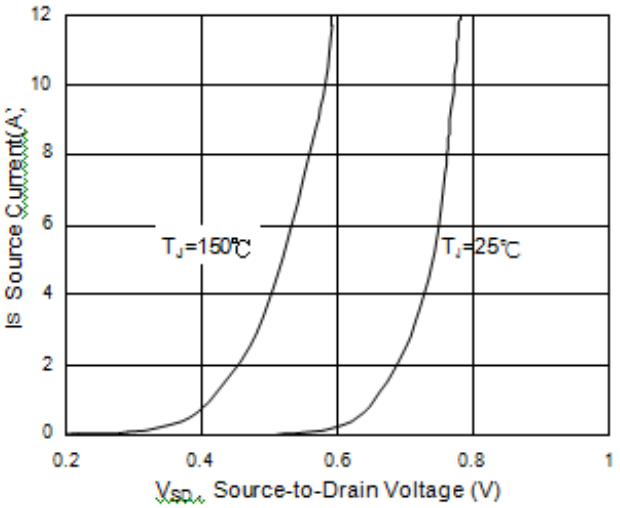


Fig. 3 Forward Characteristics
Reverse Diodes

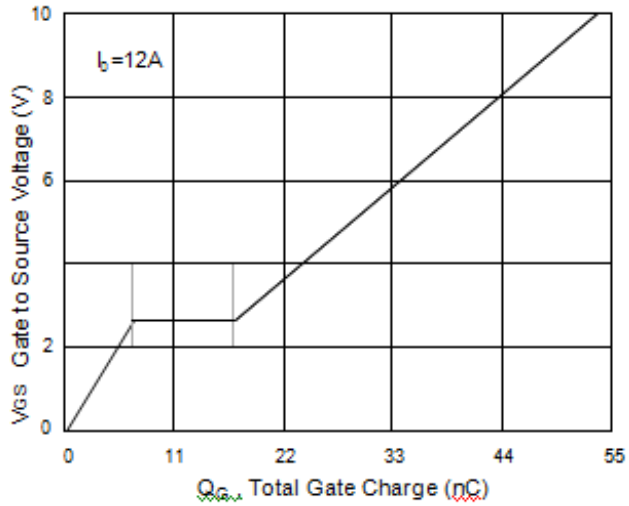


Fig. 4 Gate Charge Characteristics

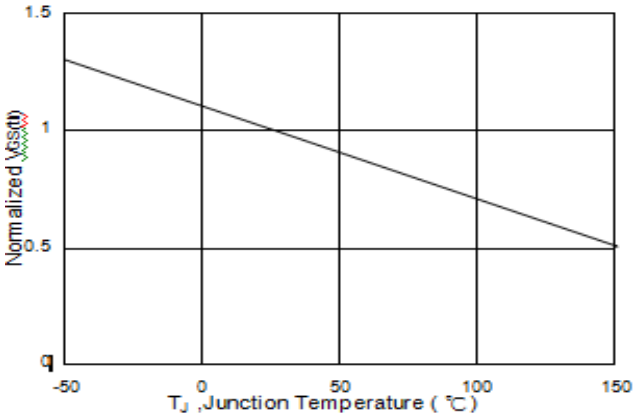


Fig. 5 Vgs vs. Junction Temperature

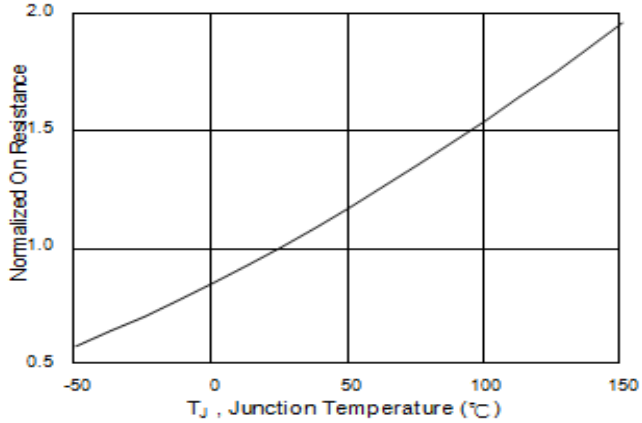


Fig. 6 On-Resistance vs. Temperature

TYPICAL CHARACTERISTICS

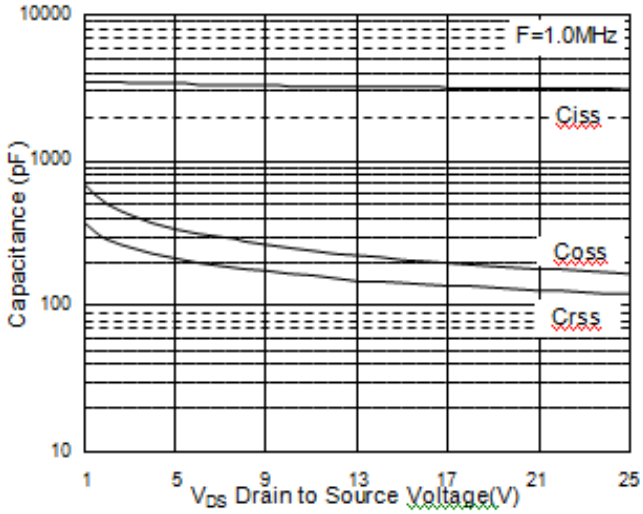


Fig. 7 Typical Capacitance Characteristics

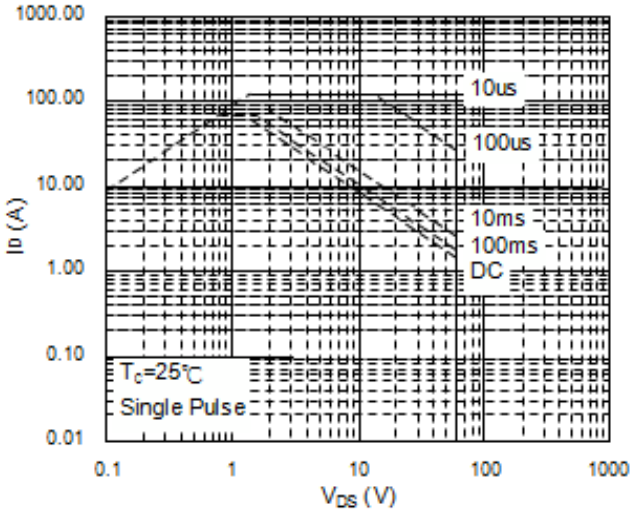


Fig. 8 Maximum Safe Operation Area

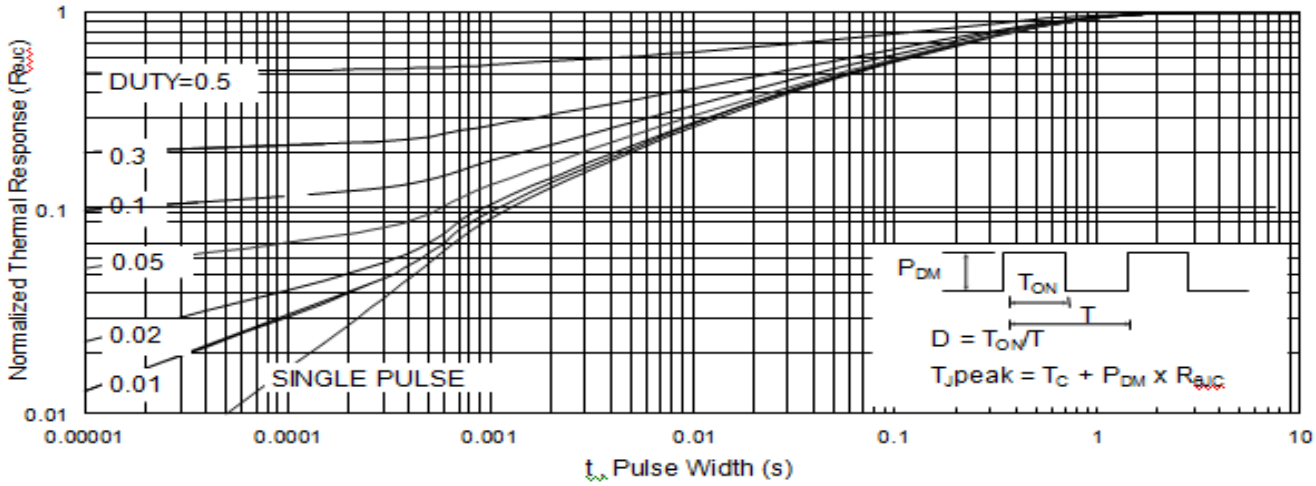


Fig. 9 Effective Transient Thermal Impedance

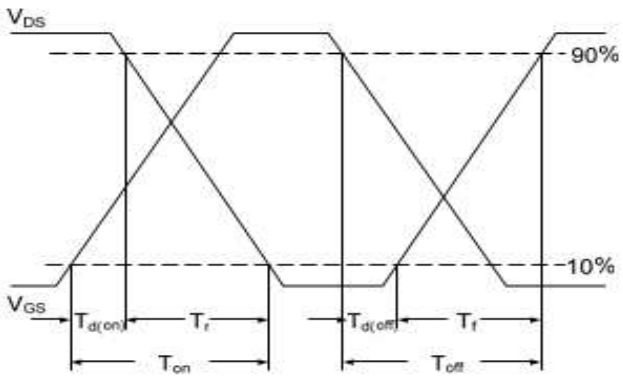


Fig. 10 Switching Time Waveform

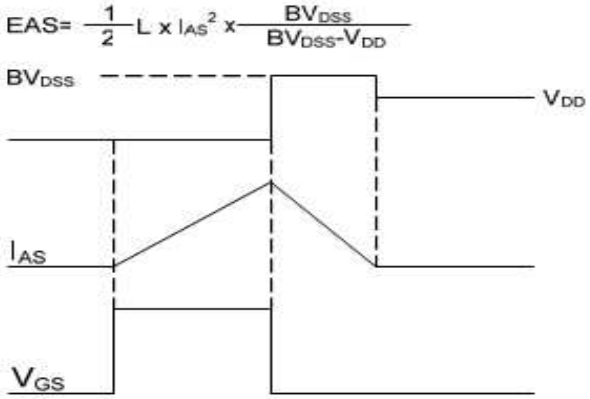
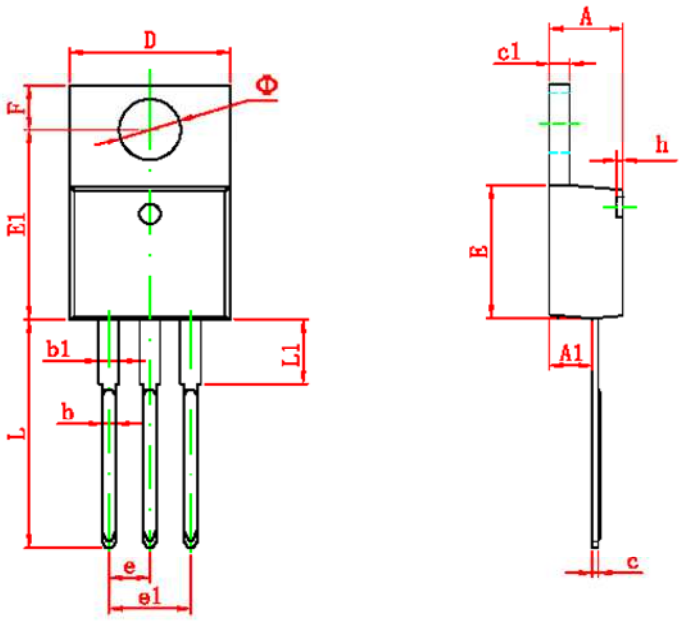


Fig. 11 Unclamped Inductive Waveform

TO-220-3L PACKAGE OUTLINE



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
• •	3.735	3.935	0.147	0.155

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