



# SPN6099

## N-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPN6099 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 low voltage application , notebook computer power management and other battery powered circuits where high-side switching .

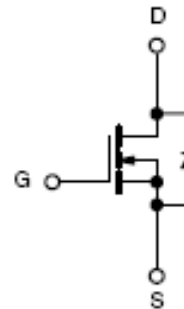
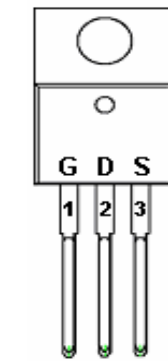
### FEATURES

- ◆ 60V/80A,  $R_{DS(ON)} = 4.0m\Omega @ V_{GS} = 10V$
- ◆ 60V/20A,  $R_{DS(ON)} = 4.2m\Omega @ V_{GS} = 6.0V$
- ◆ 60V/10A,  $R_{DS(ON)} = 4.4m\Omega @ V_{GS} = 4.5V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ TO-220-3L package design

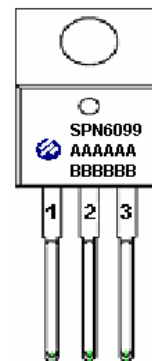
### APPLICATIONS

- DC/DC Converter
- Load Switch
- SMPS Secondary Side Synchronous Rectifier

### PIN CONFIGURATION( TO-220-3L )



### PART MARKING



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



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### PIN DESCRIPTION

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

### ORDERING INFORMATION

Part Number	Package	Part Marking
SPN6099T220TGB	TO-220-3L	SPN6099

※ SPN6099T220TGB: Tube ; Pb – Free; Halogen – Free

### ABSOLUTE MAXIMUM RATINGS

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

Parameter	Symbol	Typical	Unit	
Drain-Source Voltage	$V_{DS}$	60	V	
Gate –Source Voltage	$V_{GS}$	$\pm 20$	V	
Continuous Drain Current( $T_J=150^{\circ}\text{C}$ )	$I_D$	$T_A=25^{\circ}\text{C}$	80	A
		$T_A=70^{\circ}\text{C}$	80	
Pulsed Drain Current	$I_{DM}$	420	A	
Avalanche Current	$I_{AS}$	75	A	
Power Dissipation	$P_D$	$T_A=25^{\circ}\text{C}$	62.5	W
		$T_A=70^{\circ}\text{C}$	3.38	
Avalanche Energy with Single Pulse ( $T_J=25^{\circ}\text{C}$ , $L = 0.12\text{mH}$ , $I_{AS} = 80\text{A}$ , $V_{DD} = 48\text{V}$ .)	$E_{AS}$	380	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	$R_{\theta JA}$	2	$^{\circ}\text{C}/\text{W}$	



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### ELECTRICAL CHARACTERISTICS

(T<sub>A</sub>=25°C Unless otherwise noted)

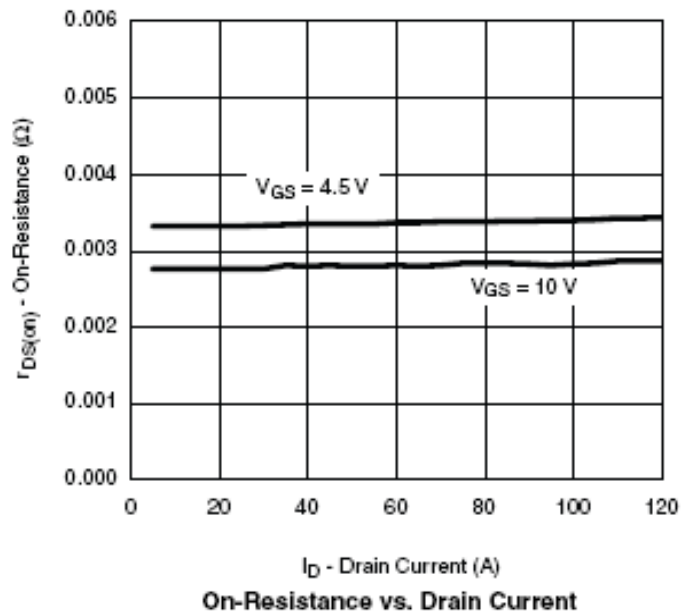
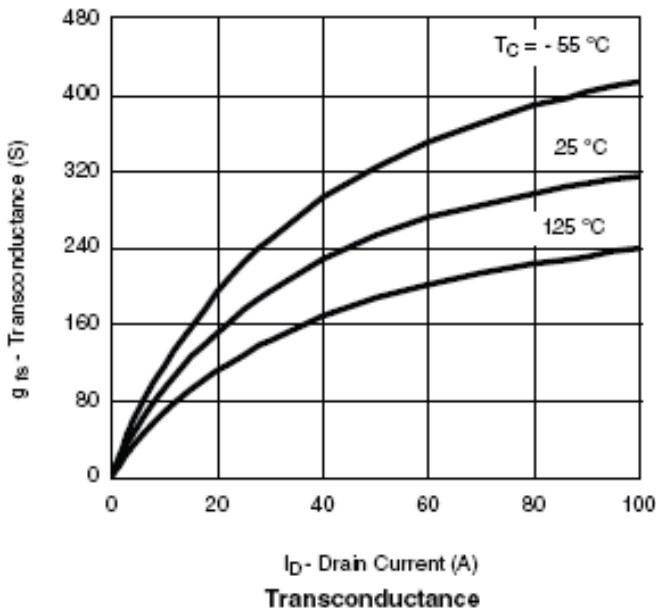
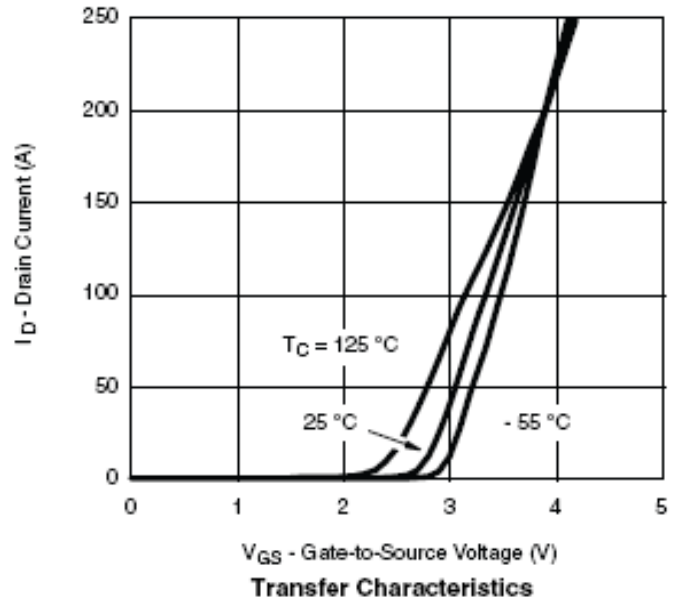
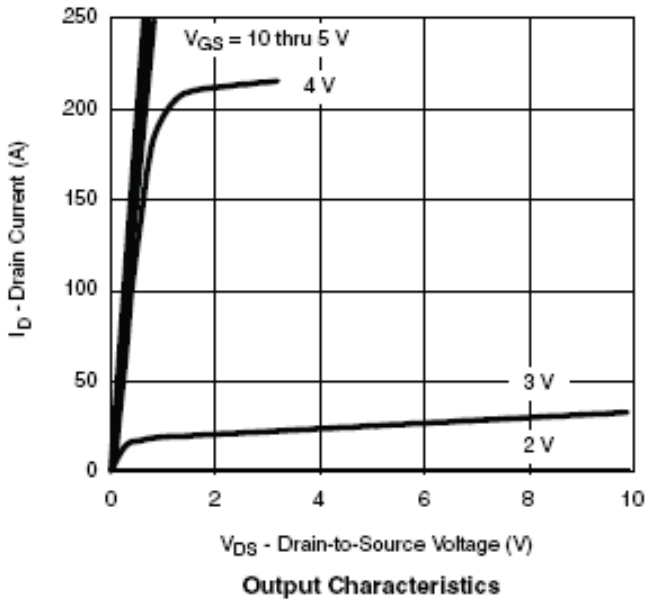
Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	60			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0		2.5	
Gate Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V			1	μA
		V <sub>DS</sub> =60V, V <sub>GS</sub> =0V T <sub>J</sub> = 150 °C			250	
On-State Drain Current	I <sub>D(on)</sub>	V <sub>DS</sub> ≥5V, V <sub>GS</sub> =10V	70			A
Drain-Source On-Resistance	R <sub>DSS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> =80A		3.6	4.0	mΩ
		V <sub>GS</sub> = 6.0V, I <sub>D</sub> =20A		3.8	4.2	
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> =10A		4.0	4.4	
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =20A		60		S
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =30A, V <sub>GS</sub> =0V			1.5	V
<b>Dynamic</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =10V I <sub>D</sub> = 80A		100		nC
Gate-Source Charge	Q <sub>gs</sub>			28		
Gate-Drain Charge	Q <sub>gd</sub>			25		
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V f=1MHz		6000		pF
Output Capacitance	C <sub>oss</sub>			900		
Reverse Transfer Capacitance	C <sub>rss</sub>			320		
Turn-On Time	t <sub>d(on)</sub>	V <sub>DD</sub> =30V, R <sub>L</sub> =0.4Ω I <sub>D</sub> =80A, V <sub>GEN</sub> =10V R <sub>G</sub> =1.0Ω		25	35	nS
	t <sub>r</sub>			15	25	
Turn-Off Time	t <sub>d(off)</sub>			35	55	
	t <sub>f</sub>			8	15	



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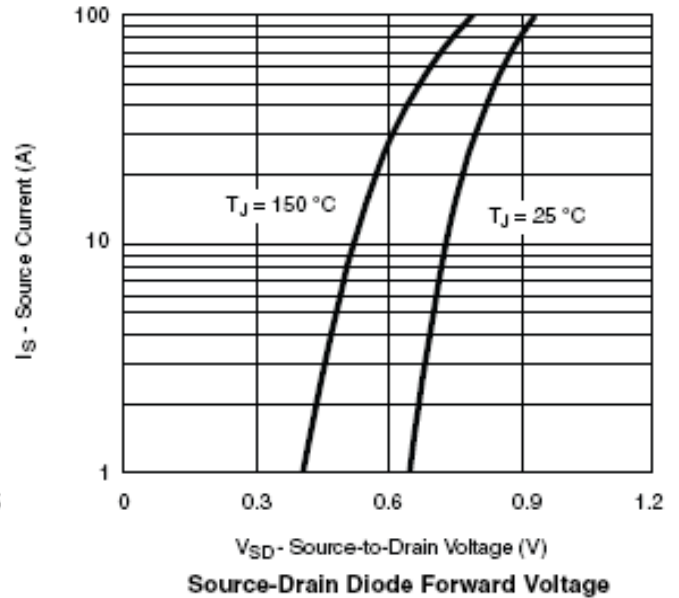
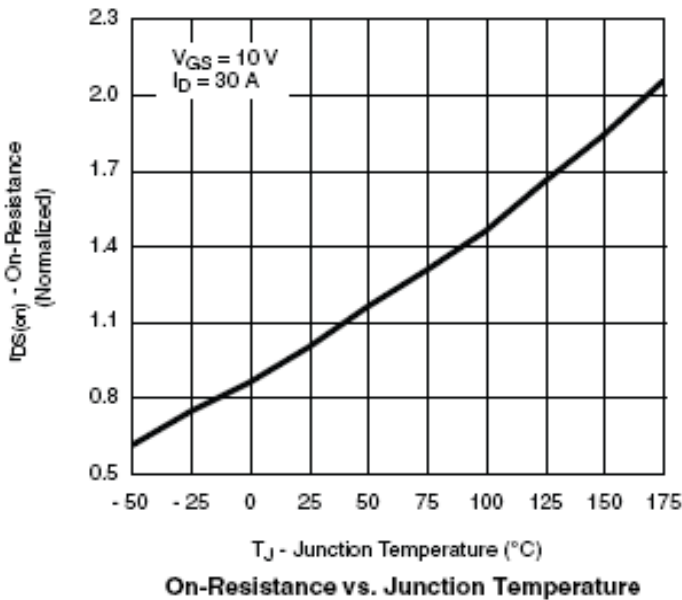
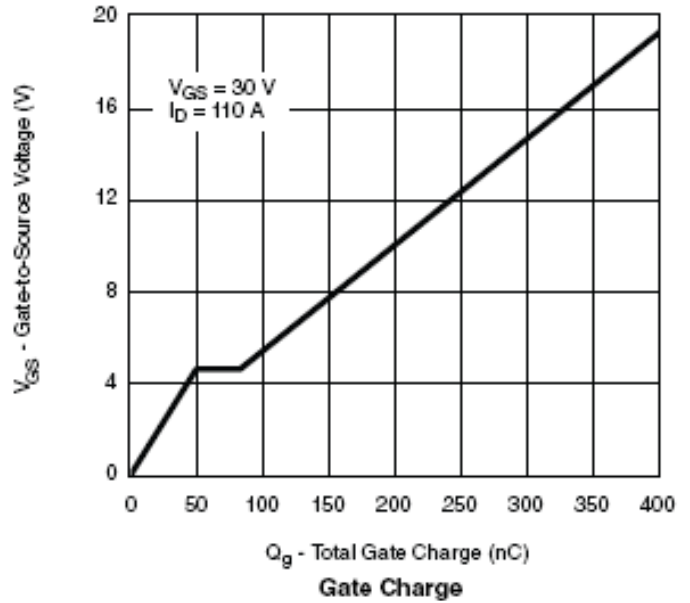
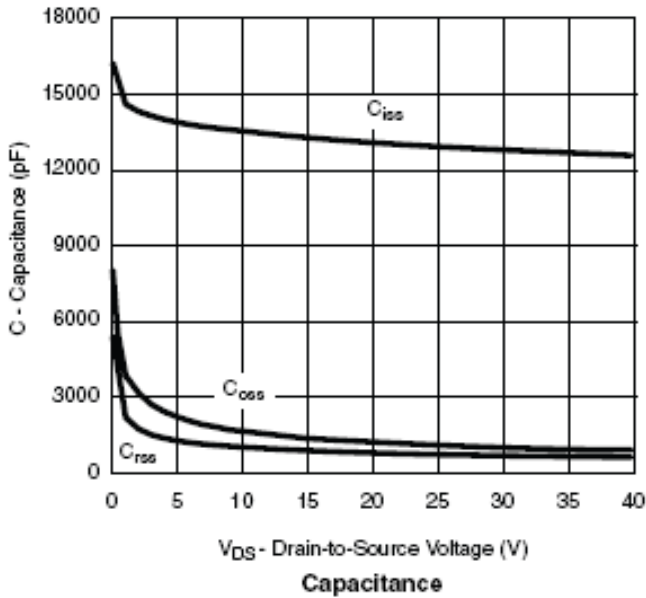
### TYPICAL CHARACTERISTICS





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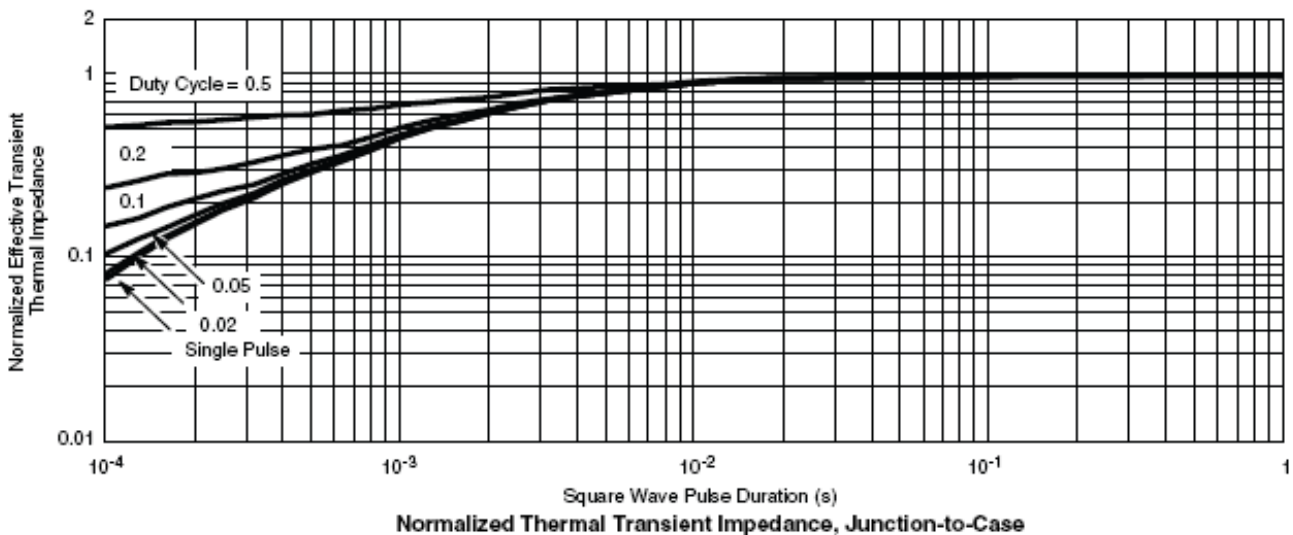
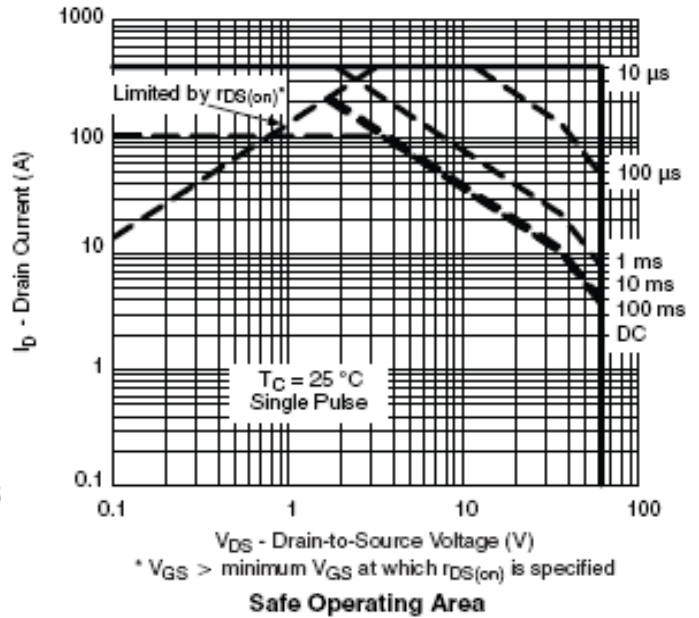
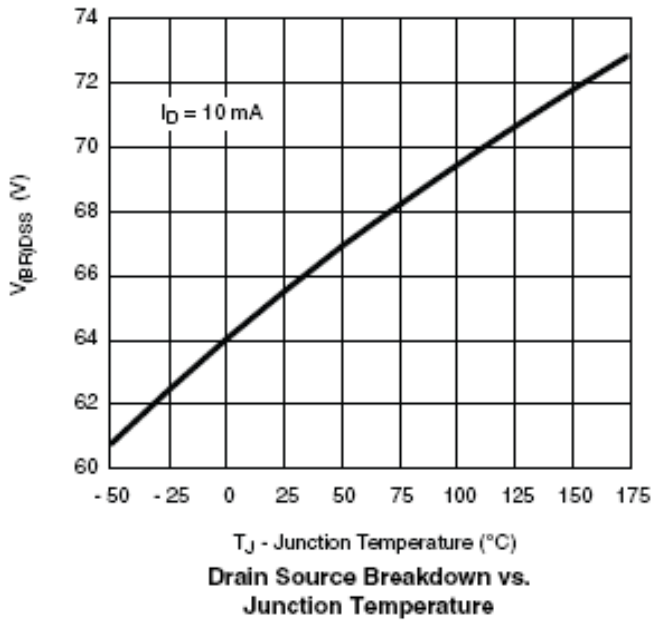
## TYPICAL CHARACTERISTICS





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## TYPICAL CHARACTERISTICS





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### 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



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