



# SPN150N04

## N-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPN150N04 is the N-Channel logic enhancement mode power field effect transistor which is produced using super high cell density DMOS trench technology. This high density process is especially tailored to minimize on-state resistance. These devices are particularly suitable for synchronous rectifier application, Motor control power management and other Power Tool circuits. It has been optimized for low gate charge, low  $R_{DS(ON)}$  and fast switching speed.

### FEATURES

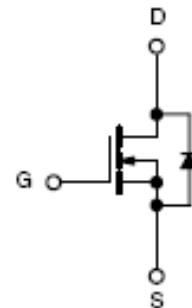
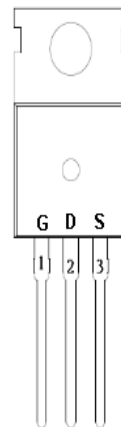
- ◆ 40V/150A,  $R_{DS(ON)}=3.0m\Omega@V_{GS}=10V$
- ◆ 40V/150A,  $R_{DS(ON)}=3.9m\Omega@V_{GS}=4.5V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ TO-220-3L package design

### APPLICATIONS

- DC/DC Converter
- Load Switch
- SMPS Secondary Side Synchronous Rectifier
- Motor Control
- Power Tool

### PIN CONFIGURATION

#### TO-220-3L



### PART MARKING



A : Lot Code  
B : Date Code



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### T0-220-3L PIN DESCRIPTION

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

### ORDERING INFORMATION

Part Number	Package	Part Marking
SPN150N04T220TGB	TO-220-3L	SPN150N04

※ SPN150N04T220TGB : Tube ; Pb – Free ; Halogen – Free

### ABSOLUTE MAXIMUM RATINGS

(TA=25°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	V <sub>DSS</sub>	40	V
Gate –Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current (Silicon Limited)	I <sub>D</sub>	T <sub>C</sub> =25°C	150
		T <sub>C</sub> =70°C	120
Pulsed Drain Current	I <sub>DM</sub>	480	A
Power Dissipation	P <sub>D</sub>	T <sub>C</sub> =25°C	83
		T <sub>C</sub> =70°C	53
Operating Junction Temperature	T <sub>J</sub>	-55/150	°C
Storage Temperature Range	T <sub>STG</sub>	-55/150	°C
Thermal Resistance-Junction to Case	R <sub>θJC</sub>	1.5	°C/W



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### ELECTRICAL CHARACTERISTICS

(TA=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	40			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.9	2.5	
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=32V, V_{GS}=0V$ $T_J=25^\circ C$			1	$\mu A$
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=30A$			3.0	m $\Omega$
		$V_{GS}=4.5V, I_D=20A$			3.9	
Diode Forward Voltage	$V_{SD}$	$I_F=1A, V_{GS}=0V$			1.3	V
<b>Dynamic</b>						
Total Gate Charge (10V)	$Q_g$	$V_{DS}=20V, V_{GS}=20V$ $I_D=30A$		79.5		nC
Gate-Source Charge	$Q_{gs}$			23.2		
Gate-Drain Charge	$Q_{gd}$			4.89		
Input Capacitance	$C_{iss}$	$V_{DS}=20V, V_{GS}=0V$ $f=1MHz$		4264		pF
Output Capacitance	$C_{oss}$			897		
Reverse Transfer Capacitance	$C_{rss}$			401		
Turn-On Time	$t_{d(on)}$	$V_{DD}=20V, I_D=30A$ $V_{GEN}=10V, R_G=3\Omega$		22		nS
	$t_r$			7		
Turn-Off Time	$t_{d(off)}$			99		
	$t_f$			18		

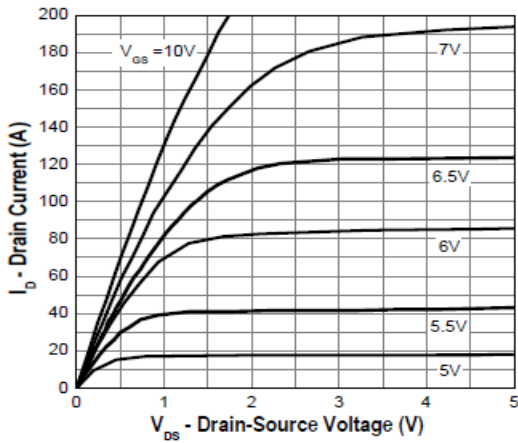


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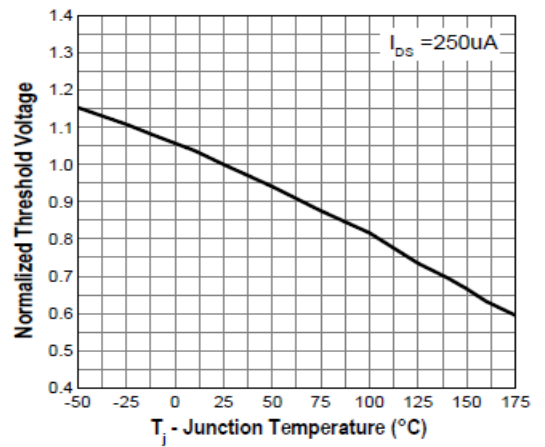
## N-Channel Enhancement Mode MOSFET

### TYPICAL CHARACTERISTICS

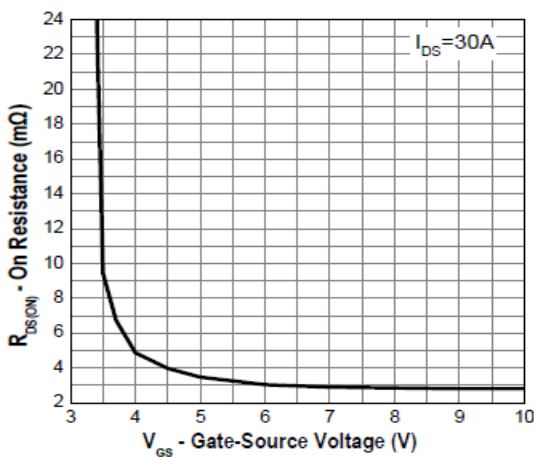
#### Output Characteristics



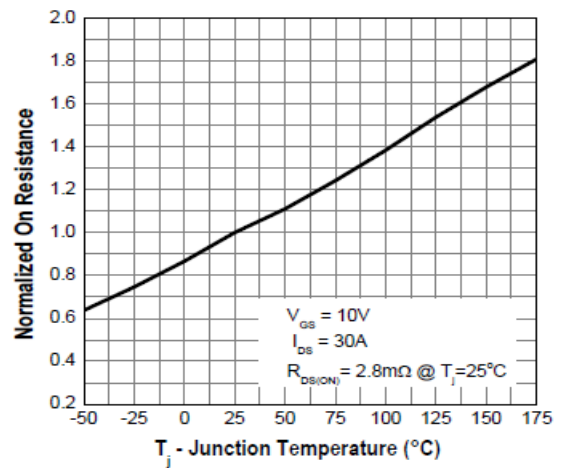
#### Gate Threshold Voltage



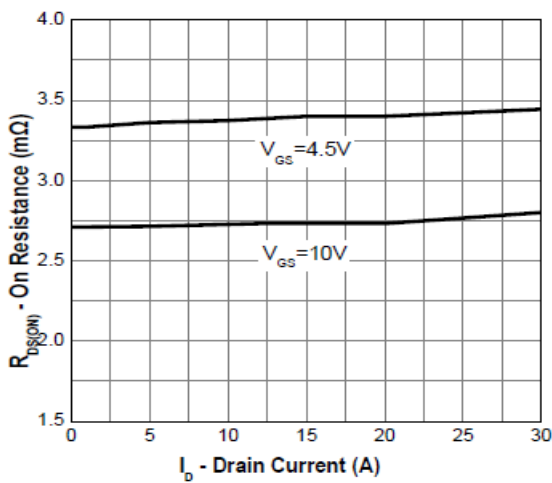
#### Gate-Source On Resistance



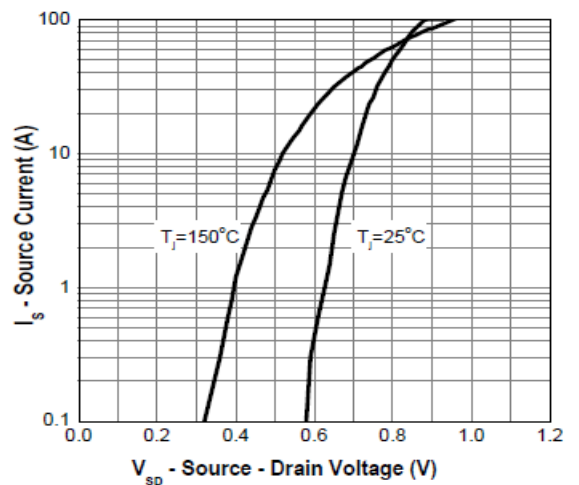
#### Drain-Source On Resistance



#### Drain-Source On Resistance



#### Source-Drain Diode Forward



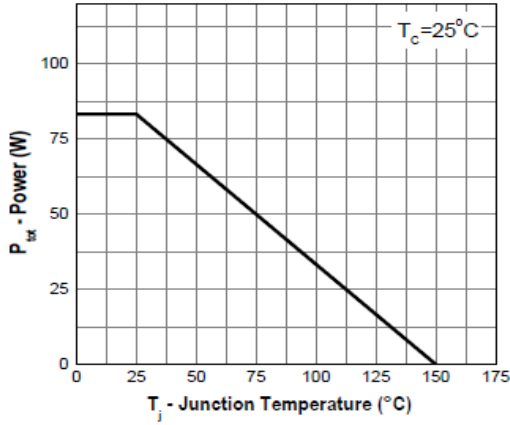


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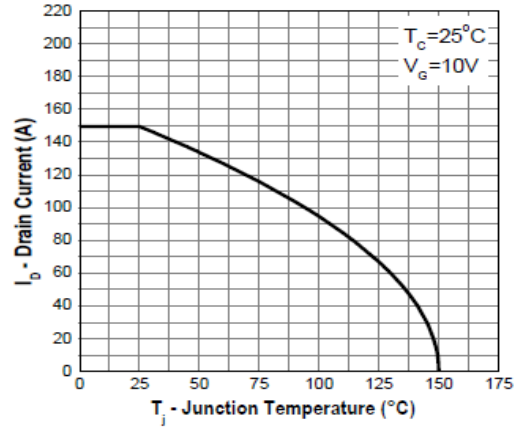
## N-Channel Enhancement Mode MOSFET

### TYPICAL CHARACTERISTICS

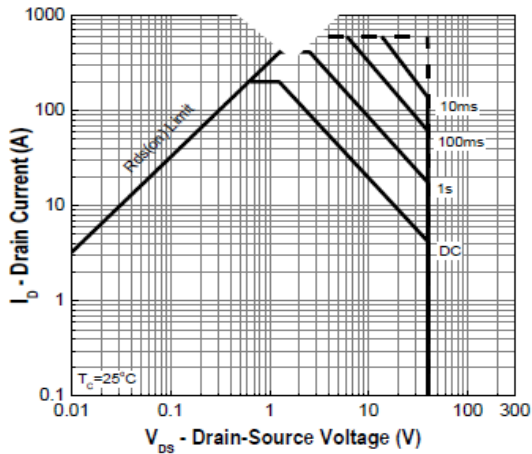
Power Dissipation



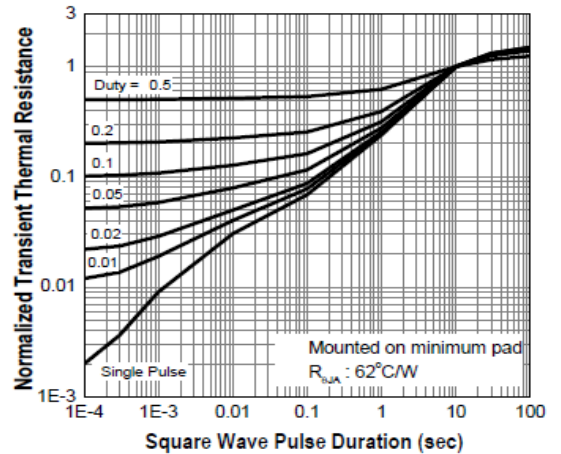
Drain Current



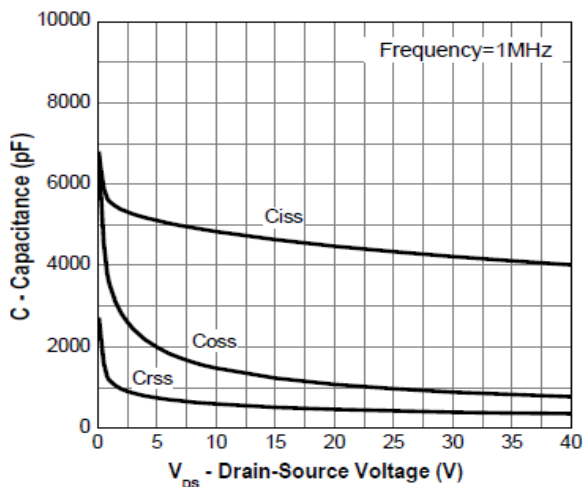
Safe Operation Area



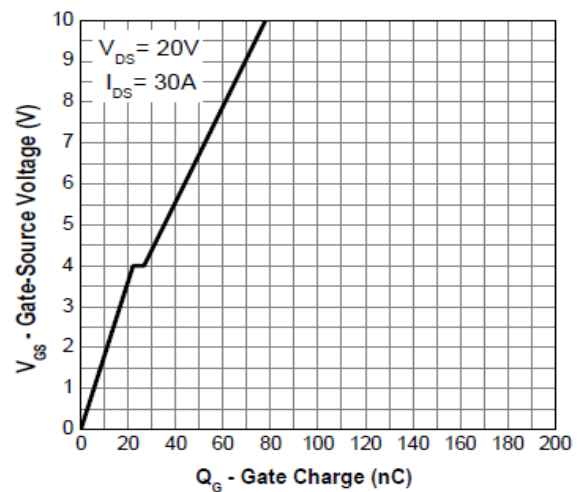
Transient Thermal Impedance



Capacitance



Gate Charge





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