



SPN7575 N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SPN7575 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.

This device is particularly suited for E Bike application.

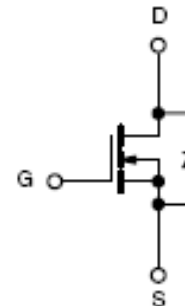
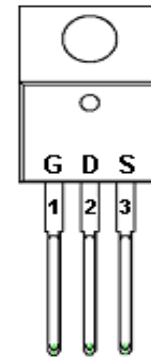
APPLICATIONS

- DC/DC Converter
- Load Switch
- Power Tool

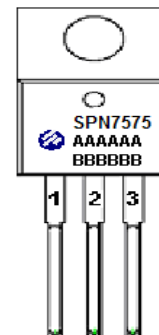
FEATURES

- ◆ 75V/80A, $R_{DS(ON)}= 11m\Omega@V_{GS}= 10V$
- ◆ Super high density cell design for extremely low $R_{DS(ON)}$
- ◆ 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)



SPN7575

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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 |
|---------------|-----------|--------------|
| SPN7575T220TG | TO-220-3L | SPN7575 |

※ SPN7575T220TG: Tube ; Pb – Free

ABSOLUTE MAXIMUM RATINGS

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

| Parameter | Symbol | Typical | Unit | |
|--|-----------------|--------------------------|-----------------------------|---|
| Drain-Source Voltage | V_{DS} | 75 | V | |
| Gate –Source Voltage | V_{GS} | ± 20 | V | |
| Continuous Drain Current($T_J=150^{\circ}\text{C}$) | I_D | $T_A=25^{\circ}\text{C}$ | 90 | A |
| | | $T_A=70^{\circ}\text{C}$ | 80 | |
| Pulsed Drain Current | I_{DM} | 370 | A | |
| Avalanche Current | I_{AS} | 52 | A | |
| Power Dissipation | P_D | $T_A=25^{\circ}\text{C}$ | 200 | W |
| | | $T_A=70^{\circ}\text{C}$ | 140 | |
| Avalanche Energy with Single Pulse ($T_J=25^{\circ}\text{C}$, $L = 500\mu\text{H}$, $I_{AS} = 20\text{A}$, $V_{DD} = 60\text{V}$.) | E_{AS} | 165 | 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 | $R_{\theta JC}$ | 0.75 | $^{\circ}\text{C}/\text{W}$ | |



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ELECTRICAL CHARACTERISTICS

(TA=25°C Unless otherwise noted)

| Parameter | Symbol | Conditions | Min. | Typ | Max. | Unit |
|---------------------------------|---------------|---|------|-------|-----------|------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$ | 75 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 2.0 | | 4.0 | |
| Gate Leakage Current | I_{GSS} | $V_{DS}=0V, V_{GS}=\pm 20V$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=60V, V_{GS}=0V$ | | | 1 | uA |
| | | $V_{DS}=60V, V_{GS}=0V$ $T_J = 55^\circ C$ | | | 5 | |
| On-State Drain Current | $I_{D(on)}$ | $V_{DS} \geq 5V, V_{GS} = 10V$ | 70 | | | A |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 40A$ | | 11 | 12 | mΩ |
| Forward Transconductance | g_{fs} | $V_{DS}=5V, I_D=20A$ | | 52 | | S |
| Single Pulse Avalanche Energy | EAS | $V_{DS}=60V, L=500\mu H,$ $I_{AS}=20A$ | 58 | | | mJ |
| Diode Forward Voltage | V_{SD} | $I_S=30A, V_{GS} = 0V$ | | | 1.2 | V |
| Dynamic | | | | | | |
| Total Gate Charge | Q_g | $V_{DS}=15V, V_{GS}=10V$ $I_D = 15A$ | | 105 | | nC |
| Gate-Source Charge | Q_{gs} | | | 20 | | |
| Gate-Drain Charge | Q_{gd} | | | 17 | | |
| Input Capacitance | C_{iss} | $V_{DS}=15V, V_{GS}=0V$ $f=1MHz$ | | 7760 | | pF |
| Output Capacitance | C_{oss} | | | 320 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 210 | | |
| Turn-On Time | $t_{d(on)}$ | $V_{DD}=15V, I_D=1A,$ $V_{GEN}=10V, R_G=3.3\Omega$ | | 19.5 | | nS |
| | t_r | | | 11.5 | | |
| Turn-Off Time | $t_{d(off)}$ | | | 118.5 | | |
| | t_f | | | 11 | | |



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TYPICAL CHARACTERISTICS

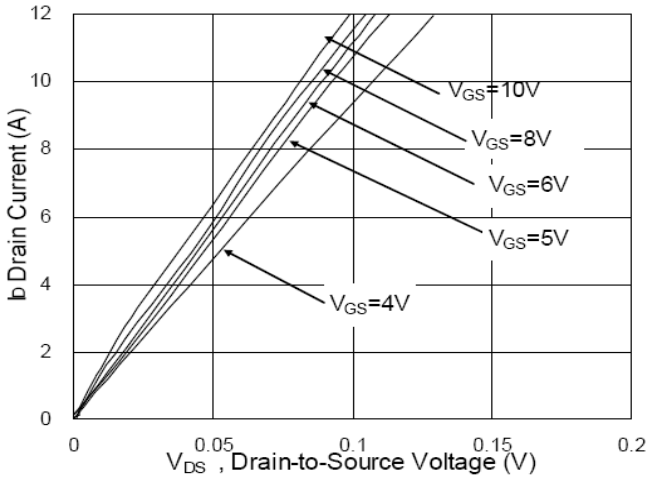


Fig. 1 Typical Output Characteristics

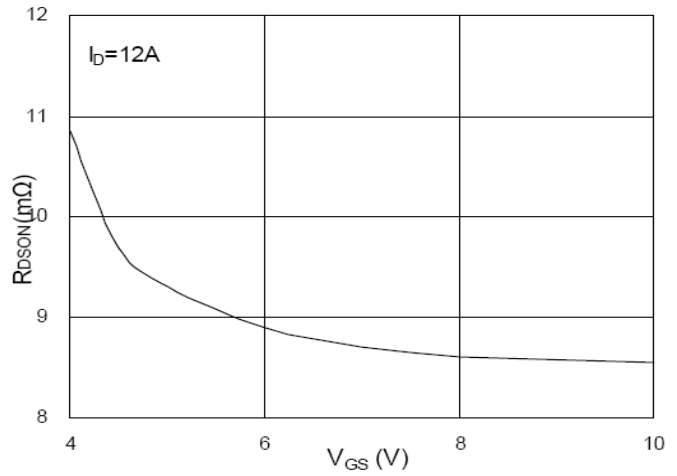


Fig. 2 On-Resistance vs. Gate Voltage

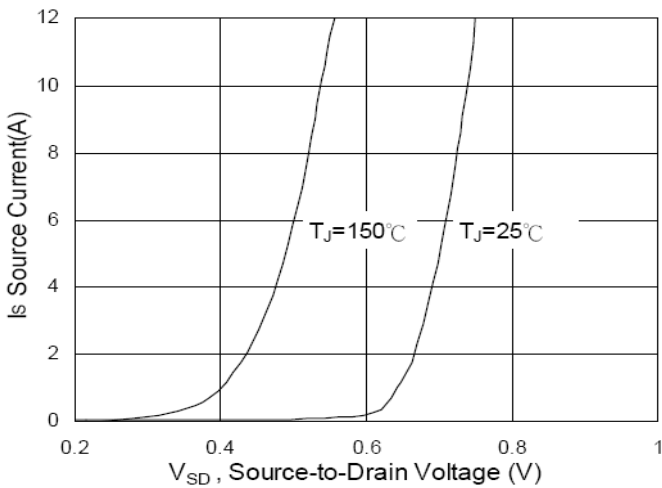


Fig. 3 Forward Characteristics of Reverse Diode

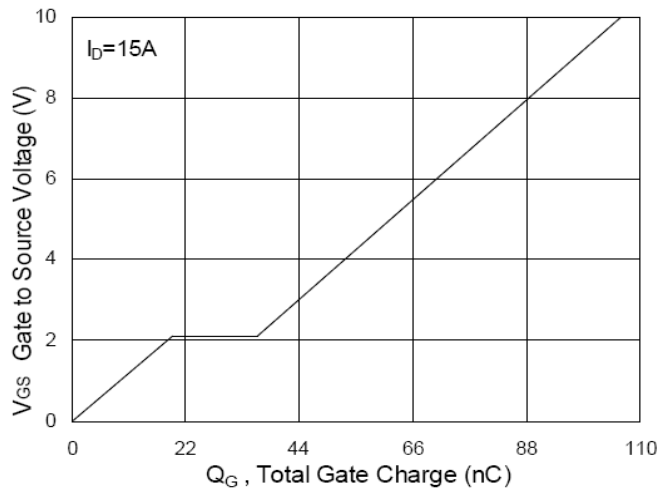


Fig. 4 Gate Charge Characteristics

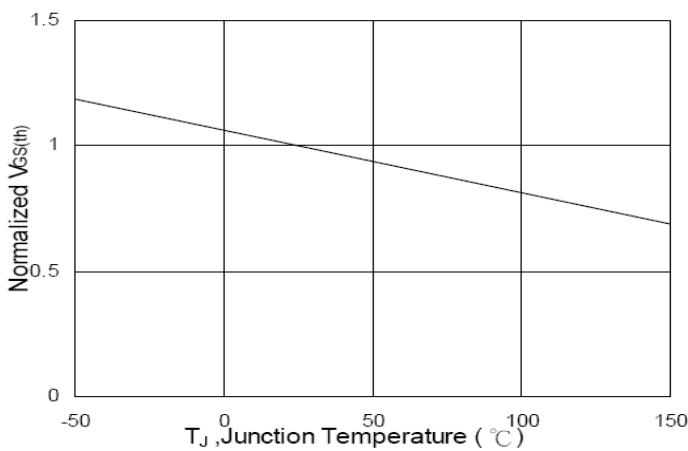


Fig. 5 V_{GS} vs. Junction Temperature

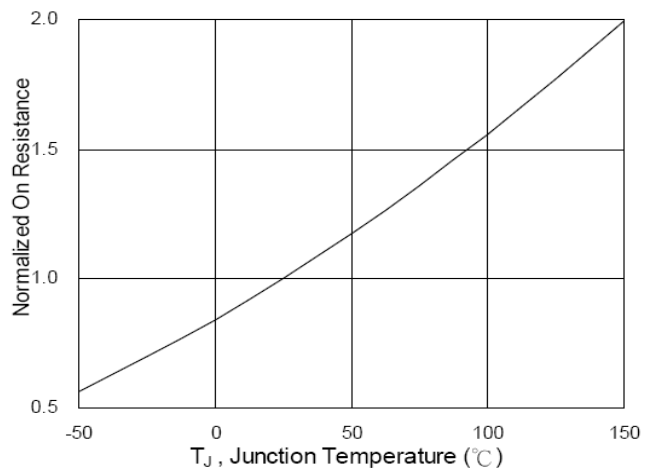


Fig. 6 On Resistance vs. Junction Temperature



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TYPICAL CHARACTERISTICS

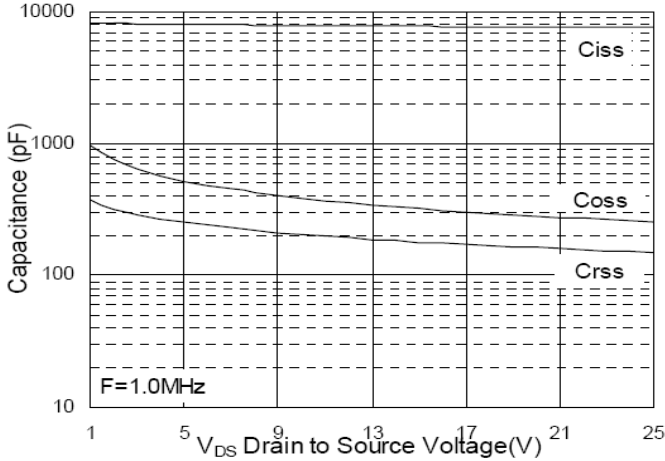


Fig. 7 Typical Capacitance Characteristics

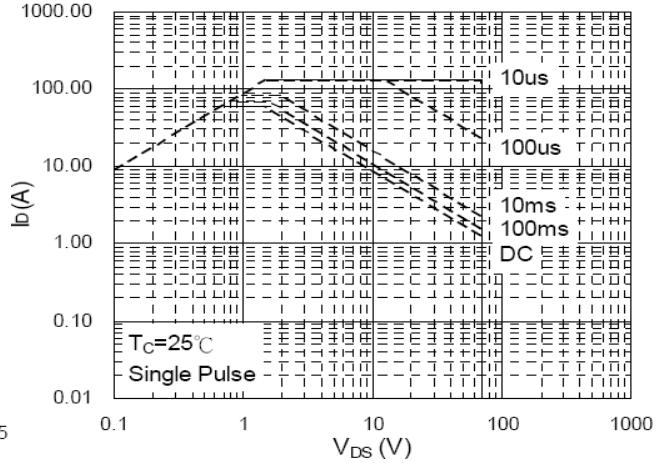


Fig. 8 Maximum Safe Operation Area

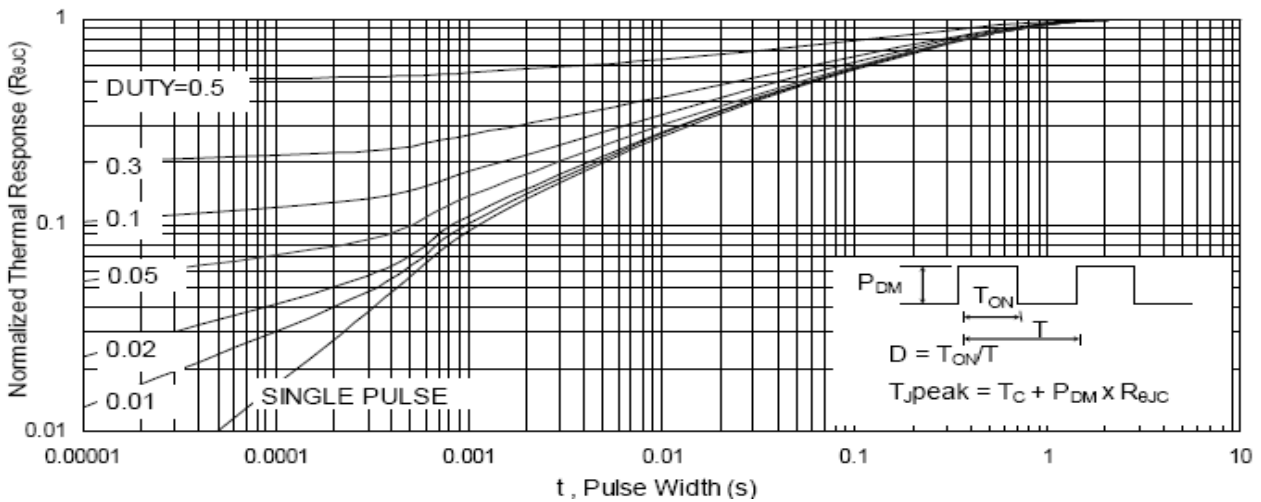


Fig. 9 Effective Transient Thermal Impedance

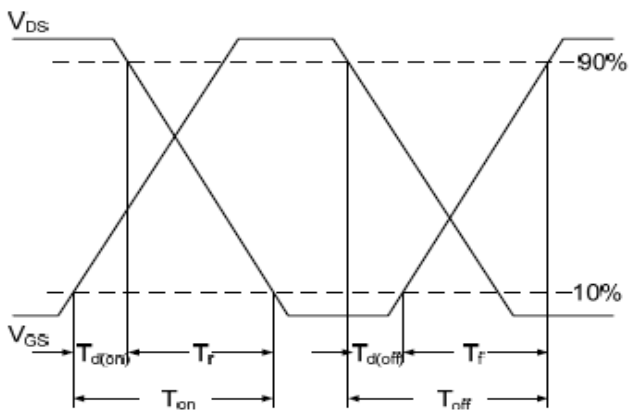


Fig. 10 Switching Time Waveform

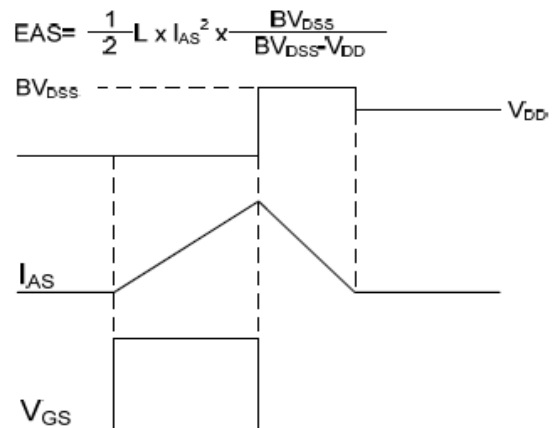


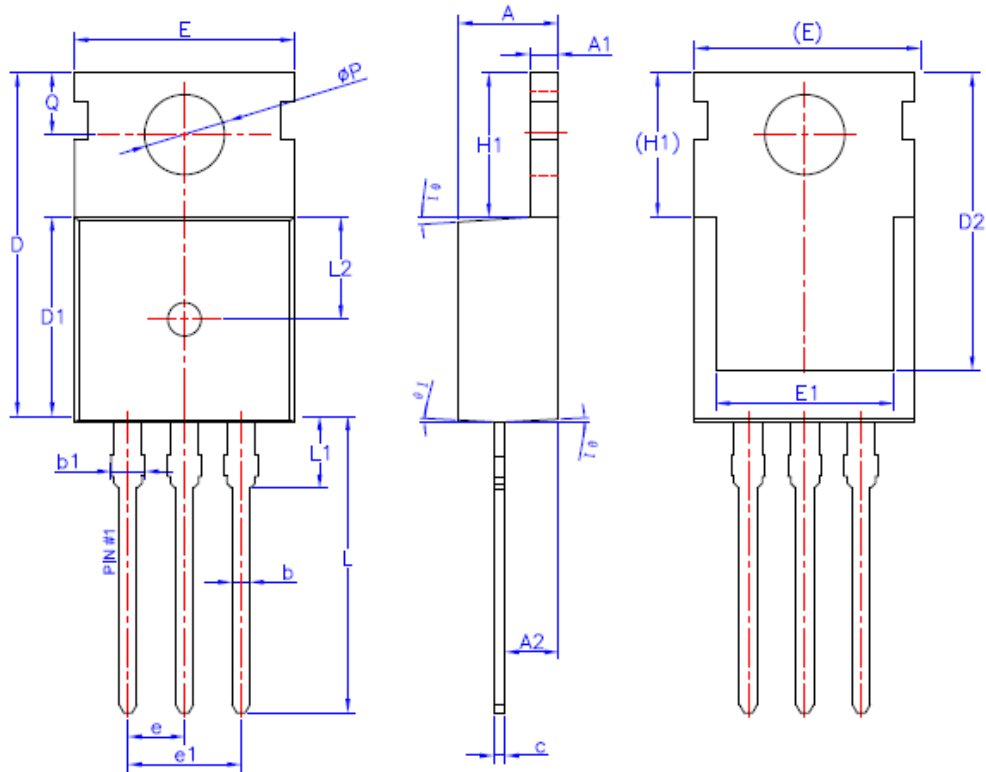
Fig. 11 Unclamped Inductive Waveform



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TO-220-3L PACKAGE OUTLINE



| SYMBOL | MIN | NOM | MAX |
|--------|---------|-------|-------|
| A | 4.40 | 4.50 | 4.60 |
| A1 | 1.27 | 1.30 | 1.33 |
| A2 | 2.30 | 2.40 | 2.50 |
| b | 0.70 | — | 0.90 |
| b1 | 1.42 | — | 1.57 |
| c | 0.45 | 0.50 | 0.60 |
| D | 15.30 | 15.70 | 16.10 |
| D1 | 9.10 | 9.20 | 9.30 |
| D2 | 13.10 | — | 13.70 |
| E | 9.70 | 9.90 | 10.20 |
| E1 | 7.80 | 8.00 | 8.20 |
| e | 2.54BSC | | |
| e1 | 5.08BSC | | |
| H1 | 6.30 | 6.50 | 6.70 |
| L | 12.78 | 13.08 | 13.38 |
| L1 | — | — | 3.50 |
| L2 | 4.60REF | | |
| φP | 3.55 | 3.60 | 3.65 |
| Q | 2.73 | — | 2.87 |
| θ1 | 1° | 3° | 5° |



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