



SPN160T15

N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SPN160T15 is the N-Channel enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. The SPN160T15 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.

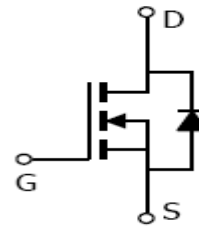
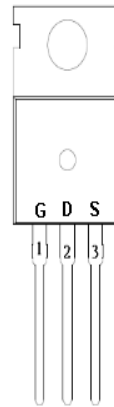
FEATURES

- ◆ 150V/160A, $R_{DS(ON)} = 6m\Omega @ V_{GS} = 10V$
- ◆ Super high density cell design for extremely low $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability

APPLICATIONS

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

PIN CONFIGURATION



PART MARKING



A : Lot Code
B : Date Code



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PIN DESCRIPTION

TO-220-3L

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

ORDERING INFORMATION

| Part Number | Package | Part Marking |
|------------------|-----------|--------------|
| SPN160T15T220TGB | TO-220-3L | SPN160T15 |

※ SPN160T15T220TGB : Tube ; Pb – Free ; Halogen – Free

ABSOLUTE MAXIMUM RATINGS

(TA=25°C Unless otherwise noted)

| Parameter | Symbol | Typical | Unit |
|---|------------------|-----------------------|------|
| Drain-Source Voltage | V _{DSS} | 150 | V |
| Gate –Source Voltage | V _{GSS} | ±20 | V |
| Continuous Drain Current (Silicon Limited) | I _D | T _C =25°C | 160 |
| | | T _C =100°C | 113 |
| Pulsed Drain Current | I _{DM} | 545 | A |
| Single Pulse Avalanche Energy (T _C =25°C , L=0.4mH.) | E _{AS} | 720 | mJ |
| Power Dissipation (TO-220-3L) | P _D | 355 | W |
| Operating Junction Temperature | T _J | -55~150 | °C |
| Storage Temperature Range | T _{STG} | -55~150 | °C |
| Thermal Resistance-Junction to Case (TO-220-3L) | R _{θJC} | 0.35 | °C/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 | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$ | 150 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 2.0 | | 4.0 | V |
| Gate Leakage Current | I_{GSS} | $V_{DS}=0V, V_{GS}=\pm 20V$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=150V, V_{GS}=0V$ $T_J=25^\circ C$, | | | 1 | uA |
| | | $V_{DS}=150V, V_{GS}=0V$, $T_J=100^\circ C$ | | | 100 | |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=20A$ | | 5.4 | 6 | mΩ |
| Forward Transconductance | g_{fs} | $V_{DS}=5V, I_D=20A$ | | 80 | | S |
| Gate resistance | R_g | $V_{DS}=0V, V_{GS}=0V$ $f=1MHz$ | | 2.7 | | Ω |
| Diode Forward Voltage | V_{SD} | $I_F=20A, V_{GS}=0V$ | | 0.9 | 1.2 | V |
| Dynamic | | | | | | |
| Total Gate Charge | Q_g | $V_{DS}=75V, V_{GS}=10V$ $I_D=20A$ | | 80 | | nC |
| Gate-Source Charge | Q_{gs} | | | 28 | | |
| Gate-Drain Charge | Q_{gd} | | | 12 | | |
| Input Capacitance | C_{iss} | $V_{DS}=75V, V_{GS}=0V$ $f=1MHz$ | | 6320 | | pF |
| Output Capacitance | C_{oss} | | | 462 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 7.5 | | |
| Turn-On Time | $t_{d(on)}$ | $V_{DD}=75V$, $I_D=20A, V_{GS}=10V$ $R_G=10\Omega$ | | 27 | | nS |
| | t_r | | | 21 | | |
| Turn-Off Time | $t_{d(off)}$ | | | 38 | | |
| | t_f | | | 14 | | |
| Reverse Recovery Time | t_{rr} | $V_R=75V, I_F=20A$, | | 86 | | nS |
| Reverse Recovery Charge | Q_{rr} | $dI_F/dt=100A/uS$ | | 160 | | nC |



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TYPICAL CHARACTERISTICS

Fig 1. Typical Output Characteristics

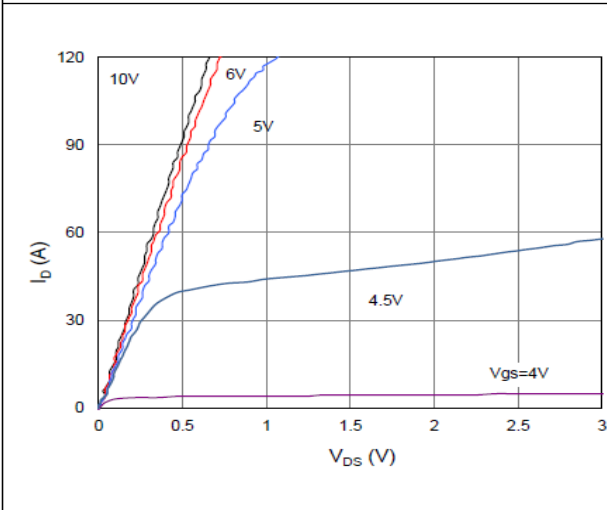


Figure 2. On-Resistance vs. Gate-Source Voltage

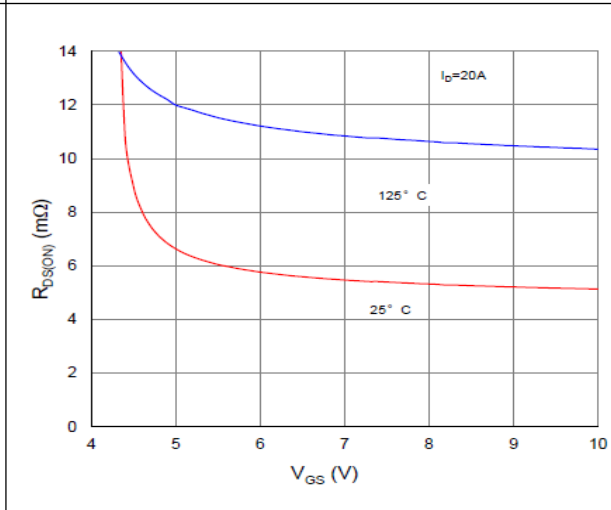


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

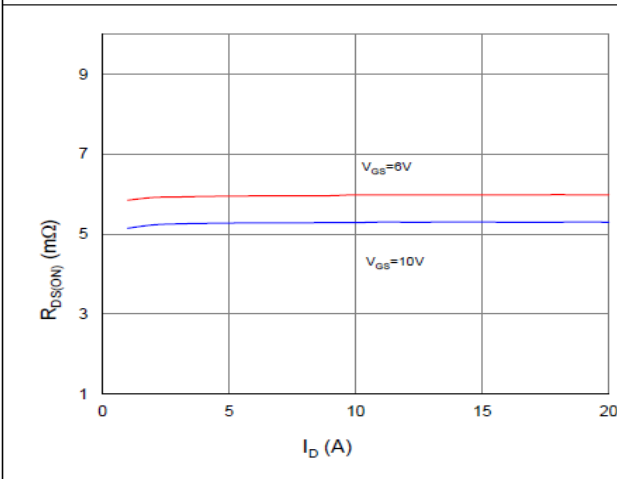


Figure 4. Normalized On-Resistance vs. Junction Temperature

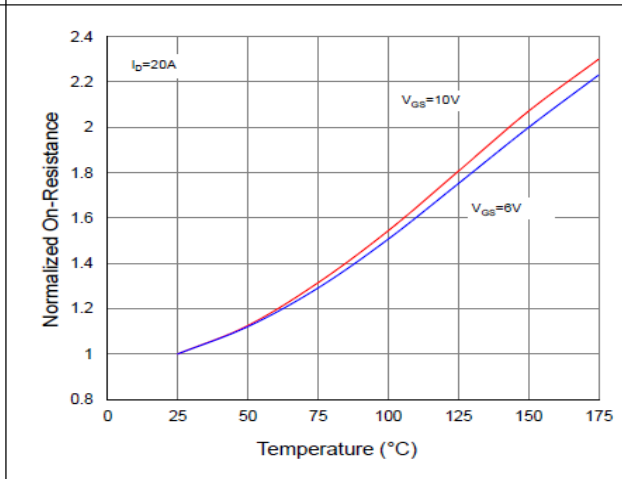


Figure 5. Typical Transfer Characteristics

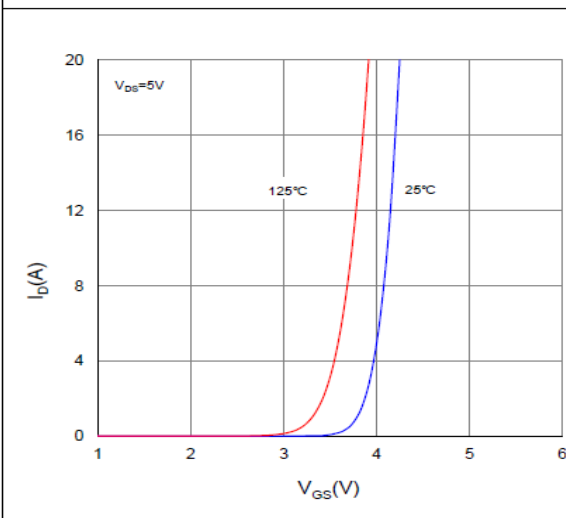
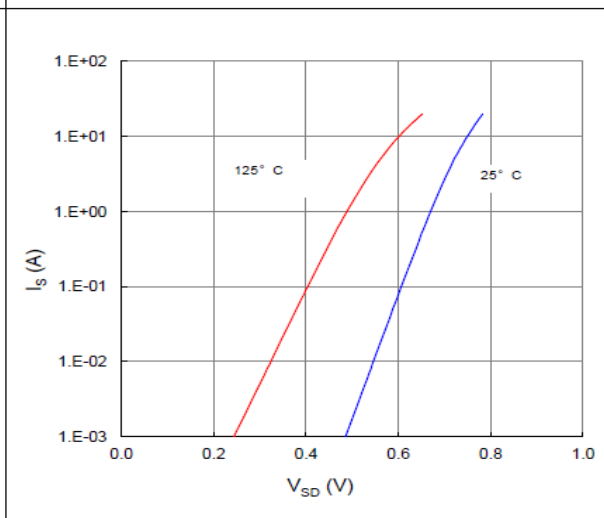


Figure 6. Typical Source-Drain Diode Forward Voltage





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TYPICAL CHARACTERISTICS

Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

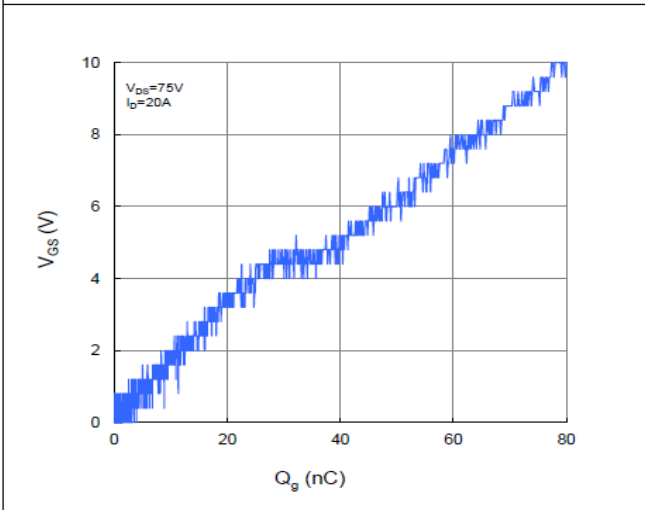


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

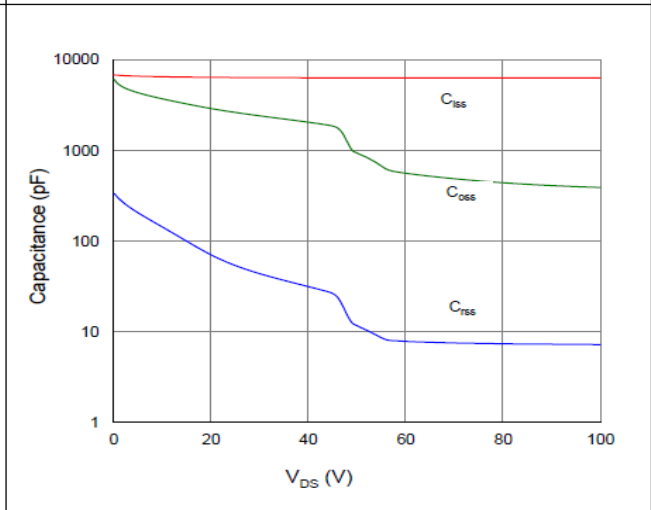


Figure 9. Maximum Safe Operating Area

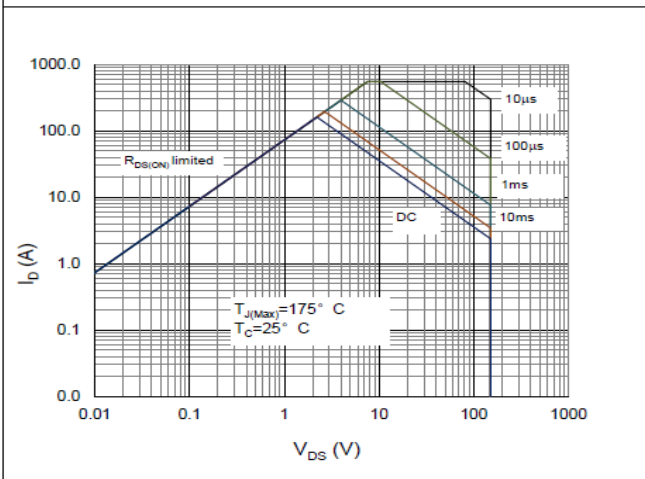


Figure 10. Maximum Drain Current vs. Case Temperature

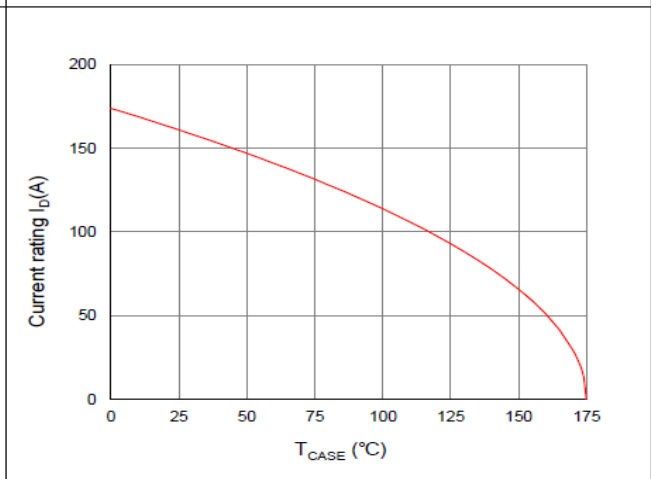
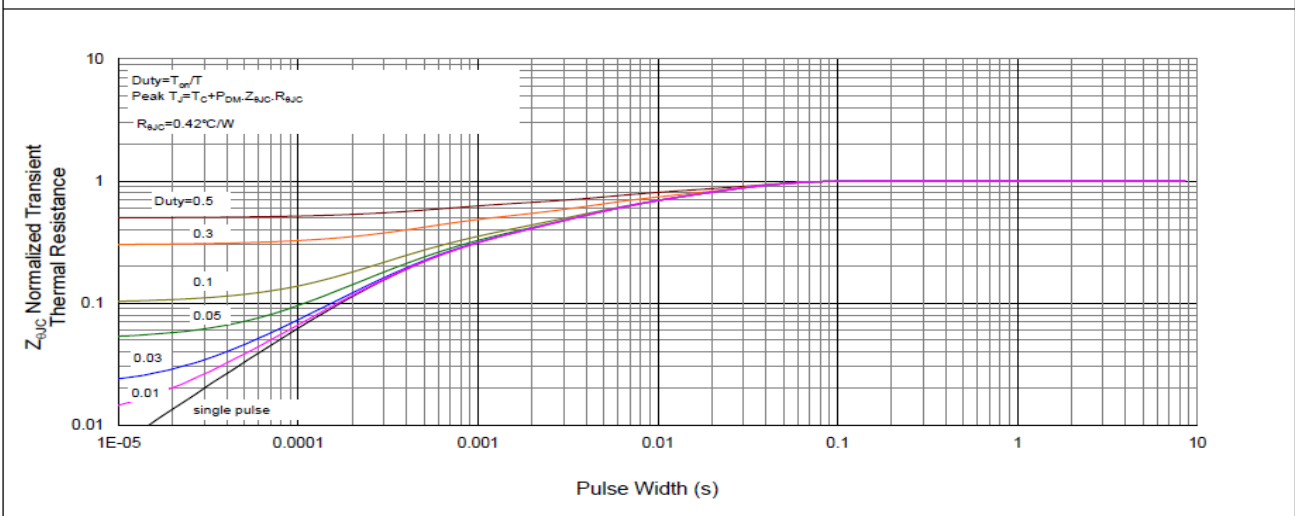


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case





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