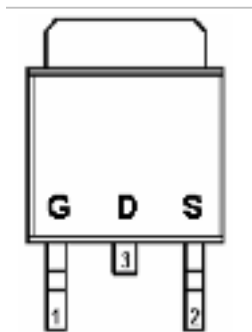


DESCRIPTION

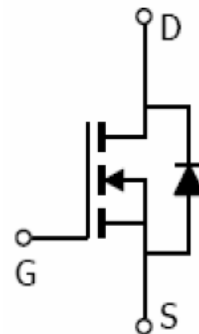
STN4102 is the N-Channel logic enhancement mode power field effect transistor which is produced using high cell density, DMOS trench technology. The STN4102 has been designed specially to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for low gate charge, low $R_{DS(ON)}$ and fast switching speed.

PIN CONFIGURATION (D-PAK)
TO-252

FEATURE

- 30V/ 15.0A, $R_{DS(ON)} = 32m\Omega$
@ $V_{GS} = 10V$
- 30V/8.0A, $R_{DS(ON)} = 40m\Omega$
@ $V_{GS} = 4.5V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- TO-252 package design

PART MARKING


Y: Year Code
A: Week Code
X: Process Code



**STN4102**

N Channel Enhancement Mode MOSFET

15.0A

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C Unless otherwise noted)

| Parameter | Symbol | Typical | Unit |
|--|--------|--------------|------|
| Drain-Source Voltage | VDSS | 30 | V |
| Gate-Source Voltage | VGSS | ±12 | V |
| Continuous Drain Current (TJ=150°C) | ID | 15.0 10.0 | A |
| Pulsed Drain Current | IDM | 30 | A |
| Continuous Source Current (Diode Conduction) | IS | 12 | A |
| Power Dissipation | PD | 25 12.5 | W |
| Operation Junction Temperature | TJ | 150 | °C |
| Storage Temperature Range | TSTG | -55/150 | °C |
| Thermal Resistance-Junction to Ambient | RθJA | 60 | °C/W |



STN4102



N Channel Enhancement Mode MOSFET

15.0A

ELECTRICAL CHARACTERISTICS (Ta = 25°C Unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---------------------------------|-----------------------|--|-----|----------|-----------|------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$ | 30 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 0.8 | | 1.6 | V |
| Gate Leakage Current | I_{GSS} | $V_{DS}=0V, V_{GS}=\pm 12V$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=24V, V_{GS}=0V$ | | | 1 | uA |
| | | $V_{DS}=24V, V_{GS}=0V$ $T_J=85^\circ C$ | | | 5 | |
| Drain-source On-Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=15.0A$ $V_{GS}=4.5V, I_D=8.0A$ | | 22 32 | 32 40 | mΩ |
| Forward Transconductance | g_{fs} | $V_{DS}=5V, I_D=12A$ | | 20 | | S |
| Diode Forward Voltage | V_{SD} | $I_S=1.0A, V_{GS}=0V$ | | | 1.0 | V |
| Dynamic | | | | | | |
| Total Gate Charge | Q_g | $V_{DS}=10V, V_{DS}=15V$ $I_D=8A$ | | 7 | | nC |
| Gate-Source Charge | Q_{gs} | | | 3.4 | | |
| Gate-Drain Charge | Q_{gd} | | | 1.78 | | |
| Input Capacitance | C_{iss} | $V_{DS} = 15, V_{DS}=15V$ $F=1MHz$ | | 290 | | pF |
| Output Capacitance | C_{oss} | | | 60 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 75 | | |
| Turn-On Time | $t_{d(on)}$ t_r | $V_{DD}=10V, R_L= 1.8\Omega$ $V_{GEN}=3\Omega$ | | 4 | | nS |
| | | | | 3.7 | | |
| Turn-Off Time | $t_{d(off)}$ t_f | | | 15.9 | | |
| | | | | 2.6 | | |

TYPICAL CHARACTERISTICS

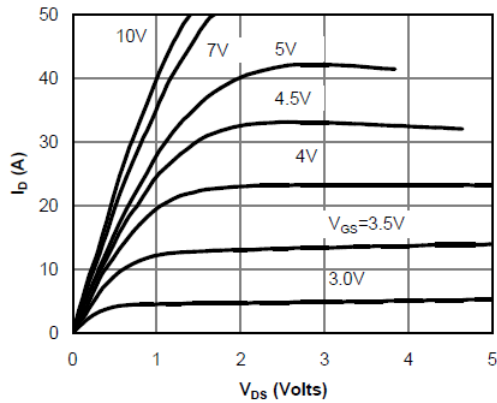


Fig 1: On-Region Characteristics

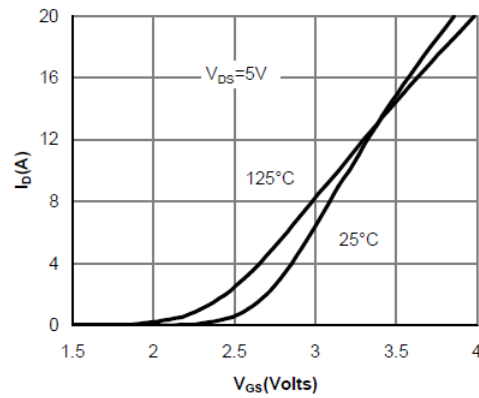


Figure 2: Transfer Characteristics

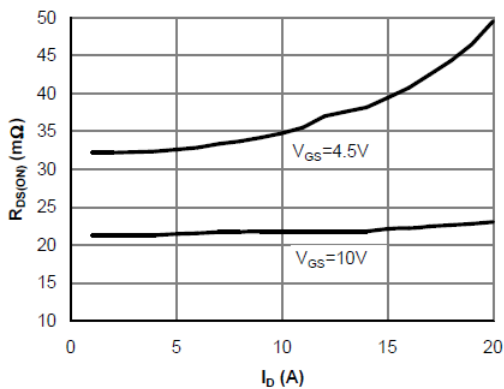


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

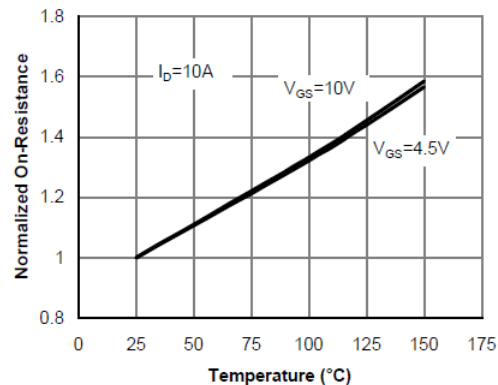


Figure 4: On-Resistance vs. Junction Temperature

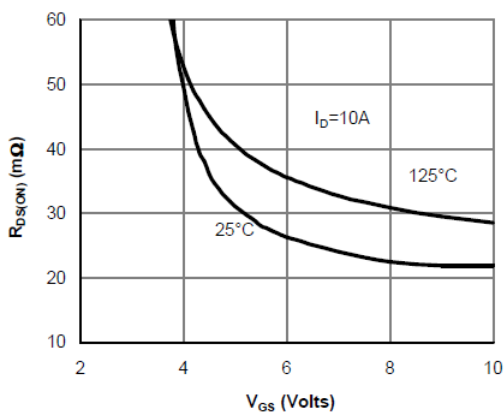


Figure 5: On-Resistance vs. Gate-Source Voltage

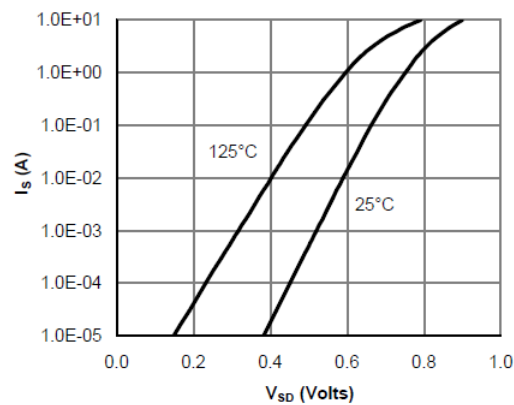
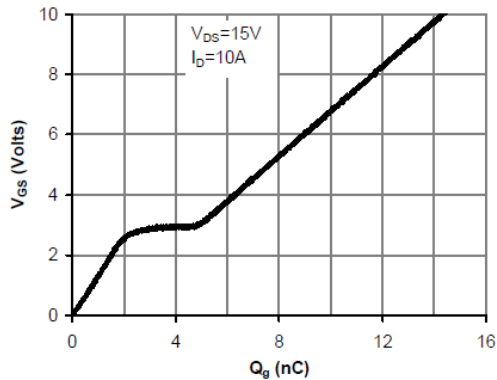
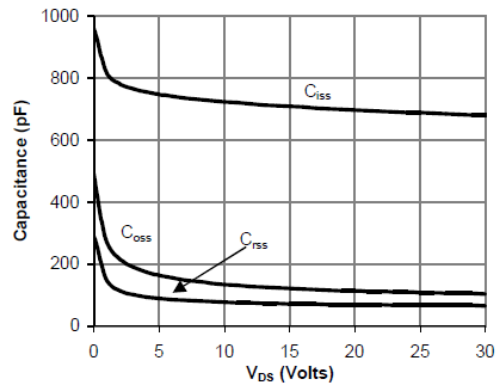
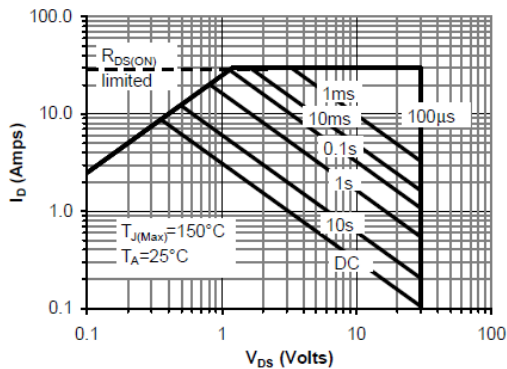
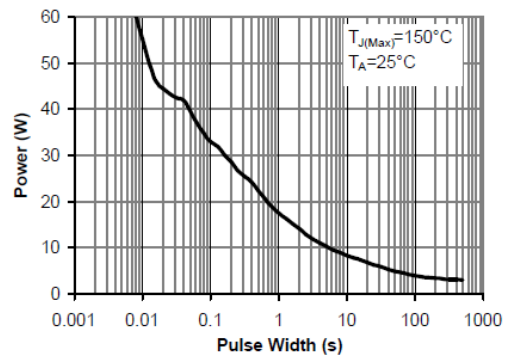
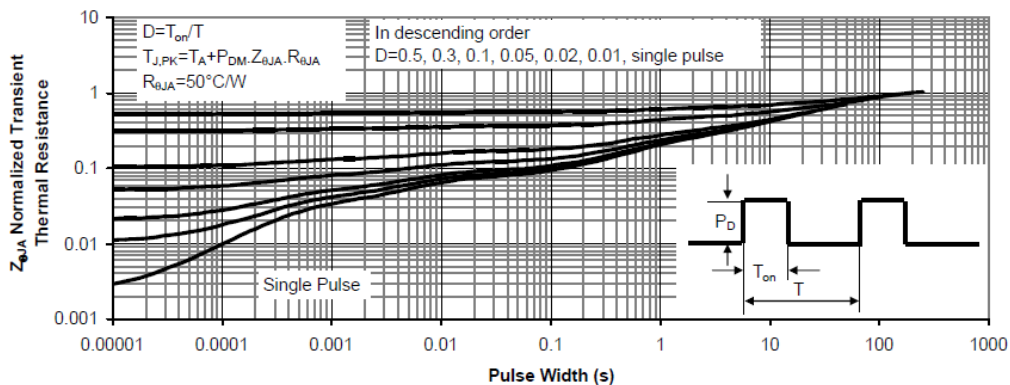
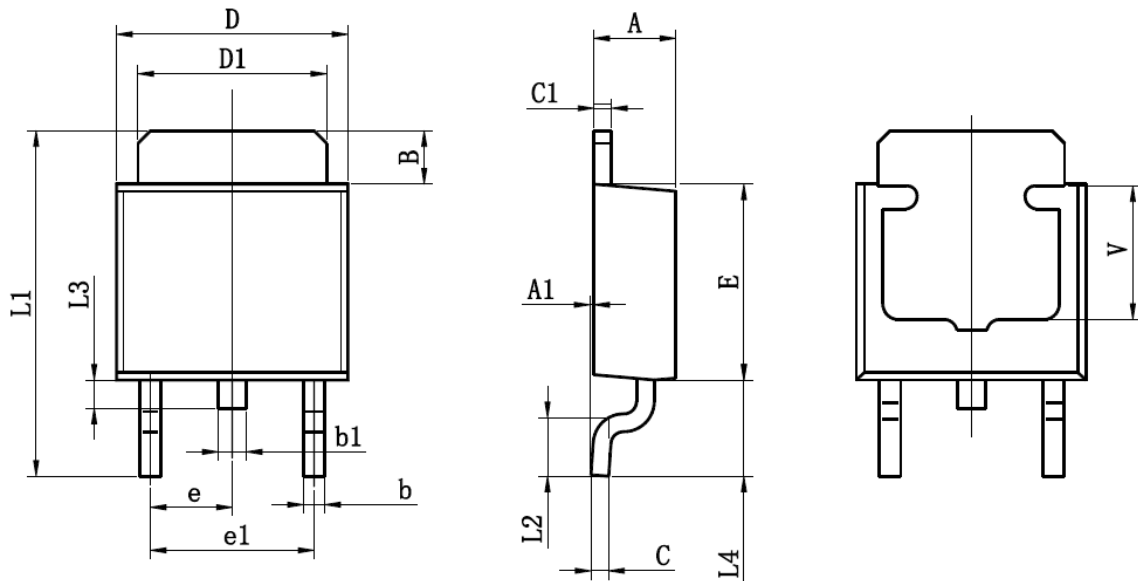


Figure 6: Body-Diode Characteristics

TYPICAL CHARACTERISTICS

Figure 7: Gate-Charge Characteristics

Figure 8: Capacitance Characteristics

Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TO-252-2L PACKAGE OUTLINE


| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 2.200 | 2.400 | 0.087 | 0.094 |
| A1 | 0.000 | 0.127 | 0.000 | 0.005 |
| B | 1.350 | 1.650 | 0.053 | 0.065 |
| b | 0.500 | 0.700 | 0.020 | 0.028 |
| b1 | 0.700 | 0.900 | 0.028 | 0.035 |
| c | 0.430 | 0.580 | 0.017 | 0.023 |
| c1 | 0.430 | 0.580 | 0.017 | 0.023 |
| D | 6.350 | 6.650 | 0.250 | 0.262 |
| D1 | 5.200 | 5.400 | 0.205 | 0.213 |
| E | 5.400 | 5.700 | 0.213 | 0.224 |
| e | 2.300TYP | | 0.091TYP | |
| e1 | 4.500 | 4.700 | 0.177 | 0.185 |
| L1 | 9.500 | 9.900 | 0.374 | 0.390 |
| L2 | 1.400 | 1.780 | 0.055 | 0.070 |
| L3 | 0.650 | 0.950 | 0.026 | 0.037 |
| L4 | 2.550 | 2.900 | 0.100 | 0.114 |
| V | 3.80REF | | 0.150REF | |