



SPN2302D

N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SPN2302D 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 such as cellular phone and notebook computer power management and other battery powered circuits, and low in-line power loss are needed in a very small outline surface mount package.

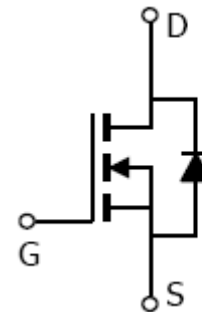
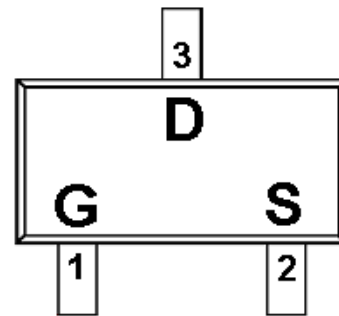
FEATURES

- ◆ 20V/3.6A, $R_{DS(ON)} = 97m\Omega @ V_{GS} = 4.5V$
- ◆ 20V/3.1A, $R_{DS(ON)} = 113m\Omega @ V_{GS} = 2.5V$
- ◆ 20V/2.8A, $R_{DS(ON)} = 140m\Omega @ V_{GS} = 1.8V$
- ◆ Super high density cell design for extremely low $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ SOT-23 package design

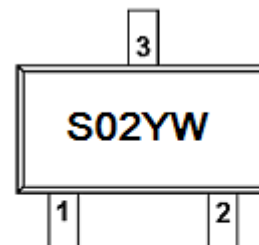
APPLICATIONS

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- DSC
- LCD Display inverter

PIN CONFIGURATION(SOT-23)



PART MARKING



Y : Year Code
W : Week Code



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PIN DESCRIPTION

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

ORDERING INFORMATION

| Part Number | Package | Part Marking |
|----------------|---------|--------------|
| SPN2302DS23RG | SOT-23 | S02YW |
| SPN2302DS23RGB | SOT-23 | S02YW |

- ※ Week Code : A ~ Z (1 ~ 26) ; a ~ z (27 ~ 52)
- ※ SPN2302DS23RG : Tape Reel ; Pb – Free
- ※ SPN2302DS23RGB : Tape Reel ; Pb – Free; Halogen – Free

ABSOLUTE MAXIMUM RATINGS

(TA=25°C Unless otherwise noted)

| Parameter | Symbol | Typical | Unit | |
|---|------------------|---------|------|---|
| Drain-Source Voltage | V _{DSS} | 20 | V | |
| Gate –Source Voltage | V _{GSS} | ±12 | V | |
| Continuous Drain Current(T _J =150°C) | I _D | TA=25°C | 3.2 | A |
| | | TA=70°C | 2.6 | |
| Pulsed Drain Current | I _{DM} | 10 | A | |
| Continuous Source Current(Diode Conduction) | I _S | 1.6 | A | |
| Power Dissipation | P _D | TA=25°C | 1.25 | W |
| | | TA=70°C | 0.8 | |
| Operating Junction Temperature | T _J | 150 | °C | |
| Storage Temperature Range | T _{STG} | -55/150 | °C | |
| Thermal Resistance-Junction to Ambient | R _{θJA} | 100 | °C/W | |



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ELECTRICAL CHARACTERISTICS

(T_A=25°C Unless otherwise noted)

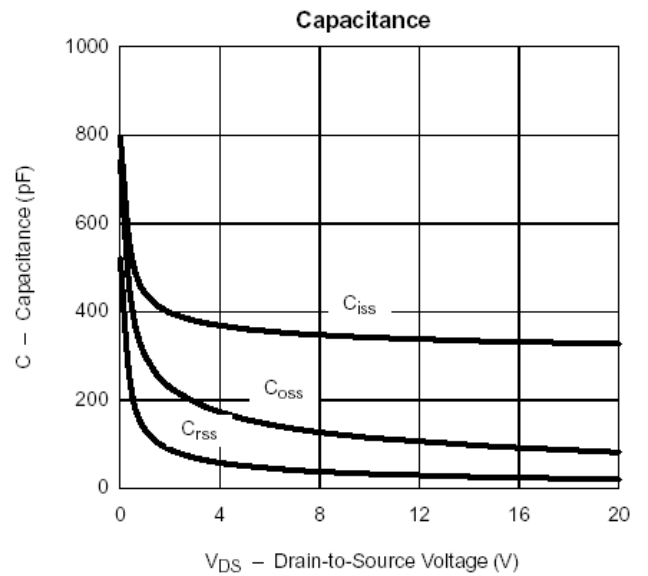
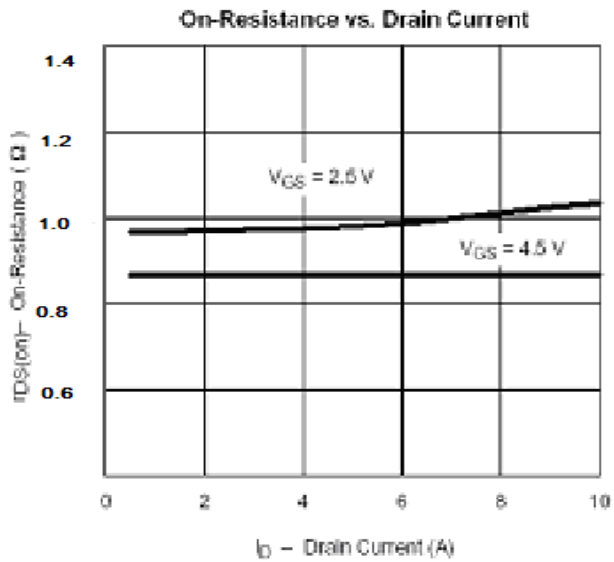
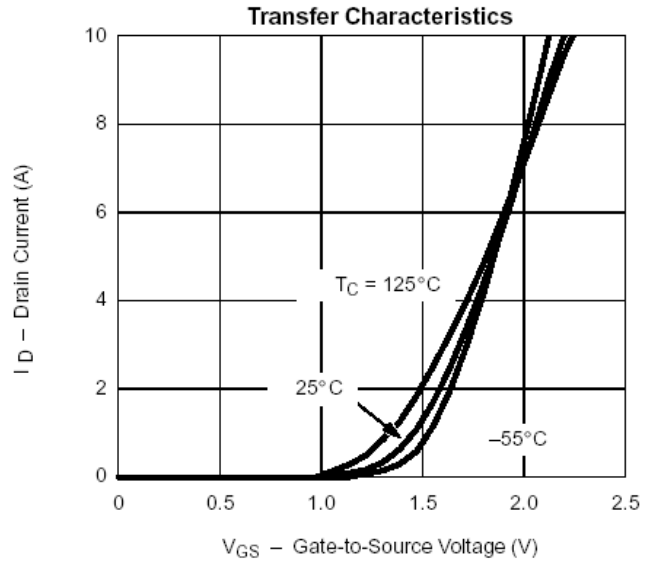
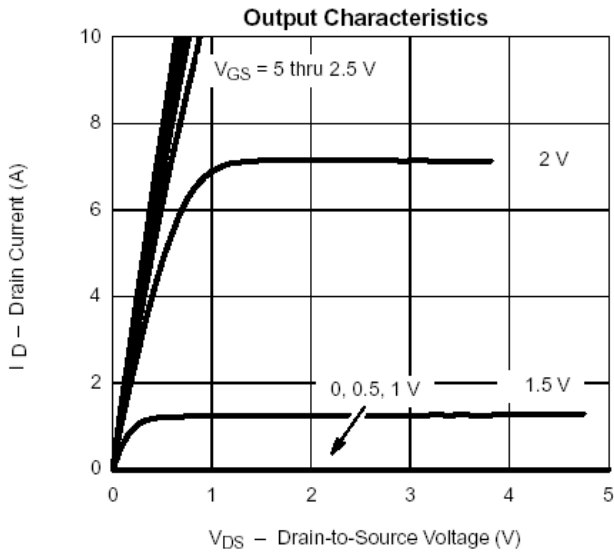
| Parameter | Symbol | Conditions | Min. | Typ | Max. | Unit |
|---------------------------------|----------------------|--|------|-------|-------|------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | V _{GS} =0V, I _D =250μA | 20 | | | V |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250μA | 0.45 | | 1.2 | |
| Gate Leakage Current | I _{GSS} | V _{DS} =0V, V _{GS} =±12V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =20V, V _{GS} =0V | | | 1 | μA |
| | | V _{DS} =20V, V _{GS} =0V T _J =55°C | | | 10 | |
| On-State Drain Current | I _{D(on)} | V _{DS} ≥ 5V, V _{GS} =4.5V | 6 | | | A |
| | | V _{DS} ≥ 5V, V _{GS} =2.5V | 4 | | | |
| Drain-Source On-Resistance | R _{DS(on)} | V _{GS} =4.5V, I _D =3.6A | | 0.085 | 0.097 | Ω |
| | | V _{GS} =2.5V, I _D =3.1A | | 0.100 | 0.113 | |
| | | V _{GS} =1.8V, I _D =2.8A | | 0.132 | 0.140 | |
| Forward Transconductance | g _{fs} | V _{DS} =5V, I _D =3.6A | | 10 | | S |
| Diode Forward Voltage | V _{SD} | I _S =1.6A, V _{GS} =0V | | 0.85 | 1.2 | V |
| Dynamic | | | | | | |
| Total Gate Charge | Q _g | V _{DS} =10V, V _{GS} =4.5V I _D ≅3.6A | | 5.4 | 10 | nC |
| Gate-Source Charge | Q _{gs} | | | 0.65 | | |
| Gate-Drain Charge | Q _{gd} | | | 1.4 | | |
| Input Capacitance | C _{iss} | V _{DS} =10V, V _{GS} =0V f=1MHz | | 340 | | pF |
| Output Capacitance | C _{oss} | | | 115 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 33 | | |
| Turn-On Time | t _{d(on)} | V _{DD} =10V, R _L =5.5Ω I _D ≅3.6A, V _{GEN} =4.5V R _G =6Ω | | 12 | 25 | ns |
| | t _r | | | 36 | 60 | |
| Turn-Off Time | t _{d(off)} | | | 34 | 60 | |
| | t _f | | | 10 | 25 | |



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TYPICAL CHARACTERISTICS

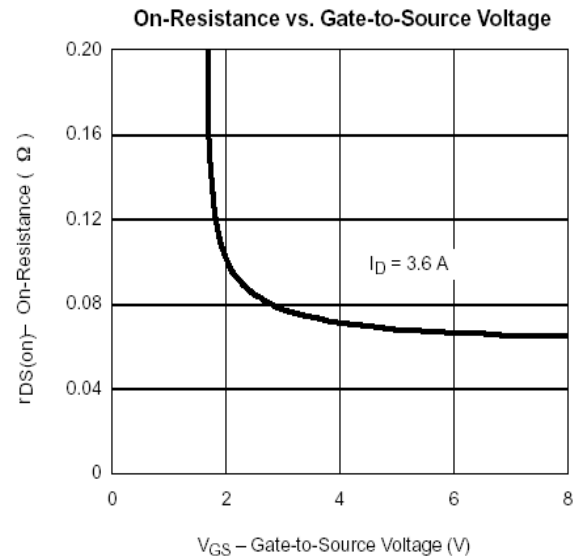
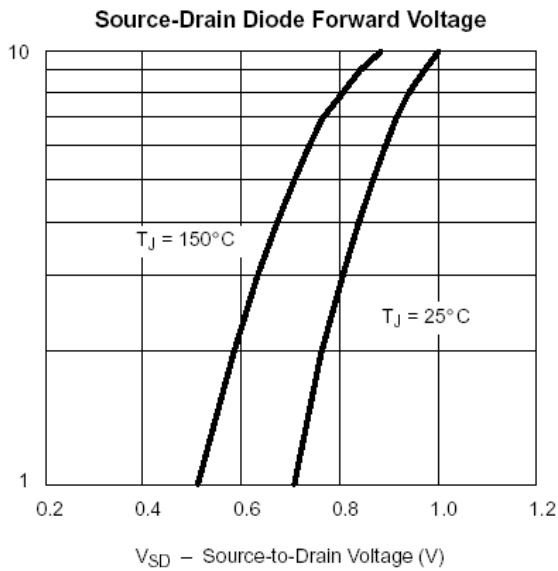
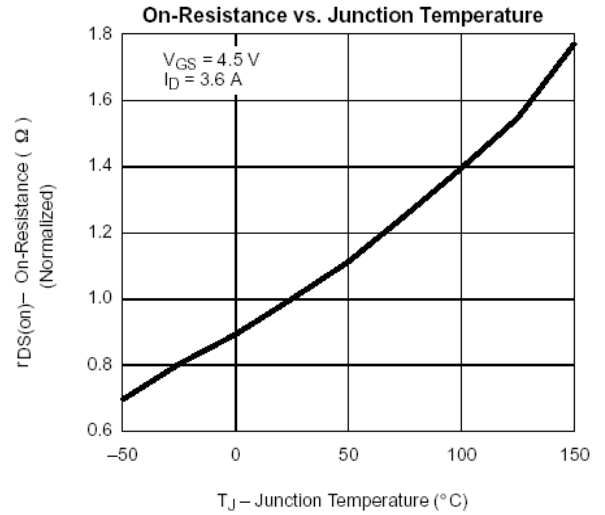
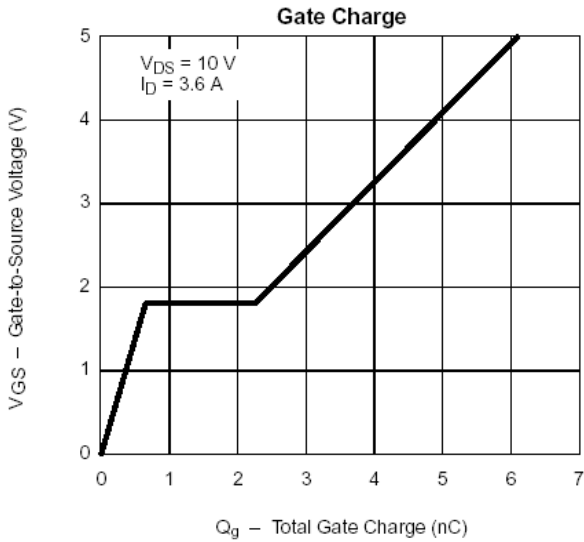




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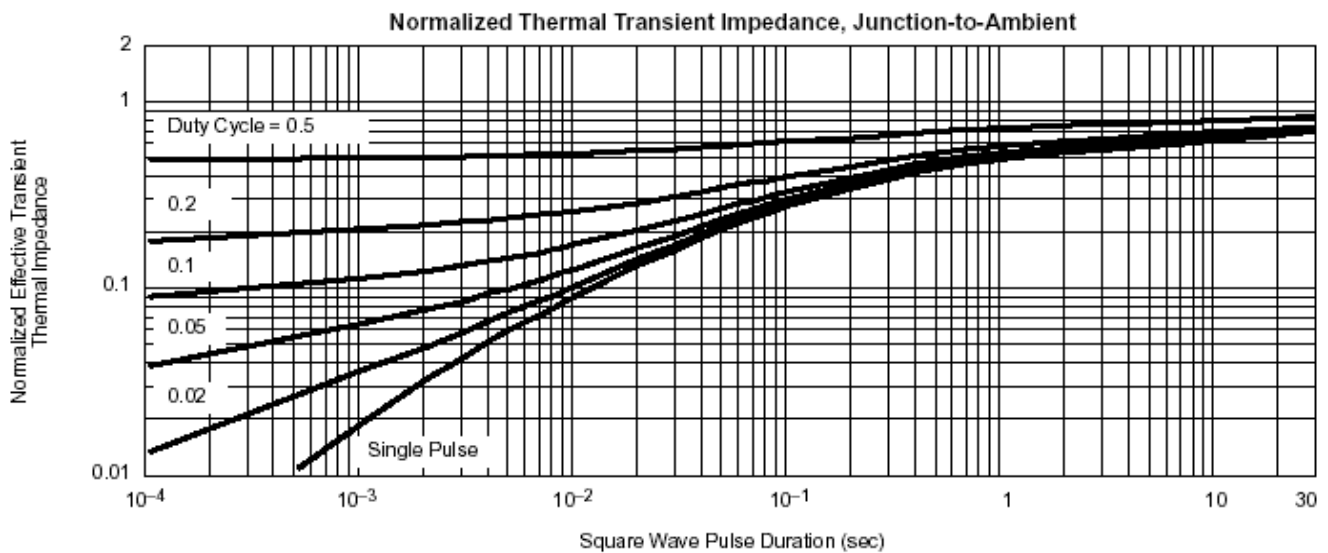
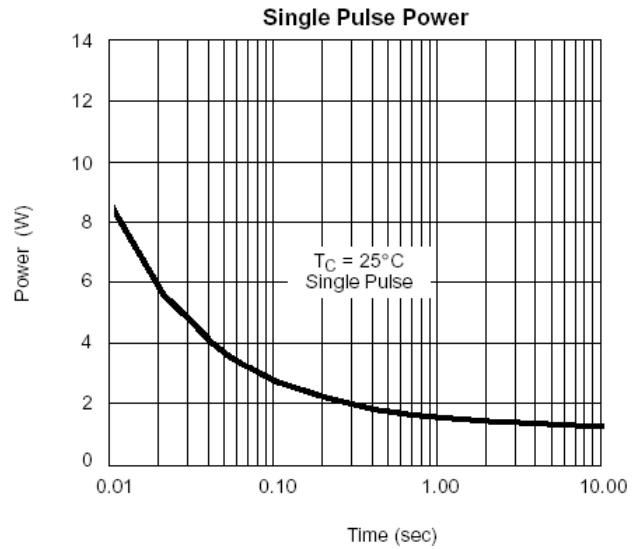
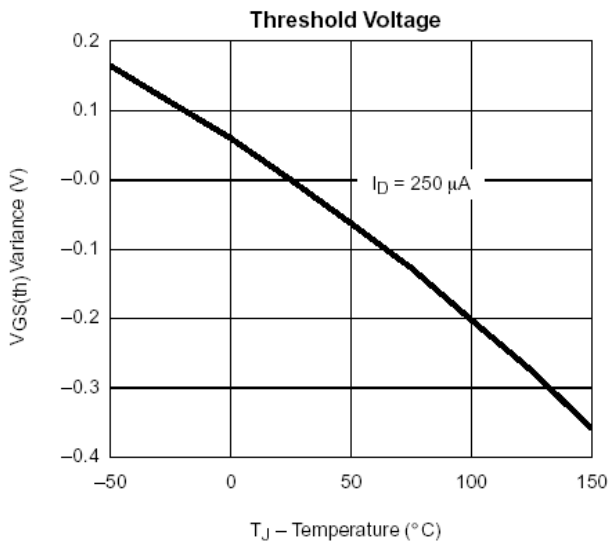




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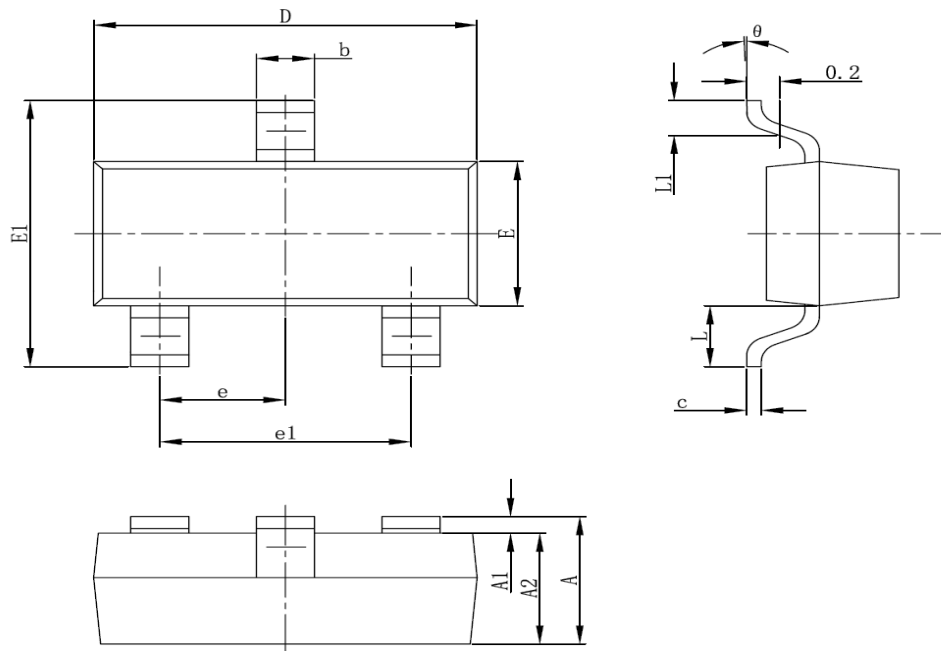




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SOT-23 PACKAGE OUTLINE



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 0.900 | 1.100 | 0.035 | 0.043 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.000 | 0.035 | 0.039 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950TYP | | 0.037TYP | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550REF | | 0.022REF | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| theta | 0° | 8° | 0° | 8° |



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