



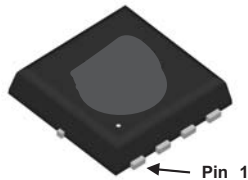
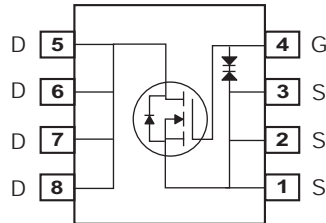
N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

| V _{DSS} | I _D | R _{DS(ON)} (mΩ) Typ |
|------------------|----------------|------------------------------|
| 33V | 27A | 3.8 @ V _{GS} =10V |
| | | 4.5 @ V _{GS} =6V |
| | | 6.4 @ V _{GS} =4.5V |

FEATURES

- Super high dense cell design for low R_{DS(ON)}.
- Rugged and reliable.
- Surface Mount Package.
- ESD Protected.

**TSON 3.3 x 3.3**

ABSOLUTE MAXIMUM RATINGS (T_C=25°C unless otherwise noted)

| Symbol | Parameter | Limit | Units |
|-----------------------------------|--|----------------------|-------|
| V _{DS} | Drain-Source Voltage | 33 | V |
| V _{GS} | Gate-Source Voltage | ±20 | V |
| I _D | Drain Current-Continuous ^c | T _A =25°C | 16 |
| | | T _A =70°C | 12.8 |
| | | T _C =25°C | 27 |
| | | T _C =70°C | 21.6 |
| I _{DM} | -Pulsed ^{a c} | T _A =25°C | 81 |
| | | T _C =25°C | 150 |
| P _D | Maximum Power Dissipation | T _A =25°C | 1.67 |
| | | T _A =70°C | 1.07 |
| | | T _C =25°C | 30 |
| | | T _C =70°C | 19 |
| T _J , T _{STG} | Operating Junction and Storage Temperature Range | -55 to 150 | °C |

THERMAL CHARACTERISTICS

| | | | |
|------------------|---|-----|------|
| R _{θJA} | Thermal Resistance, Junction-to-Ambient | 75 | °C/W |
| R _{θJC} | Thermal Resistance, Junction-to-Case | 4.2 | °C/W |

SP8009EL

Ver 2.4

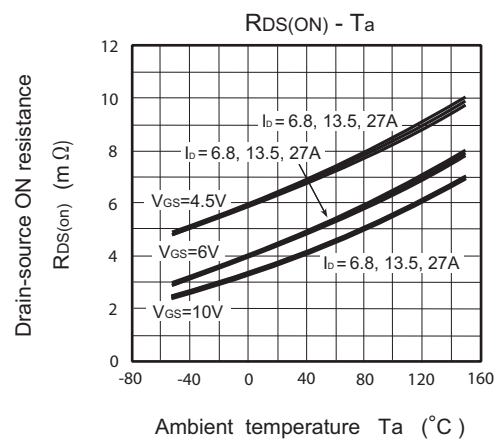
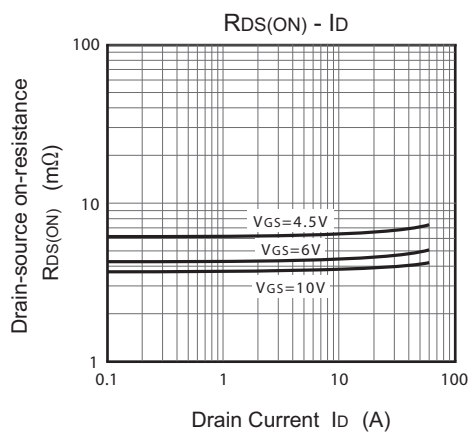
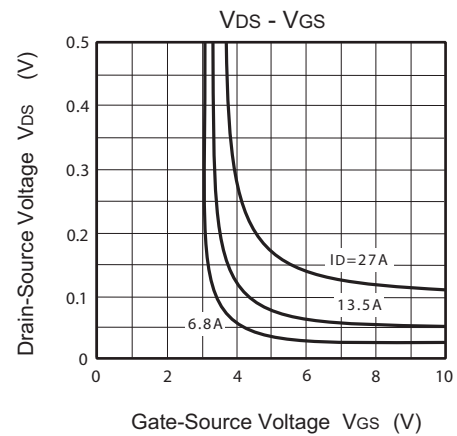
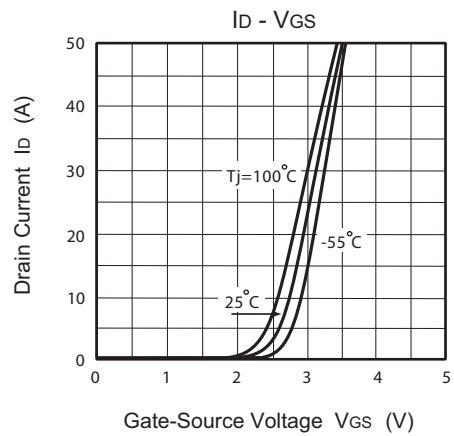
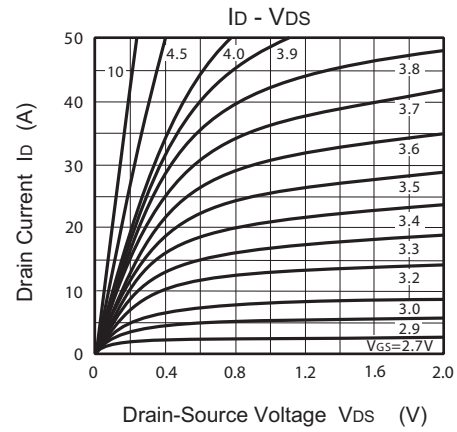
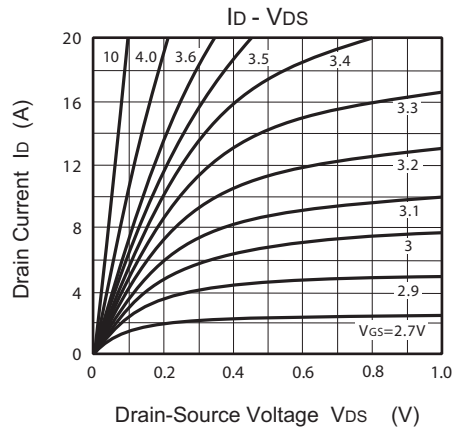
ELECTRICAL CHARACTERISTICS (T_C=25°C unless otherwise noted)

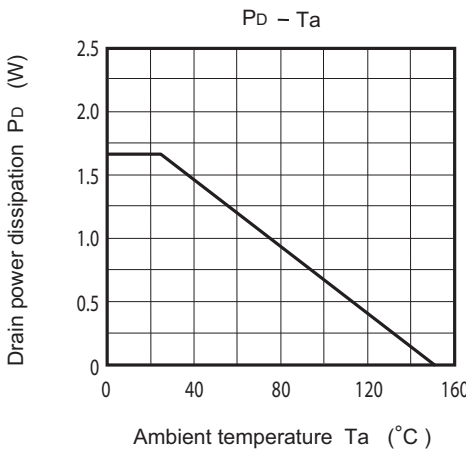
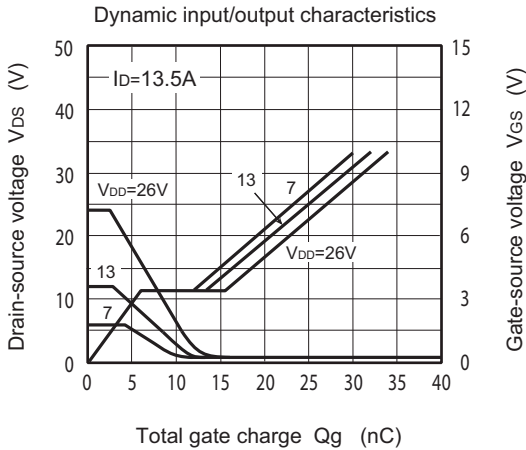
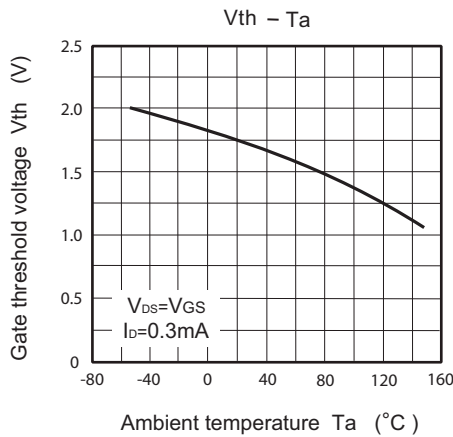
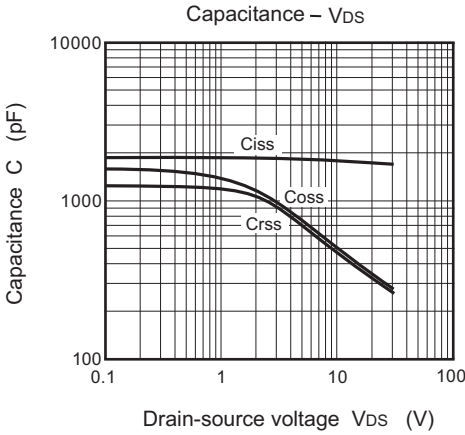
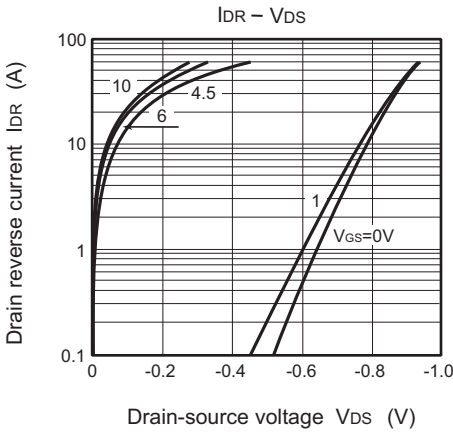
| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|--|----------------------------------|---|-----|------|-----|-------|
| OFF CHARACTERISTICS | | | | | | |
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V , I _D =250uA | 33 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =33V , V _{GS} =0V | | | 10 | uA |
| I _{GSS} | Gate-Body Leakage Current | V _{GS} = ±20V , V _{DS} =0V | | | ±10 | uA |
| ON CHARACTERISTICS | | | | | | |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =0.3mA | 1.3 | 1.8 | 2.3 | V |
| R _{DS(ON)} | Drain-Source On-State Resistance | V _{GS} =10V , I _D =10A | | 3.8 | 4.6 | m ohm |
| | | V _{GS} =6V , I _D =10A | | 4.5 | 6.2 | m ohm |
| | | V _{GS} =4.5V , I _D =10A | | 6.4 | 8.8 | m ohm |
| DYNAMIC CHARACTERISTICS ^b | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} =10V,V _{GS} =0V f=1.0MHz | | 1660 | | pF |
| C _{oss} | Output Capacitance | | | 498 | | pF |
| C _{RSS} | Reverse Transfer Capacitance | | | 456 | | pF |
| SWITCHING CHARACTERISTICS ^b | | | | | | |
| t _{D(ON)} | Turn-On Delay Time | V _{DD} =16V I _D =13.5A V _{GS} =10V R _{GEN} = 4.7 ohm | | 35 | | ns |
| t _r | Rise Time | | | 63 | | ns |
| t _{D(OFF)} | Turn-Off Delay Time | | | 61 | | ns |
| t _f | Fall Time | | | 46 | | ns |
| Q _g | Total Gate Charge | V _{DS} =26V,I _D =13.5A,V _{GS} =10V | | 34 | | nC |
| Q _{gs} | Gate-Source Charge | V _{DS} =26V,I _D =13.5A, V _{GS} =10V | | 6 | | nC |
| Q _{gd} | Gate-Drain Charge | | | 9.5 | | nC |
| DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS | | | | | | |
| V _{SD} | Diode Forward Voltage | V _{GS} =0V,I _S =27A | | 0.84 | 1.3 | V |

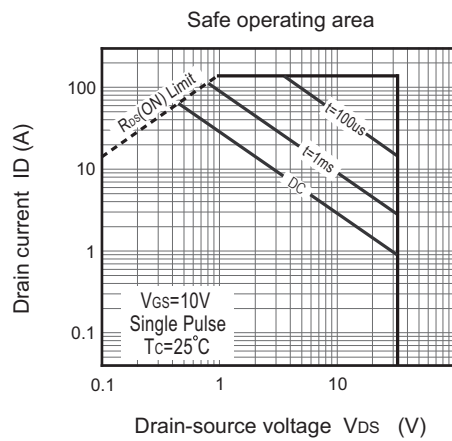
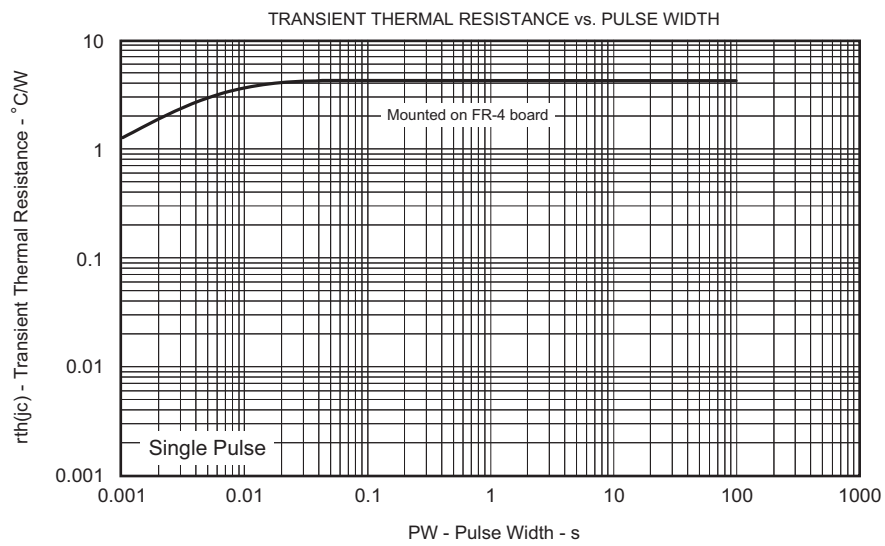
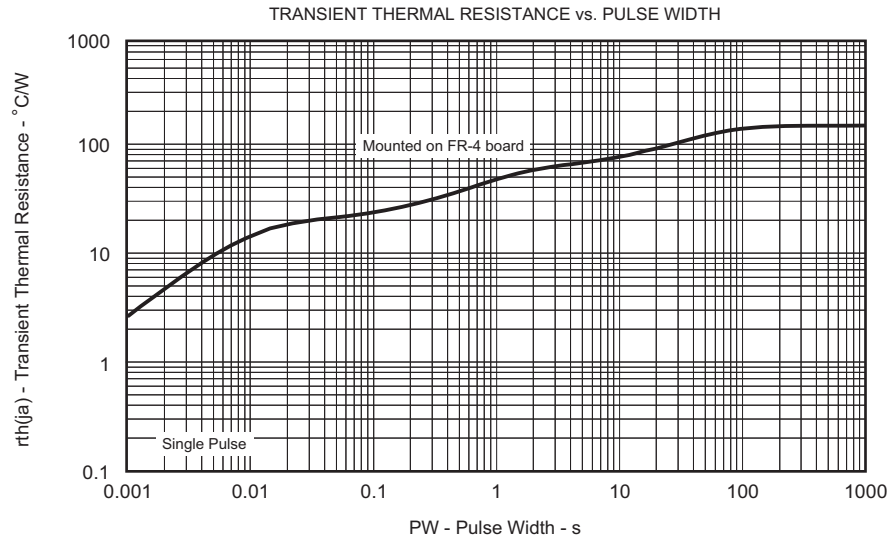
Notes

- a. Pulse Test: Pulse Width ≤ 10us, Duty Cycle ≤ 1%.
b. Guaranteed by design, not subject to production testing.
c. Drain current limited by maximum junction temperature.
d. Mounted on FR4 Board of 1 inch² , 2oz.

Nov,30,2020

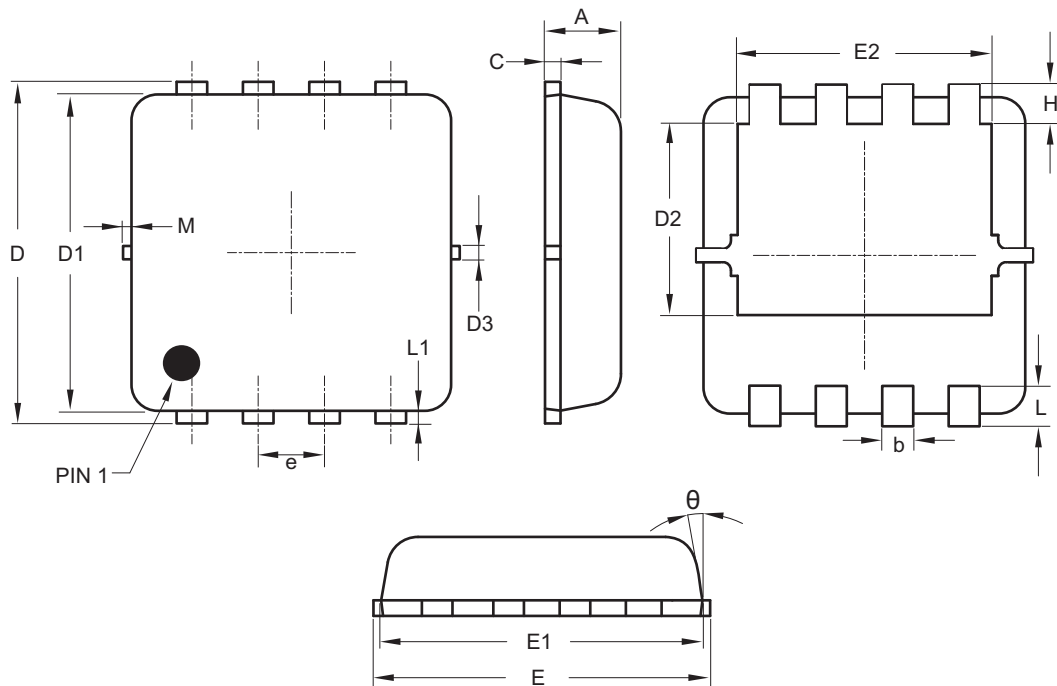






PACKAGE OUTLINE DIMENSIONS

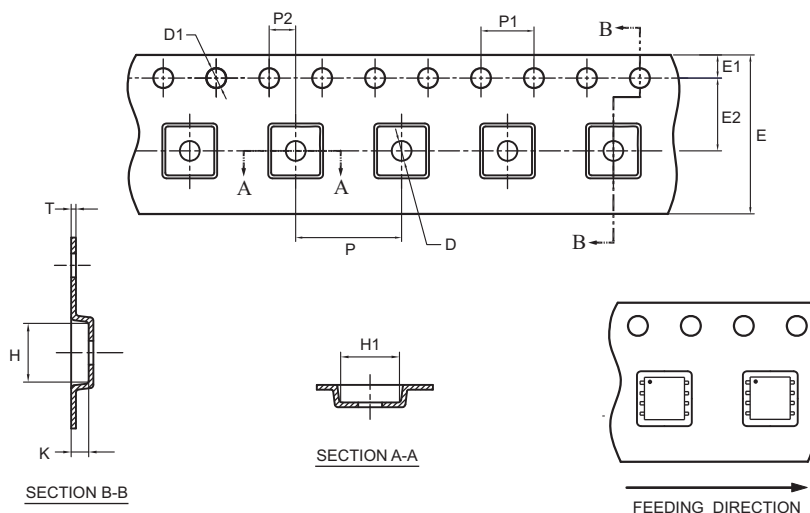
TSOP 3.3 x 3.3



| SYMBOLS | MILLIMETERS | | |
|----------|-------------|------|------|
| | MIN. | NOM. | MAX. |
| A | 0.70 | 0.80 | 0.90 |
| b | 0.24 | 0.30 | 0.35 |
| C | 0.10 | 0.15 | 0.25 |
| D | 3.10 | 3.30 | 3.45 |
| D1 | 2.90 | 3.10 | 3.20 |
| D2 | 1.65 | 1.82 | 1.98 |
| D3 | — | 0.13 | — |
| E | 3.10 | 3.25 | 3.40 |
| E1 | 2.90 | 3.10 | 3.20 |
| E2 | 2.25 | 2.40 | 2.59 |
| e | 0.65 BSC | | |
| H | 0.30 | 0.40 | 0.50 |
| L | 0.30 | 0.40 | 0.50 |
| L1 | — | 0.15 | — |
| M | — | — | 0.15 |
| θ | — | 10° | 12° |

TSON 3.3 x 3.3 Tape

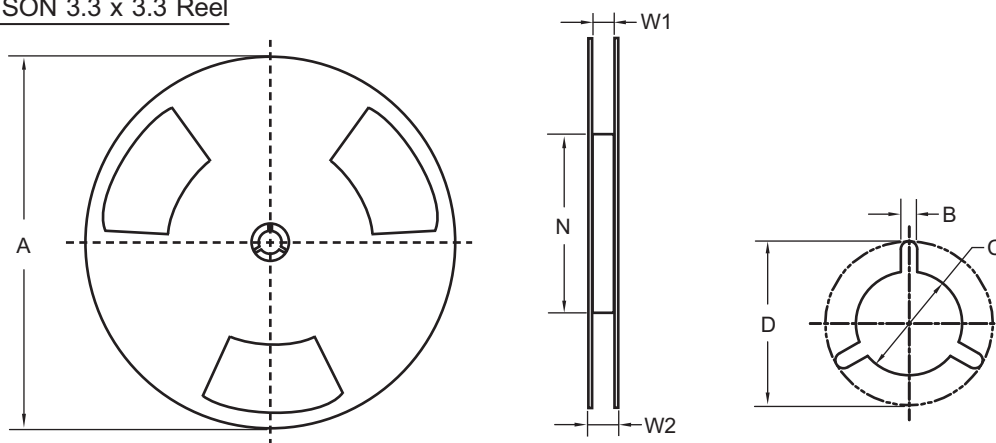
TSON 3.3 x 3.3 Tape and Reel Data



unit:

| PACKAGE | D | D1 | E | E1 | E2 | H | H1 | K | P | P1 | P2 | T |
|----------|---------------|------------------------|------------------------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|-------------|-------------|
| S mini 8 | 1.50 (MIN) | 1.50 +0.10 -0.00 | 12.0 +0.30 -0.10 | 1.75 0.10 | 5.50 0.05 | 3.70 0.10 | 3.70 0.10 | 1.10 0.10 | 8.0 0.10 | 4.0 0.10 | 2.0 0.05 | 0.3 0.05 |

TSON 3.3 x 3.3 Reel



UNIT:

| TAPE SIZE | REEL SIZE | A | B | C | D | N | W1 | W2 |
|-----------|-----------|---------|-----------------------------|------------------------------|------------|-----------------------------|------------------------------|------------|
| 12 | 13 " | 330 1.0 | 1.5 ^{+0.5} -0.2 | 13.0 ^{+0.5} -0.2 | 20.2(ref.) | 178 ^{+0.0} -2.0 | 12.4 ^{+2.0} -0.0 | 18.4(ref.) |

TOP MARKING DEFINITION

