

DESCRIPTION

The SSF4604 uses advanced trench technology MOSFET to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFET may be used in power inverters, and other applications.

GENERAL FEATURES

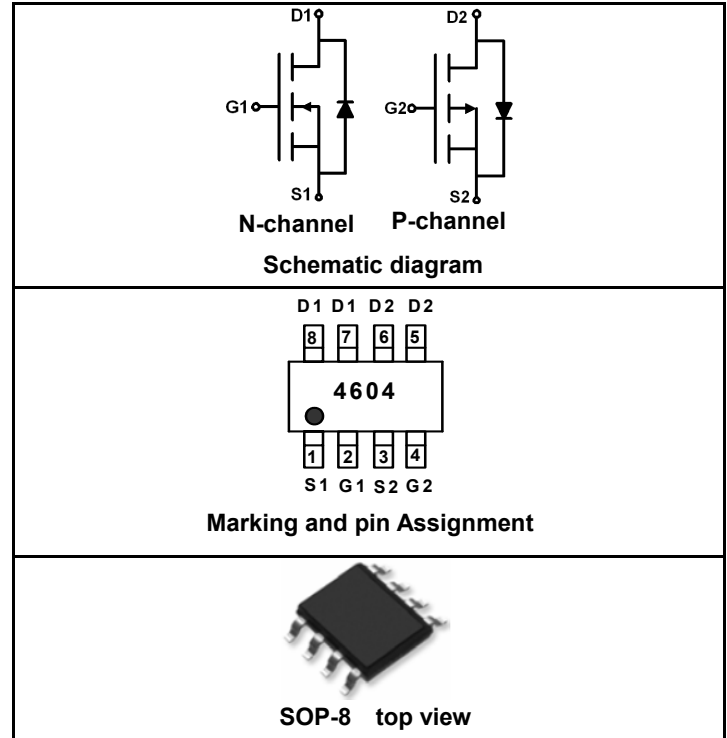
●N-Channel

$V_{DS} = 30V, I_D = 6.9A$
 $R_{DS(ON)} < 44m\Omega @ V_{GS}=4.5V$
 $R_{DS(ON)} < 28m\Omega @ V_{GS}=10V$

●P-Channel

$V_{DS} = -30V, I_D = -5A$
 $R_{DS(ON)} < 87m\Omega @ V_{GS}=-4.5V$
 $R_{DS(ON)} < 52m\Omega @ V_{GS}=-10V$

- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package



PACKAGE MARKING AND ORDERING INFORMATION

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|---------|----------------|-----------|------------|------------|
| 4604 | SSF4604 | SOP-8 | Ø330mm | 12mm | 3000 units |

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

| Parameter | | Symbol | N-Channel | P-Channel | Unit |
|--|------------------|----------------|------------|------------|------|
| Drain-Source Voltage | | V_{DS} | 30 | -30 | V |
| Gate-Source Voltage | | V_{GS} | ±20 | ±20 | V |
| Continuous Drain Current | $T_A=25^\circ C$ | I_D | 6.9 | -5 | A |
| | $T_A=70^\circ C$ | | 6.0 | -4.0 | |
| Pulsed Drain Current (Note 1) | | I_{DM} | 30 | -20 | A |
| Maximum Power Dissipation | $T_A=25^\circ C$ | P_D | 2.0 | 2.0 | W |
| | $T_A=70^\circ C$ | | 1.35 | 1.44 | |
| Operating Junction and Storage Temperature Range | | T_J, T_{STG} | -55 To 150 | -55 To 150 | °C |

THERMAL CHARACTERISTICS

| Parameter | Symbol | N-Ch | P-Ch | Unit |
|---|-----------------|------|------|------|
| Thermal Resistance, Junction-to-Ambient (Note2) | $R_{\theta JA}$ | 62.5 | 62.5 | °C/W |

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

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|----------------------------|--------|-----------|-----|-----|-----|------|
| OFF CHARACTERISTICS | | | | | | |

| | | | | | | | |
|---|--------------|---|------|-----|------|-----------|------------|
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | N-Ch | 30 | | | V |
| | | $V_{GS}=0V, I_D=-250\mu A$ | P-Ch | -30 | | | |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=24V, V_{GS}=0V$ | N-Ch | | | 1 | μA |
| | | $V_{DS}=-24V, V_{GS}=0V$ | P-Ch | | | -1 | |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | N-Ch | | | ± 100 | nA |
| | | | P-Ch | | | ± 100 | |
| ON CHARACTERISTICS (Note 3) | | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | N-Ch | 1 | 1.9 | 3 | V |
| | | $V_{DS}=V_{GS}, I_D=-250\mu A$ | P-Ch | -1 | -1.8 | -3 | |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=6.9A$ | N-Ch | | 22.5 | 28 | m Ω |
| | | $V_{GS}=-10V, I_D=-5.0A$ | P-Ch | | 46 | 52 | |
| | | $V_{GS}=4.5V, I_D=5A$ | N-Ch | | 40 | 44 | |
| | | $V_{GS}=-4.5V, I_D=-4A$ | P-Ch | | 65 | 87 | |
| Forward Transconductance | g_{FS} | $V_{DS}=5V, I_D=6.9A$ | N-Ch | 10 | 15.4 | | S |
| | | $V_{DS}=-5V, I_D=-5A$ | P-Ch | 6 | 8.6 | | |
| DYNAMIC PARAMETERS | | | | | | | |
| Input Capacitance | C_{iss} | N-Ch $V_{GS}=0V, V_{DS}=15V, f=1MHz$ P-Ch $V_{GS}=0V, V_{DS}=-15V, f=1MHz$ | N-Ch | | 680 | | pF |
| Output Capacitance | C_{oss} | | P-Ch | | 700 | | |
| | | | N-Ch | | 100 | | |
| Reverse Transfer Capacitance | C_{rss} | | P-Ch | | 120 | | |
| | | | N-Ch | | 77 | | |
| | | | P-Ch | | 75 | | |
| SWITCHING CHARACTERISTICS (Note 4) | | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | N-Ch $V_{DD}=15V, R_L=2.2\Omega$ $V_{GEN}=10V, R_{GEN}=3\Omega$ | N-Ch | | 4.6 | | nS |
| | | | P-Ch | | 8.3 | | |
| Turn-on Rise Time | t_r | P-Ch $V_{DD}=-15V, R_L=3\Omega$ $V_{GEN}=-10V, R_{GEN}=3\Omega$ | N-Ch | | 4.1 | | nS |
| | | | P-Ch | | 5 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | N-Ch $V_{DD}=15V, R_L=2.2\Omega$ $V_{GEN}=10V, R_{GEN}=3\Omega$ | N-Ch | | 20.6 | | nS |
| | | | P-Ch | | 29 | | |
| Turn-Off Fall Time | t_f | P-Ch $V_{DD}=-15V, R_L=3\Omega$ $V_{GEN}=-10V, R_{GEN}=3\Omega$ | N-Ch | | 5.2 | | nS |
| | | | P-Ch | | 14 | | |
| Total Gate Charge | Q_g | N-Ch $V_{DS}=15V, I_D=6.9A,$ $V_{GS}=10V$ | N-Ch | | 14 | | nC |
| | | | P-Ch | | 14.5 | | |
| Gate-Source Charge | Q_{gs} | P-Ch $V_{DS}=-15V, I_D=-5A,$ $V_{GS}=-10V$ | N-Ch | | 1.8 | | nC |
| | | | P-Ch | | 2 | | |
| Gate-Drain Charge | Q_{gd} | N-Ch $V_{DS}=15V, I_D=6.9A,$ $V_{GS}=10V$ | N-Ch | | 3.2 | | nC |
| | | | P-Ch | | 3.8 | | |

DRAIN-SOURCE DIODE CHARACTERISTICS

| | | | | | | |
|--------------------------------|----------|----------------------|------|-------|----|---|
| Diode Forward Voltage (Note 3) | V_{SD} | $V_{GS}=0V, I_S=1A$ | N-Ch | 0.76 | 1 | V |
| | | $V_{GS}=0V, I_S=-1A$ | P-Ch | -0.77 | -1 | V |

NOTES:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production testing.

N-Channel THERMAL CHARACTERISTICS

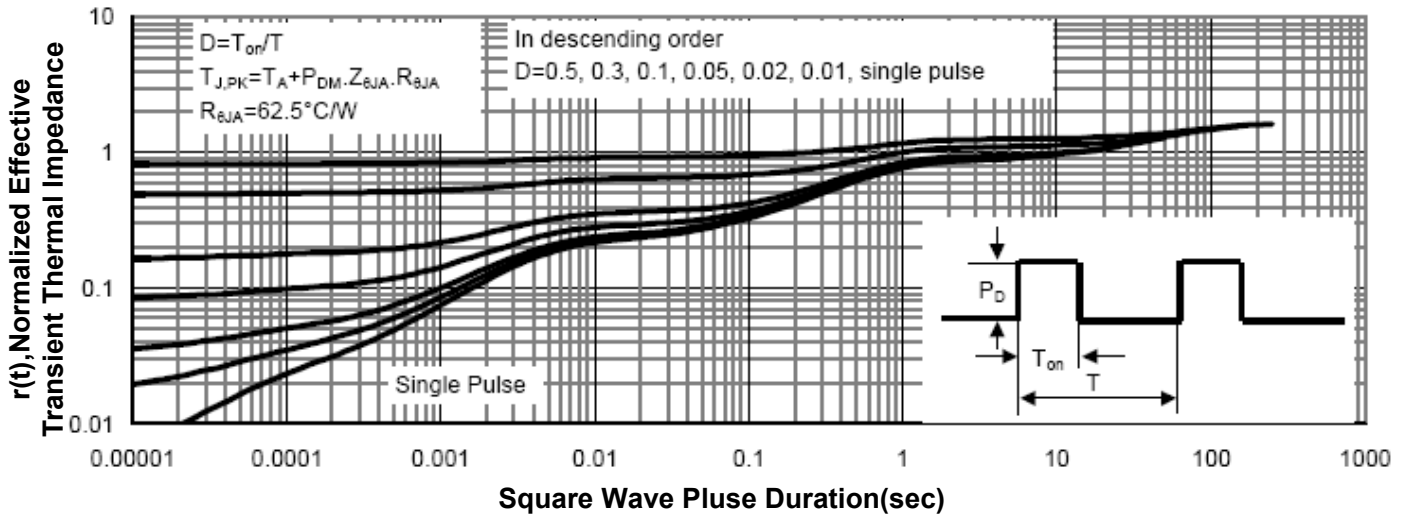


Figure 1: Normalized Maximum Transient Thermal Impedance

P-Channel THERMAL CHARACTERISTICS

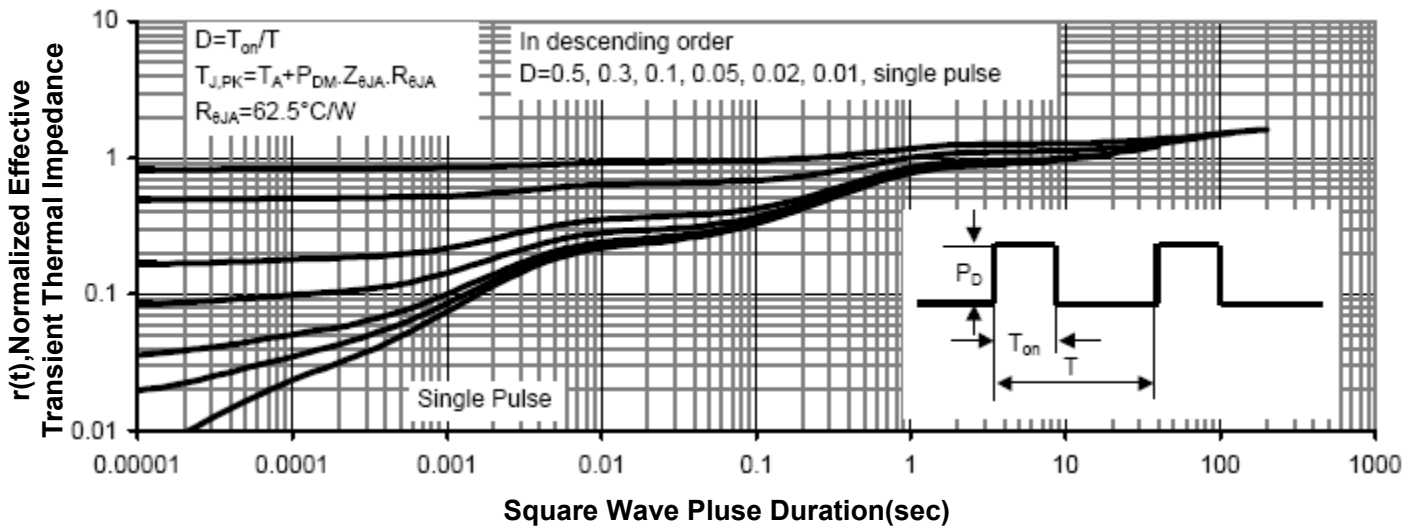
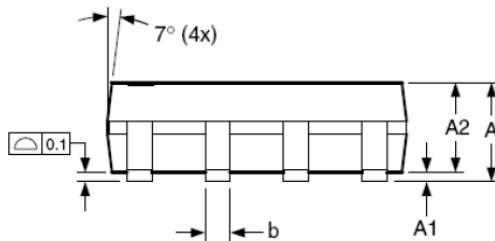
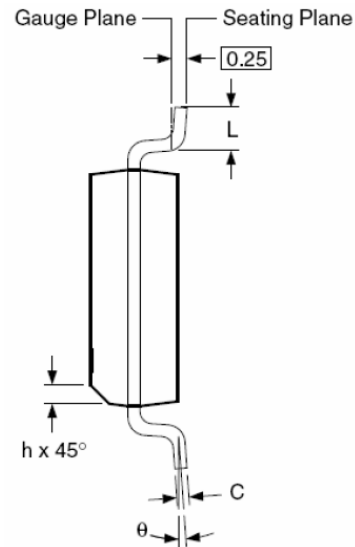
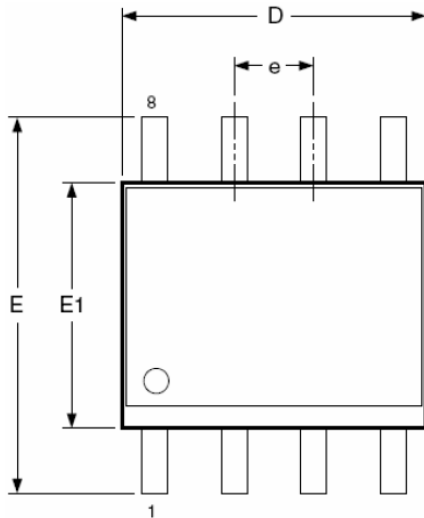


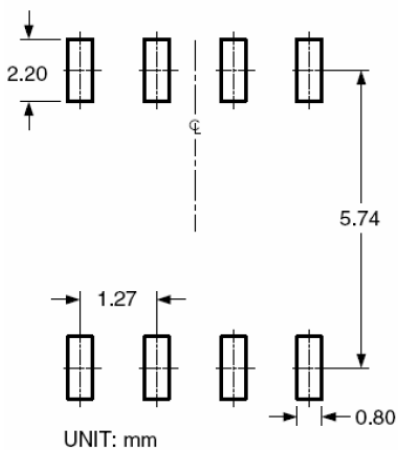
Figure 2: Normalized Maximum Transient Thermal Impedance

SOP-8 PACKAGE INFORMATION

Dimensions in Millimeters (UNIT:mm)



RECOMMENDED LAND PATTERN



Dimensions in millimeters

| Symbols | Min. | Nom. | Max. |
|---------|----------|------|------|
| A | 1.35 | 1.65 | 1.75 |
| A1 | 0.10 | — | 0.25 |
| A2 | 1.25 | 1.50 | 1.65 |
| b | 0.31 | — | 0.51 |
| c | 0.17 | — | 0.25 |
| D | 4.80 | 4.90 | 5.00 |
| E1 | 3.80 | 3.90 | 4.00 |
| e | 1.27 BSC | | |
| E | 5.80 | 6.00 | 6.20 |
| h | 0.25 | — | 0.50 |
| L | 0.40 | — | 1.27 |
| θ | 0° | — | 8° |

Dimensions in inches

| Symbols | Min. | Nom. | Max. |
|---------|-----------|-------|-------|
| A | 0.053 | 0.065 | 0.069 |
| A1 | 0.004 | — | 0.010 |
| A2 | 0.049 | 0.059 | 0.065 |
| b | 0.012 | — | 0.020 |
| c | 0.007 | — | 0.010 |
| D | 0.189 | 0.193 | 0.197 |
| E1 | 0.150 | 0.154 | 0.157 |
| e | 0.050 BSC | | |
| E | 0.228 | 0.236 | 0.244 |
| h | 0.010 | — | 0.020 |
| L | 0.016 | — | 0.050 |
| θ | 0° | — | 8° |

NOTES:

1. All dimensions are in millimeters.
2. Dimensions are inclusive of plating
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 6 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

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