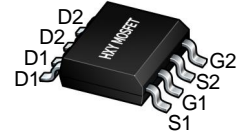




Description

The SM4953PRL uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.



SOP-8

General Features

$V_{DS} = -30V, I_D = -5.3A$

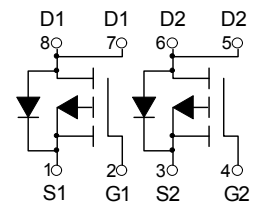
$R_{DS(ON)} < 42m \text{ @ } V_{GS} = -10V$

$R_{DS(ON)} < 85m \text{ @ } V_{GS} = -4.5V$

Application

PWM application

Load switch



Dual P-Channel MOSFET

Package Marking and Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|------------|-------|------------|----------|
| SM4953PRL | SOP-8 | HXY MOSFET | 3000 |

Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

| Symbol | Parameter | Limit | Unit |
|-----------------|--|------------|--------------|
| V_{DS} | Drain-Source Voltage | -30 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| I_D | Drain Current-Continuous | -5.3 | A |
| I_{DM} | Drain Current-Pulsed (Note 1) | -20 | A |
| P_D | Maximum Power Dissipation | 2.6 | W |
| T_J, T_{STG} | Operating Junction and Storage Temperature Range | -55 To 150 | $^\circ C$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient (Note 2) | 49 | $^\circ C/W$ |



Electrical Characteristics (T_A=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 =-250μA | -30 | -33 | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =-24V, V _{GS} =0V | - | - | -1 | μA |
| Gate-Body Leakage Current | I _{GSS} | V _{GS} =±20V, V _{DS} =0V | - | - | ±100 | nA |
| On Characteristics (Note 3) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =-250μA | -1 | -1.6 | -3 | V |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =-10V, I _D =-5.3A | - | 35 | 42 | mR |
| | | V _{GS} =-4.5V, I _D =-4.2A | - | 70 | 85 | mR |
| Forward Transconductance | g _{FS} | V _{DS} =-15V, I _D =-4.5A | 4 | 7 | - | S |
| Dynamic Characteristics (Note 4) | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =-15V, V _{GS} =0V, F=1.0MHz | - | 540 | - | PF |
| Output Capacitance | C _{oss} | | - | 150 | - | PF |
| Reverse Transfer Capacitance | C _{rss} | | - | 75 | - | PF |
| Switching Characteristics (Note 4) | | | | | | |
| Turn-on Delay Time | t _{d(on)} | V _{DD} =-15V, I _D =-1A, V _{GS} =-10V, R _{GEN} =6 | - | 8 | - | nS |
| Turn-on Rise Time | t _r | | - | 14 | - | nS |
| Turn-Off Delay Time | t _{d(off)} | | - | 18 | - | nS |
| Turn-Off Fall Time | t _f | | - | 10 | - | nS |
| Total Gate Charge | Q _g | V _{DS} =-15V, I _D =-5.3A, V _{GS} =-10V | - | 12 | - | nC |
| Gate-Source Charge | Q _{gs} | | - | 2.4 | - | nC |
| Gate-Drain Charge | Q _{gd} | | - | 3.2 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage (Note 3) | V _{SD} | V _{GS} =0V, I _S =-5.3A | - | - | -1.2 | V |

Notes:

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



Typical Electrical and Thermal Characteristics

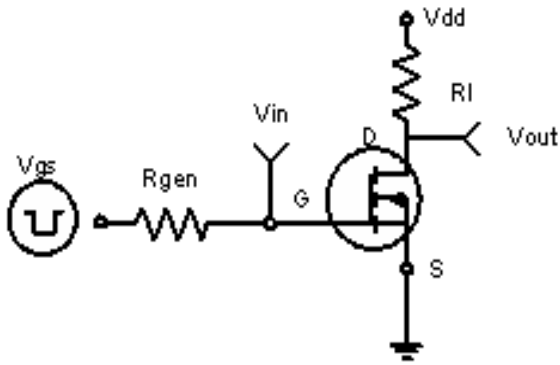


Figure 1: Switching Test Circuit

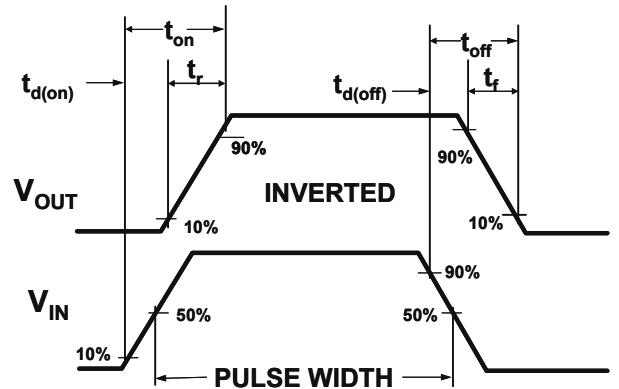


Figure 2: Switching Waveforms

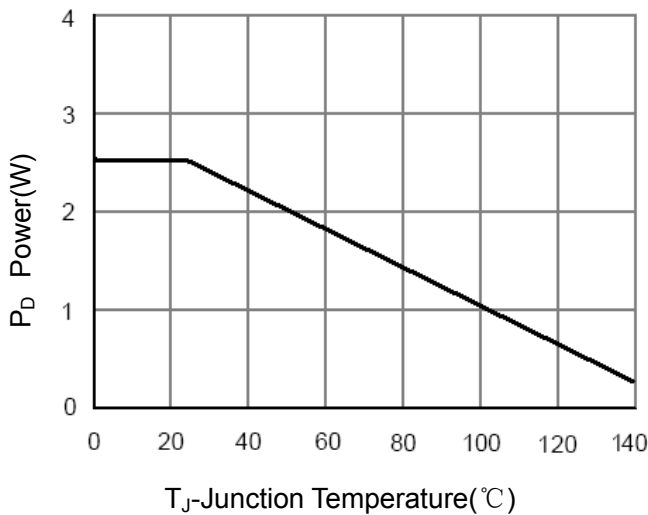


Figure 3 Power Dissipation

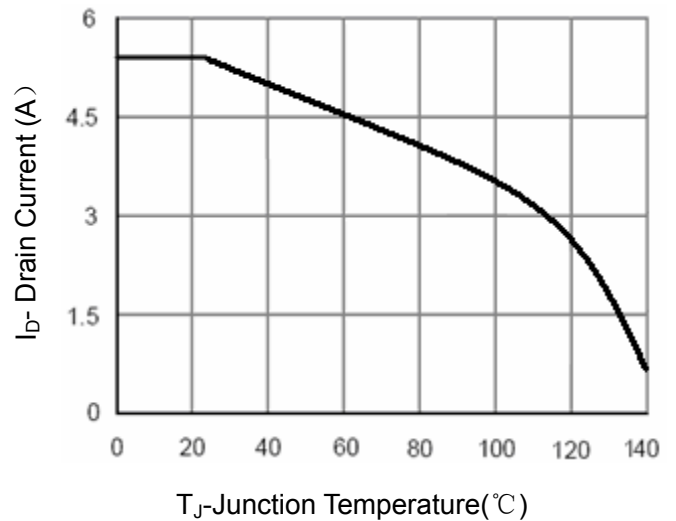


Figure 4 Drain Current

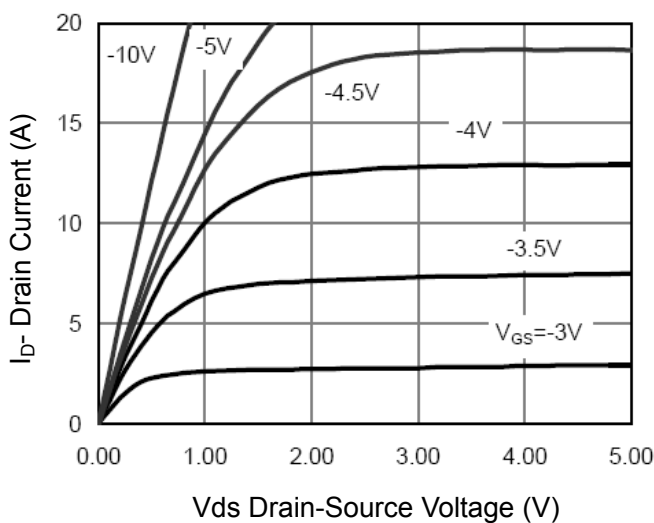


Figure 5 Output Characteristics

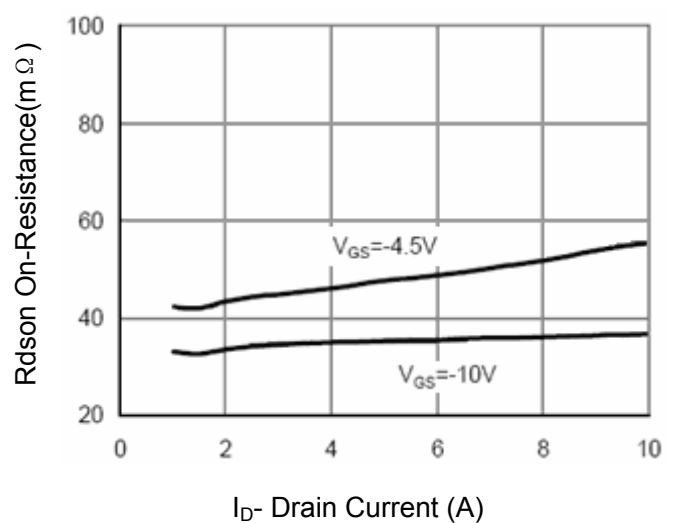


Figure 6 Drain-Source On-Resistance

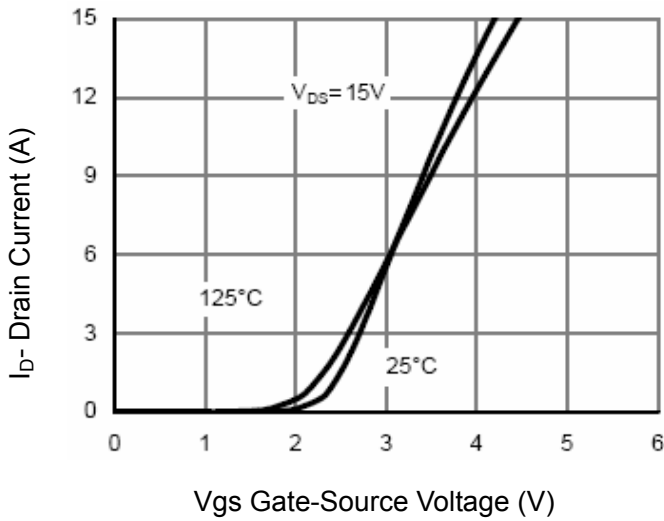


Figure 7 Transfer Characteristics

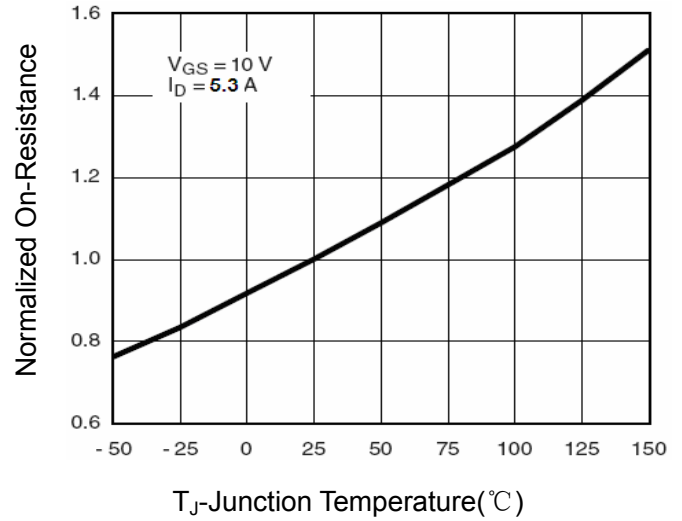


Figure 8 Drain-Source On-Resistance

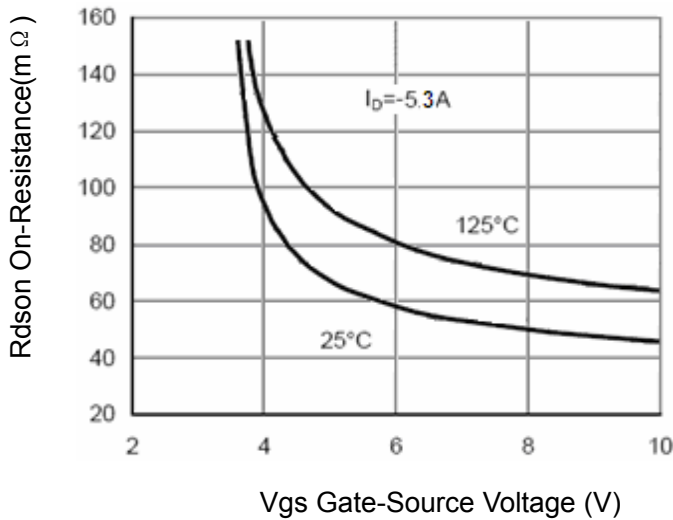


Figure 9 R_{dson} vs V_{GS}

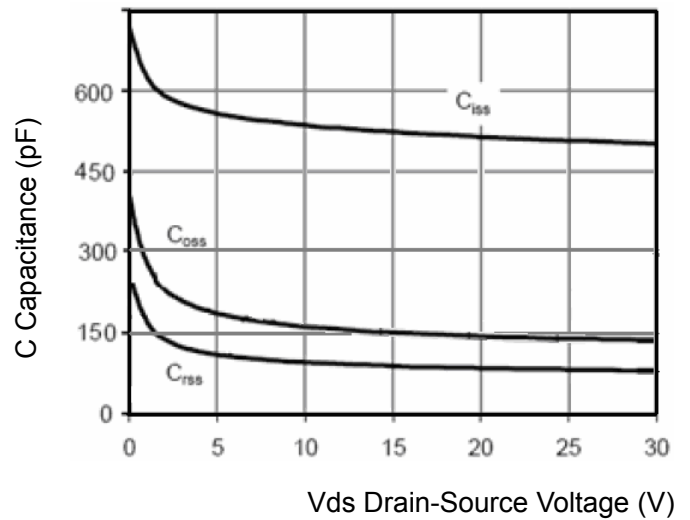


Figure 10 Capacitance vs V_{DS}

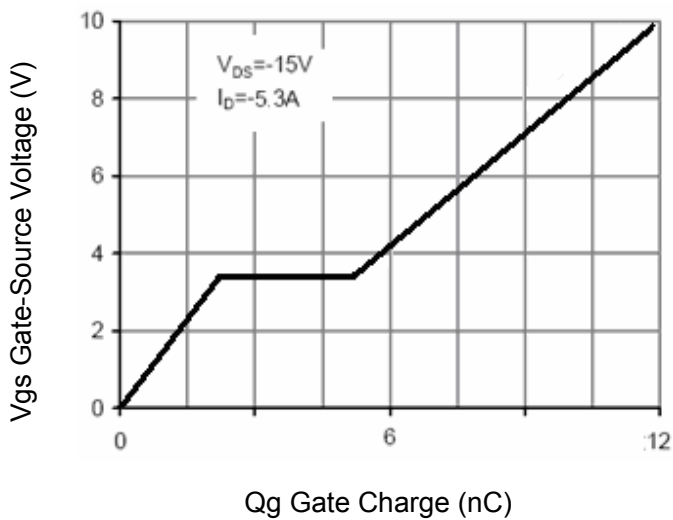


Figure 11 Gate Charge

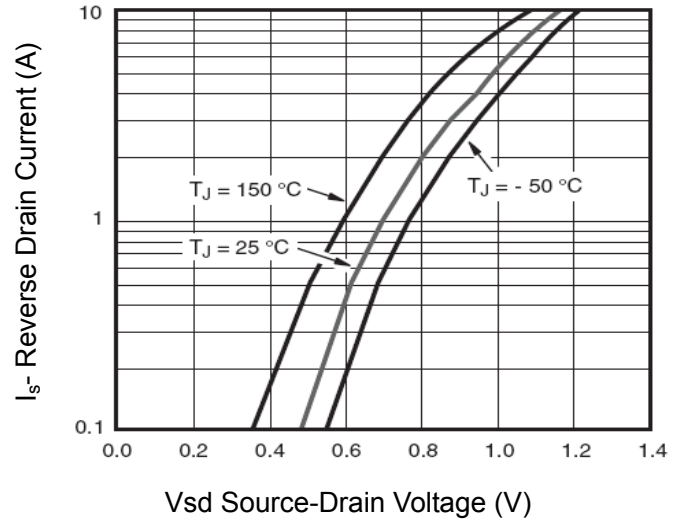


Figure 12 Source- Drain Diode Forward

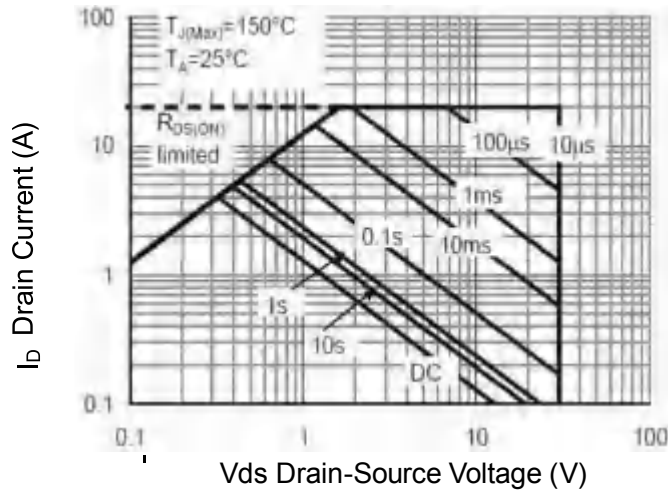


Figure 13 Safe Operation Area

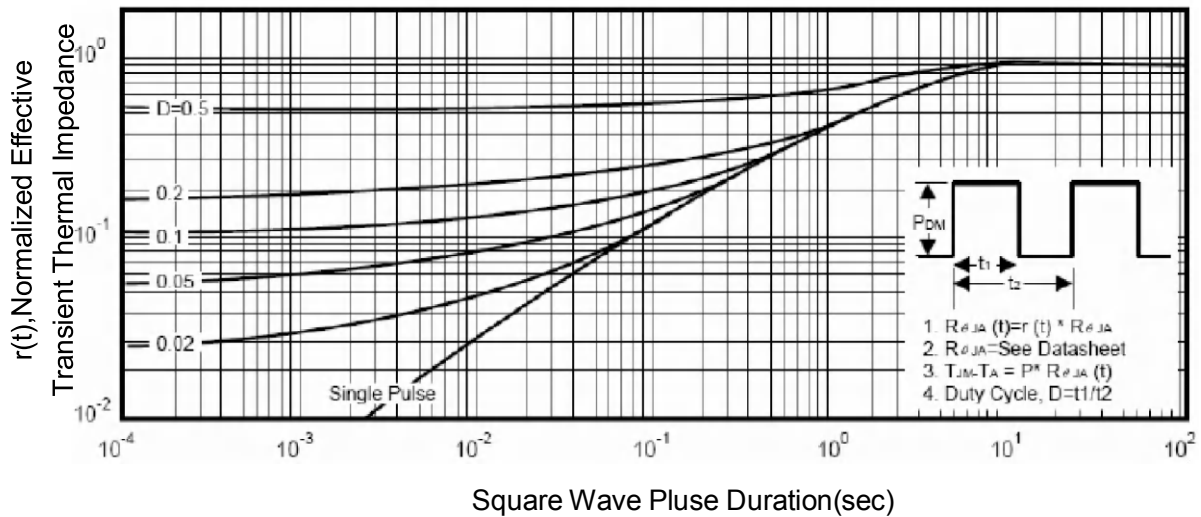
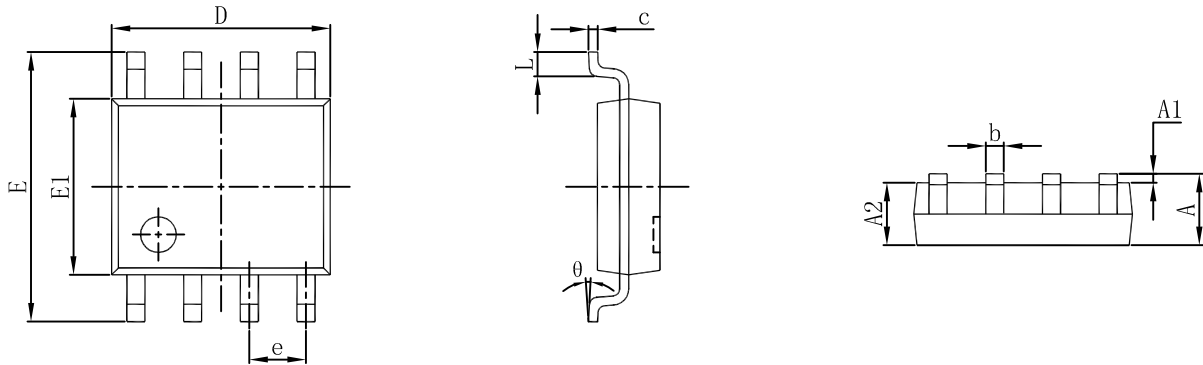


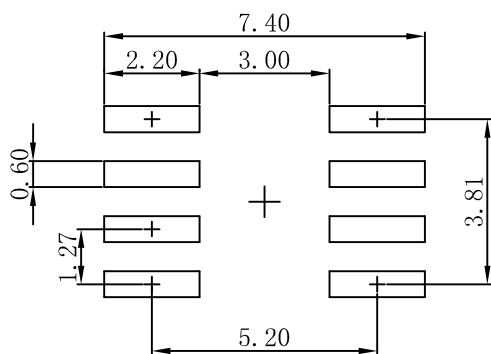
Figure 14 Normalized Maximum Transient Thermal Impedance



SOP-8 Package Outline Dimensions



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.350 | 1.750 | 0.053 | 0.069 |
| A1 | 0.100 | 0.250 | 0.004 | 0.010 |
| A2 | 1.350 | 1.550 | 0.053 | 0.061 |
| b | 0.330 | 0.510 | 0.013 | 0.020 |
| c | 0.170 | 0.250 | 0.007 | 0.010 |
| D | 4.800 | 5.000 | 0.189 | 0.197 |
| e | 1.270 (BSC) | | 0.050 (BSC) | |
| E | 5.800 | 6.200 | 0.228 | 0.244 |
| E1 | 3.800 | 4.000 | 0.150 | 0.157 |
| L | 0.400 | 1.270 | 0.016 | 0.050 |
| θ | 0° | 8° | 0° | 8° |



Note:
 1. Controlling dimension: in millimeters.
 2. General tolerance: $\pm 0.05\text{mm}$.
 3. The pad layout is for reference purposes only.



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