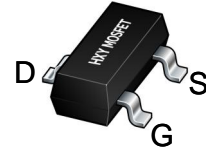




Description

The DMP2123L uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch or in PWM applications.



SOT-23

General Features

$$V_{DS} = -20V, I_D = -4.2A$$

$$R_{DS(ON)} < 55m\Omega @ V_{GS} = -4.5V$$

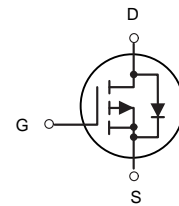
$$R_{DS(ON)} < 75m\Omega @ V_{GS} = -2.5V$$

Application

PWM applications

Load switch

Power management



P-Channel MOSFET

Package Marking and Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|------------|--------|------------|----------|
| DMP2123L | SOT-23 | HXY MOSFET | 3000 |

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

| Symbol | Parameter | Limit | Unit |
|-----------------|--|------------|------|
| V_{DS} | Drain-Source Voltage | -20 | V |
| V_{GS} | Gate-Source Voltage | ±12 | V |
| I_D | Drain Current-Continuous | -4.2 | A |
| I_{DM} | Drain Current-Pulsed (Note 1) | -15 | A |
| P_D | Maximum Power Dissipation | 1.7 | W |
| T_J, T_{STG} | Operating Junction and Storage Temperature Range | -55 To 150 | °C |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient (Note 2) | 74 | °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 | -20 | - | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =-20V, V _{GS} =0V | - | - | -1 | μA |
| Gate-Body Leakage Current | I _{GSS} | V _{GS} =±12V, V _{DS} =0V | - | - | ±100 | nA |
| On Characteristics (Note 3) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =-250μA | -0.45 | -0.7 | -1.0 | V |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =-4.5V, I _D =-4A | - | 48 | 55 | mΩ |
| | | V _{GS} =-2.5V, I _D =-3A | - | 60 | 75 | |
| Forward Transconductance | g _{FS} | V _{DS} =-5V, I _D =-4.2A | - | 6 | - | S |
| Dynamic Characteristics (Note 4) | | | | | | |
| Input Capacitance | C _{ISS} | V _{DS} =-4V, V _{GS} =0V, F=1.0MHz | - | 740 | - | PF |
| Output Capacitance | C _{OSS} | | - | 290 | - | PF |
| Reverse Transfer Capacitance | C _{RSS} | | - | 190 | - | PF |
| Switching Characteristics (Note 4) | | | | | | |
| Turn-on Delay Time | t _{d(on)} | V _{DD} =-4V, R _L =-1.2Ω, V _{GEN} =-4.5V, R _g =1Ω | - | 12 | - | nS |
| Turn-on Rise Time | t _r | | - | 35 | - | nS |
| Turn-Off Delay Time | t _{d(off)} | | - | 30 | - | nS |
| Turn-Off Fall Time | t _f | | - | 10 | - | nS |
| Total Gate Charge | Q _g | V _{DS} =-4V, I _D =-4.1A, V _{GS} =-4.5V | - | 7.8 | - | nC |
| Gate-Source Charge | Q _{gs} | | - | 1.2 | - | nC |
| Gate-Drain Charge | Q _{gd} | | - | 1.6 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage | V _{SD} | V _{GS} =0V, I _S =-4.1A | - | - | -1.2 | V |
| Diode Forward Current | I _S | | - | - | -4.1 | A |

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

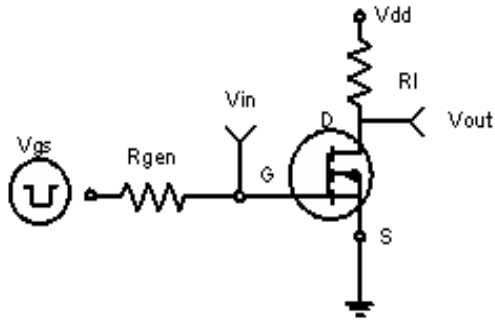


Figure 1: Switching Test Circuit

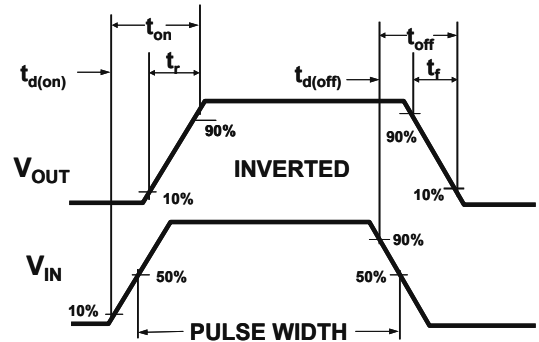
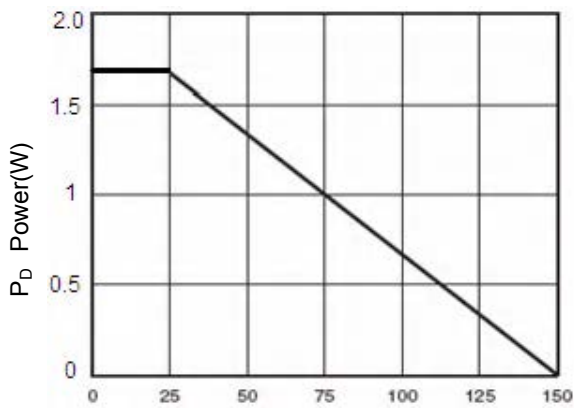
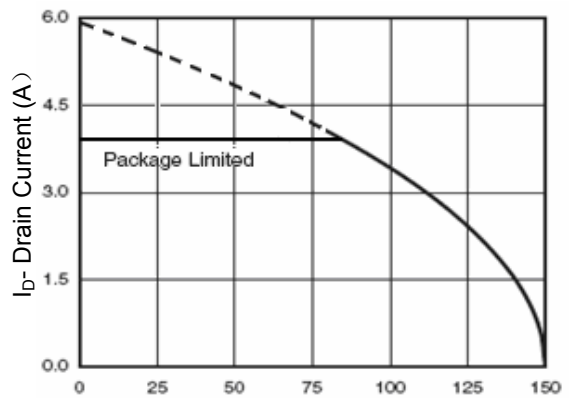


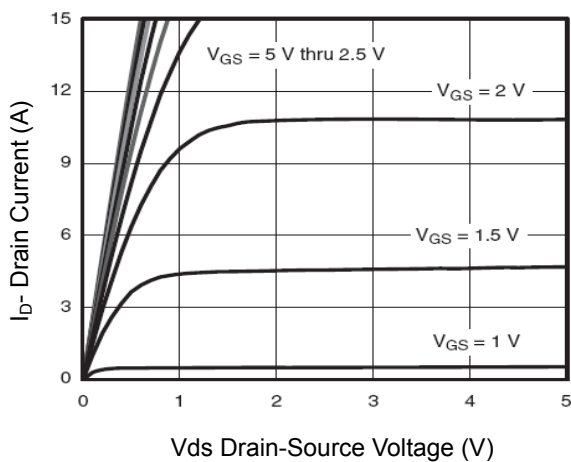
Figure 2: Switching Waveforms



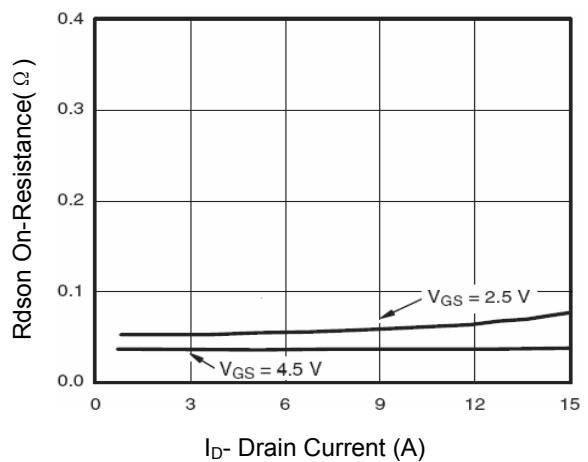
T_J-Junction Temperature(°C)
Figure 3 Power Dissipation



T_J-Junction Temperature(°C)
Figure 4 Drain Current



V_{GS} = 5 V thru 2.5 V
V_{GS} = 2 V
V_{GS} = 1.5 V
V_{GS} = 1 V
Figure 5 Output Characteristics



V_{GS} = 2.5 V
V_{GS} = 4.5 V
Figure 6 Drain-Source On-Resistance

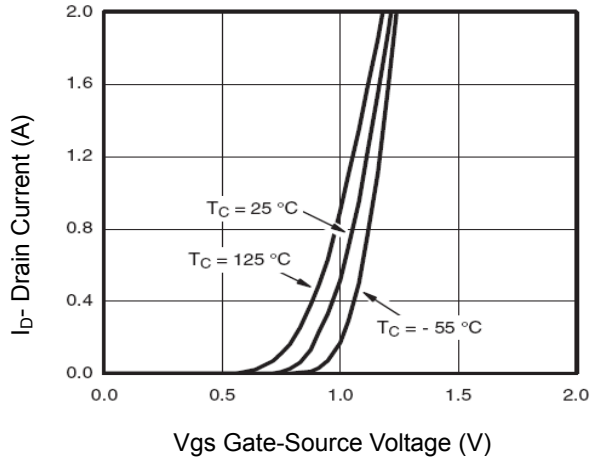


Figure 7 Transfer Characteristics

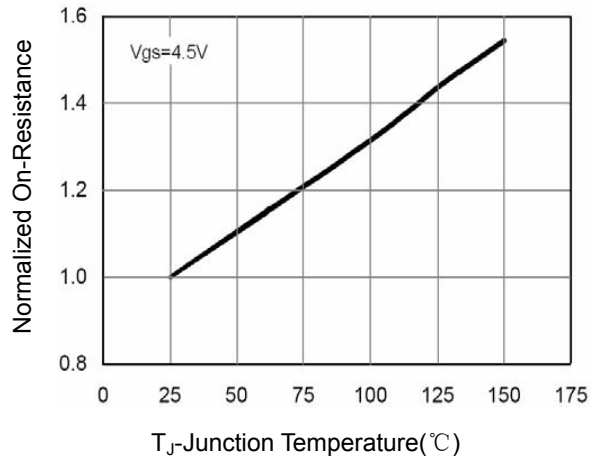


Figure 8 Drain-Source On-Resistance

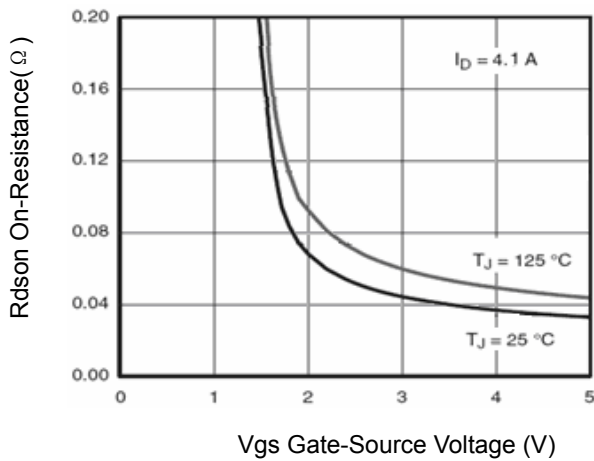


Figure 9 $R_{DS(on)}$ vs V_{GS}

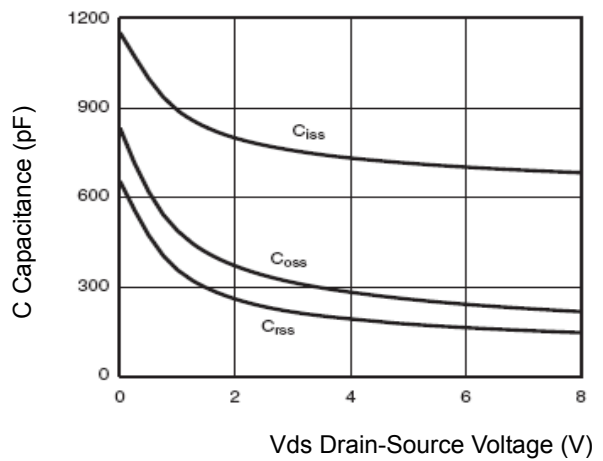


Figure 10 Capacitance vs V_{DS}

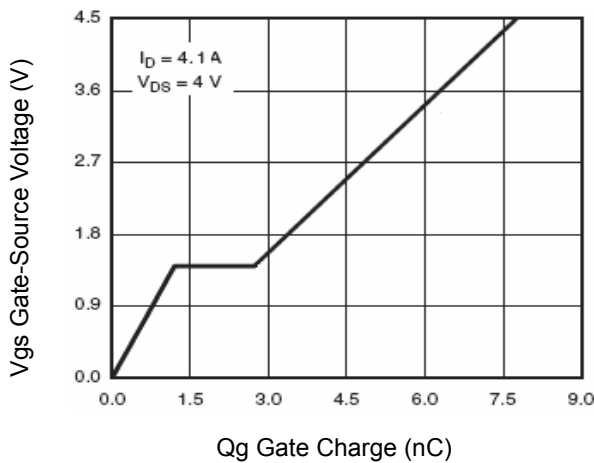


Figure 11 Gate Charge

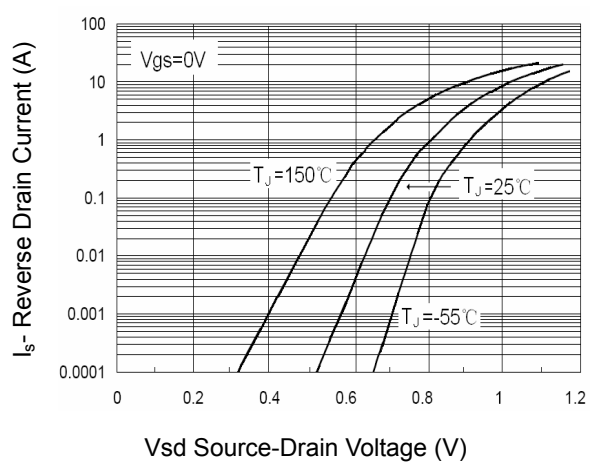


Figure 12 Source- Drain Diode Forward

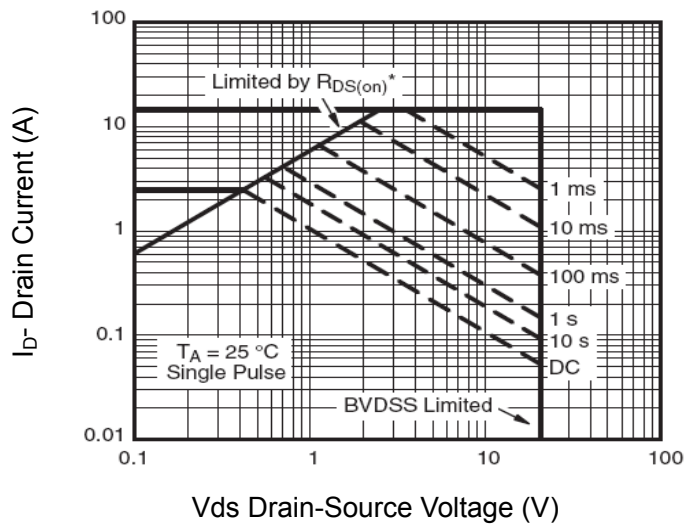


Figure 13 Safe Operation Area

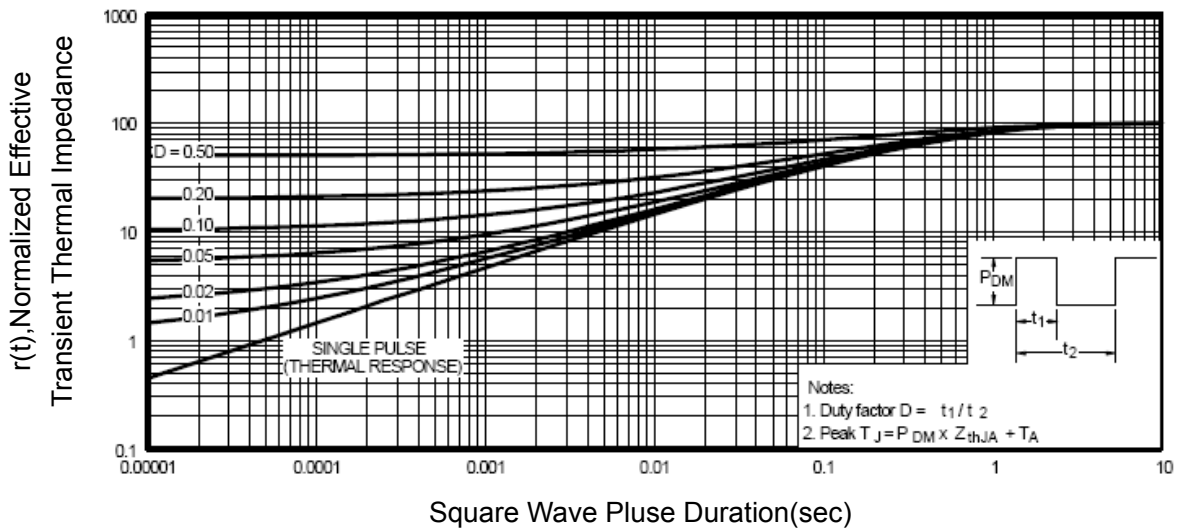
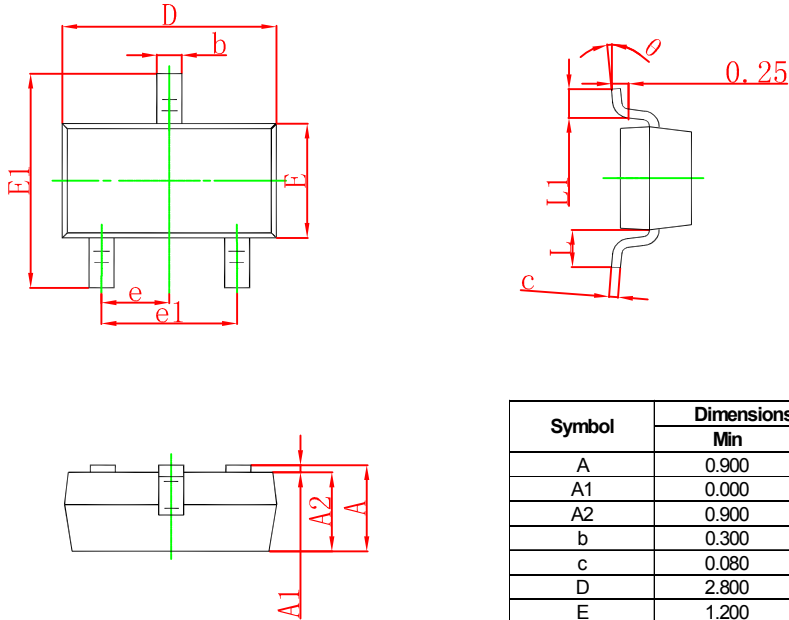


Figure 14 Normalized Maximum Transient Thermal Impedance

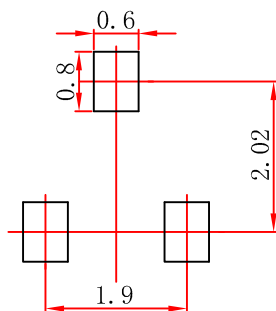


SOT-23 Package Outline Dimensions



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| 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 | 0.950 TYP | | 0.037 TYP | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF | | 0.022 REF | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |

SOT-23 Suggested Pad Layout



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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