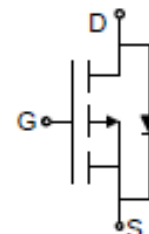


-12V P-Channel MOSFETs

Description

Features

- $V_{DS} = -12V$, $I_D = -4.1A$
- $R_{DS(ON)} < 45\ m\Omega$ @ $V_{GS} = -4.5V$
 $R_{DS(ON)} < 60m\Omega$ @ $V_{GS} = -2.5V$
- High Power and Current Handling Capability
- Lead Free Product is Acquired
- Surface Mount Package



Application

- PWM Applications
- Load Switch for Portable Devices
- Power Management



SOT-23

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

| Symbol | Parameter | Max. | Units |
|-----------------------------------|---|------------------------|-------|
| V _{DSS} | Drain-Source Voltage | -12 | V |
| V _{GSS} | Gate-Source Voltage | ±8 | V |
| I _D | Continuous Drain Current | T _C = 25°C | -4.1 |
| | | T _C = 100°C | -2.6 |
| I _{DM} | Pulsed Drain Current ^{note1} | -16 | A |
| P _D | Power Dissipation | T _C = 25°C | 1.7 |
| R _{θJA} | Thermal Resistance, Junction to Ambient | 74 | °C/W |
| T _J , T _{STG} | Operating and Storage Temperature Range | -55 to +150 | °C |

Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|--|--|------|------|-----------|------------|
| Off Characteristic | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D = -250\mu A$ | -12 | - | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS} = -8V, V_{GS} = 0V,$ | - | - | -1 | μA |
| I_{GSS} | Gate to Body Leakage Current | $V_{DS} = 0V, V_{GS} = \pm 8V$ | - | - | ± 100 | nA |
| On Characteristics | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS} = V_{GS}, I_D = -250\mu A$ | -0.5 | - | -0.9 | V |
| $R_{DS(on)}$ | Static Drain-Source on-Resistance note2 | $V_{GS} = -4.5V, I_D = -4.1A$ | - | 30 | 45 | m Ω |
| | | $V_{GS} = -2.5V, I_D = -3A$ | - | 40 | 60 | |
| g_{FS} | Forward Transconductance | $V_{DS} = -5V, I_D = -4.1A$ | 6 | - | - | S |
| Dynamic Characteristics | | | | | | |
| C_{iss} | Input Capacitance | $V_{DS} = -4V, V_{GS} = 0V,$ $f = 1.0MHz$ | - | 740 | - | pF |
| C_{oss} | Output Capacitance | | - | 290 | - | pF |
| C_{rss} | Reverse Transfer Capacitance | | - | 190 | - | pF |
| Q_g | Total Gate Charge | $V_{DS} = -4V, I_D = -4.1A,$ $V_{GS} = -2.5V$ | - | 4.5 | 9 | nC |
| Q_{gs} | Gate-Source Charge | | - | 1.2 | - | nC |
| Q_{gd} | Gate-Drain("Miller") Charge | | - | 1.6 | - | nC |
| Switching Characteristics | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DD} = -4V, I_D = -3.3A,$ $R_G = 1.0\Omega, V_{GEN} = -4.5V,$ $R_L = 1.2\Omega$ | - | 13 | 20 | ns |
| t_r | Turn-on Rise Time | | - | 35 | 53 | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | - | 32 | 48 | ns |
| t_f | Turn-off Fall Time | | - | 10 | 20 | ns |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I_S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | -4.1 | A |
| I_{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | -16 | A |
| V_{SD} | Drain to Source Diode Forward Voltage | $V_{GS} = 0V, I_S = -4.1A$ | - | - | -1.2 | V |
| t_{rr} | Reverse Recovery Time | $V_{GS} = 0V, I_S = -4.1A,$ | - | 20 | - | ns |
| Q_{rr} | Reverse Recovery Charge | $di/dt = 100A/\mu s$ | - | 9 | - | nC |

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

 2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

Typical Performance Characteristics

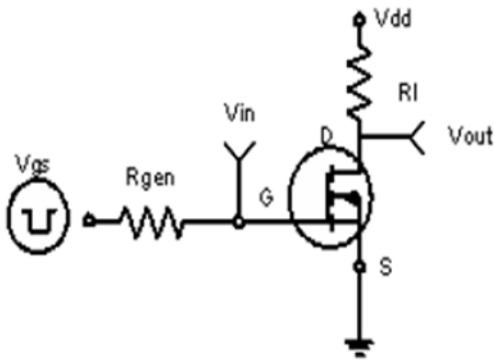


Figure1:Switching Test Circuit

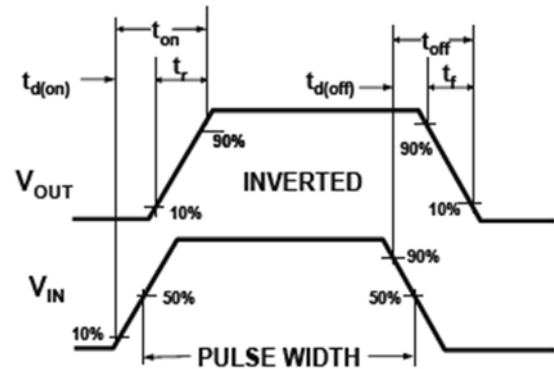
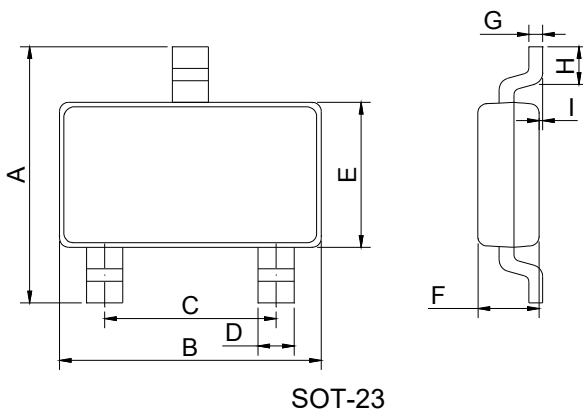


Figure2:Switching Waveforms

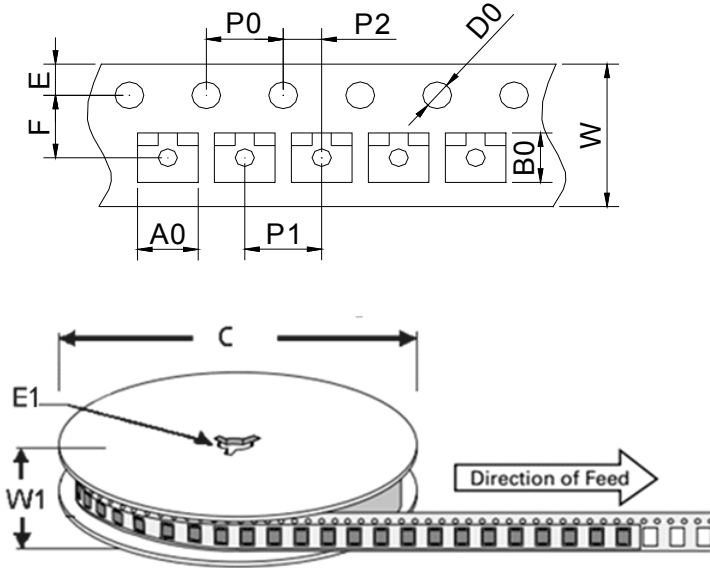
Package Mechanical Data



SOT-23

| Ref. | Dimensions | | | | | |
|------|-------------|------|------|-----------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.30 | 2.40 | 2.50 | 0.091 | 0.095 | 0.098 |
| B | 2.80 | 2.90 | 3.00 | 0.110 | 0.114 | 0.118 |
| C | 1.90 REF | | | 0.075 REF | | |
| D | 0.35 | 0.40 | 0.45 | 0.014 | 0.016 | 0.018 |
| E | 1.20 | 1.30 | 1.40 | 0.047 | 0.051 | 0.055 |
| F | 0.90 | 1.00 | 1.10 | 0.035 | 0.039 | 0.043 |
| G | | 0.10 | 0.15 | | 0.004 | 0.006 |
| H | 0.20 | | | 0.008 | | |
| I | 0 | | 0.10 | 0 | | 0.004 |

Package Information-SOT-23



| Ref. | Dimensions | |
|------|-------------|---------------|
| | Millimeters | Inches |
| A0 | 3.15 ± 0.3 | 0.124 ± 0.012 |
| B0 | 2.77 ± 0.3 | 0.109 ± 0.012 |
| C | 178 | 7.0 |
| D0 | 1.50±0.1 | 0.059 ± 0.004 |
| E | 1.75 ± 0.2 | 0.069 ± 0.008 |
| E1 | 13.3±0.3 | 0.524± 0.012 |
| F | 3.5 ± 0.2 | 0.138 ± 0.008 |
| P0 | 4.00 ± 0.2 | 0.157 ± 0.008 |
| P1 | 4.00 ± 0.2 | 0.157 ± 0.008 |
| P2 | 2.00 ± 0.2 | 0.079 ± 0.008 |
| W | 8.00 ± 0.2 | 0.315 ± 0.008 |
| W1 | 11.5±1.0 | 0.453 ± 0.039 |

Ordering Information-SOT-23

| OUTLINE | PACKAGE TYPE | QUANTITY REEL | DESCRIPTION |
|---------|--------------|---------------|------------------|
| TAPING | SOT-23 | 3,000pcs | 7 inch reel pack |

Revision history

| Date | Revision | Changes |
|-------------|----------|-----------------|
| 28-May-2020 | 1.0 | Initial release |

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