# MSD23N58

## N-Channel 60V (D-S) MOSFET

### Description

These miniature surface mount MOSFETs utilize a high cell density trench process to provide low rDS(on) and to ensure minimal power loss and heat dissipation. Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

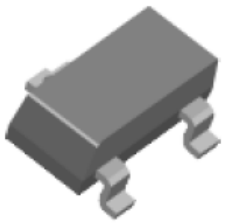
### Features

- Low rDS(on) provides higher efficiency and extends battery life
- Low thermal impedance copper leadframe
- SOT-23 saves board space
- Fast switching speed
- High performance trench technology
- RoHS compliant package

**Package type**：SOT-23

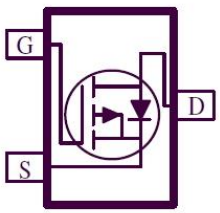
### Packing & Order Information

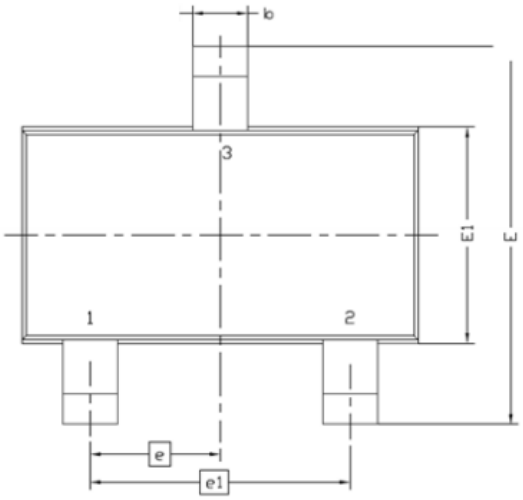
3,000/Reel

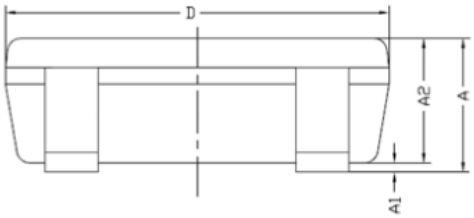


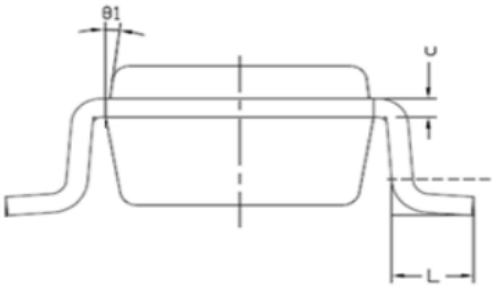
RoHS COMPLIANT

Graphic symbol




| Symbol | MILLIMETERS | |
|---|---|---|
| | MIN | MAX |
| A | 0.8 | 1.2 |
| A1 | 0 | 0.1 |
| A2 | 0.7 | 1.1 |
| b | 0.3 | 0.5 |
| c | 0.1 | 0.2 |
| D | 2.7 | 3.1 |
| E | 2.6 | 3 |
| E1 | 1.4 | 1.8 |
| e | 0.95 BSC | |
| e1 | 1.9 BSC | |
| L | 0.3 | 0.6 |
| θ1 | 7° NOM | |

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### MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

| Absolute Maximum Ratings (Tc=25°C unless otherwise noted) | | | |
|---|---|---|---|
| Symbol | Parameter | Value | Unit |
| $V_{DSS}$ | Drain-Source Voltage | 60 | V |
| $V_{GS}$ | Gate-Source Voltage | ±50 | V |
| $I_D$ | Continuous Drain Current @ TC=25°C | 2.8 | A |
| | Continuous Drain Current @ TC=100°C | 1.8 | A |
| $I_{DM}$ | Pulsed Drain Current | ±15 | A |
| $I_S$ | Continuous Source Current (Diode Conduction) | 1.7 | A |
| $P_D$ | Power Dissipation (TC=25°C) | 1.3 | W |
| | Power Dissipation (TC=100°C) | 0.8 | W |
| $T_J/T_{STG}$ | Operating Junction and Storage Temperature | -55 to +150 | °C |

Notes

a. Surface Mounted on 1" x 1" FR4 Board.

b. Pulse width limited by maximum junction temperature

| Thermal characteristics (Tc=25°C unless otherwise noted) | | | |
|---|---|---|---|
| Symbol | Parameter | Maximum | Units |
| t <= 5 sec 100 | Maximum Junction-to-Ambient(RthJA) | 100 | °C/W |
| Steady State | Maximum Junction-to-Ambient(RthJA) | 106 | |

| On Characteristics | | | | | |
|---|---|---|---|---|---|
| Symbol | Test Conditions | Min | Typ. | Max. | Units |
| $V_{GS}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 2.0 | -- | 4.0 | V |
| $R_{DS(ON)}$ | $V_{GS}$ = 10 V , $I_D$ = 3.5 A | -- | 40 | 47 | Ω |

| Off Characteristics | | | | | |
|---|---|---|---|---|---|
| Symbol | Test Conditions | Min | Typ. | Max. | Units |
| $V_{GS}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 1.0 | -- | -- | V |
| $R_{DS(ON)}$ | $V_{GS}$ = 10 V , $I_D$ = 3.1 A<br>$V_{GS}$ = 4.5 V , $I_D$ = 2.9 A | -- | -- | 92<br>107 | mΩ |
| $I_{DSS}$ | $V_{DS}$ = 48 V , $V_{GS}$ = 0 V<br>$V_{DS}$ = 48 V , $V_{GS}$ = 0 V , $T_C$ = 125°C | -- | -- | 1<br>50 | uA |
| ID(on) | $V_{GS}$ = 10 V, $V_{DS}$ = 5 V | 10 | -- | -- | A |
| $I_{GSS}$ | $V_{GS}$ = ±20 V, $V_{DS}$ = 0 V | -- | -- | ±100 | nA |
| $V_{SD}$ | $I_S$ = 1.7 V, $V_{GS}$ = 0 V | -- | 1.1 | -- | S |
| Gfs | $V_{DS}$ = 4.5 V , $I_D$ = 3.1 A | -- | 8 | -- | S |

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## N-Channel 60V (D-S) MOSFET

| Dynamic Characteristics | | | | | |
|---|---|---|---|---|---|
| Symbol | Test Conditions | Min | Typ. | Max. | Units |
| $Q_g$ | $V_{DD}$ = 30 V , $I_D$ = 2 A, $V_{GEN}$ = 10 V , $R_L$ = 30 Ω | -- | 3.6 | -- | nC |
| $Q_{gs}$ | | -- | 1.8 | -- | nC |
| $Q_{gd}$ | | -- | 1.3 | -- | nC |

| Switching Characteristics | | | | | |
|---|---|---|---|---|---|
| Symbol | Test Conditions | Min | Typ. | Max. | Units |
| $t_{d(on)}$ | $V_{DS}$ = 300 V, $I_D$ = 2 A, $R_G$ = 25 Ω | -- | 8 | 30 | ns |
| $t_r$ | | -- | 23 | 60 | ns |
| $t_{d(off)}$ | | -- | 25 | 60 | ns |
| tf | | -- | 28 | 70 | ns |

Notes

a. Pulse test: PW <= 300us duty cycle <= 2%.

b. Guaranteed by design, not subject to production testing.

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