P-Channel 30-V (D-S) MOSFET

Key Features:

- Low r_{DS(on)} trench technology
- · Low thermal impedance
- · Fast switching speed

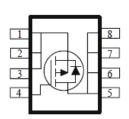
Typical Applications:

- · White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

| PRODUCT SUMMARY | | | |
|---------------------|-----------------------------|--------------------|--|
| V _{DS} (V) | $r_{DS(on)}(m\Omega)$ | I _D (A) | |
| -30 | 19 @ V _{GS} = -10V | -9.5 | |
| | $30 @ V_{GS} = -4.5V$ | -7.5 | |







| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^{\circ}$ C UNLESS OTHERWISE NOTED) | | | | | |
|---|----------------------|----------------|------------|-------|--|
| Parameter | | Symbol | Limit | Units | |
| Drain-Source Voltage | | | -30 | V | |
| Gate-Source Voltage | V_{GS} | ±20 | V | | |
| Continuous Dusin Commenta | T _A =25°C | ı | -9.5 | | |
| Continuous Drain Current ^a | T _A =70°C | i _D | -8.3 | Α | |
| Pulsed Drain Current ^b | I _{DM} | -50 | ' | | |
| Continuous Source Current (Diode Conduction) a | | I _S | -4 | Α | |
| Device Dissinction 8 | T _A =25°C | P _D | 3.1 | W | |
| Power Dissipation ^a | T _A =70°C | ГD | 2.2 | V V | |
| Operating Junction and Storage Temperature Range | | T_J, T_{sta} | -55 to 150 | °C | |

| THERMAL RESISTANCE RATINGS | | | | | | |
|--|--------------|-----------------|---------|-------|--|--|
| Parameter | | Symbol | Maximum | Units | | |
| Maximum Junction-to-Ambient ^a | t <= 10 sec | $R_{\theta JA}$ | 40 | °C/W | | |
| IMAXIMUM JUNCTION-TO-AMBIENT | Steady State | IΛθJA | 80 | C/VV | | |

Notes

- a. Surface Mounted on 1" x 1" FR4 Board.
- b. Pulse width limited by maximum junction temperature

Electrical Characteristics

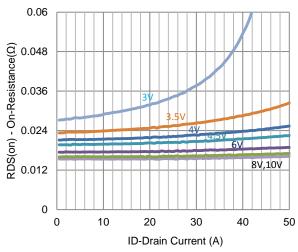
| Parameter | Symbol | ymbol Test Conditions | | Тур | Max | Unit | |
|---------------------------------|---------------------|--|-----|-------|------|------|--|
| Static | | | | | | | |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_{D} = -250 \text{ uA}$ | -1 | | | V | |
| Gate-Body Leakage | I _{GSS} | $V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$ | | | ±100 | nA | |
| Zoro Coto Voltogo Droin Correct | ı | $V_{DS} = -24 \text{ V}, V_{GS} = 0 \text{ V}$ | | | -1 | | |
| Zero Gate Voltage Drain Current | I _{DSS} | $V_{DS} = -24 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 55^{\circ}\text{C}$ | | | -25 | - uA | |
| On-State Drain Current | I _{D(on)} | $V_{DS} = -5 \text{ V}, V_{GS} = -10 \text{ V}$ | -20 | | | Α | |
| Drain-Source On-Resistance | r | $V_{GS} = -10 \text{ V}, I_{D} = -7.6 \text{ A}$ | | | 19 | m() | |
| Dialii-Source Off-Resistance | r _{DS(on)} | $V_{GS} = -4.5 \text{ V}, I_D = -6 \text{ A}$ | | | 30 | mΩ | |
| Forward Transconductance | g _{fs} | $V_{DS} = -15 \text{ V}, I_{D} = -7.6 \text{ A}$ | | 20 | | S | |
| Diode Forward Voltage | V_{SD} | $I_{S} = -2 \text{ A}, V_{GS} = 0 \text{ V}$ | | -0.74 | | V | |
| | | Dynamic | | | | | |
| Total Gate Charge | Q_g | $V_{DS} = -15 \text{ V}, V_{GS} = -4.5 \text{ V},$ | | 31 | | nC | |
| Gate-Source Charge | Q_{gs} | $I_{DS} = -7.5 \text{ V}, \text{ V}_{GS} = -4.3 \text{ V},$ $I_{D} = -7.6 \text{ A}$ | | 6.8 | | | |
| Gate-Drain Charge | Q_{gd} | 1D = -1:0 K | | 13 | | 1 | |
| Turn-On Delay Time | t _{d(on)} | $V_{DS} = -15 \text{ V}, R_1 = 1.9 \Omega,$ | | 8 | | | |
| Rise Time | t _r | $V_{DS} = -13 \text{ V}, K_L = 1.9 \Omega,$ $I_D = -7.6 \text{ A},$ | | 16 | | no | |
| Turn-Off Delay Time | $t_{d(off)}$ | $V_{GEN} = -10 \text{ V}, R_{GEN} = 6 \Omega$ | | 98 | | ns | |
| Fall Time | t _f | V GEN = 10 V, 1 (GEN = 0.12 | | 53 | | | |
| Input Capacitance | C _{iss} | | | 1934 | | | |
| Output Capacitance | C _{oss} | $V_{DS} = -15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$ | | 408 | | pF | |
| Reverse Transfer Capacitance | C _{rss} | | | 226 | | | |

Notes

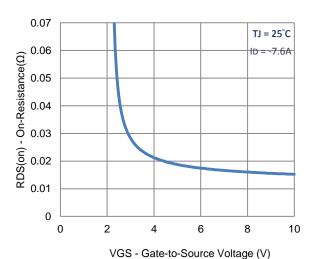
- a. Pulse test: PW <= 300us duty cycle <= 2%.
- Guaranteed by design, not subject to production testing.

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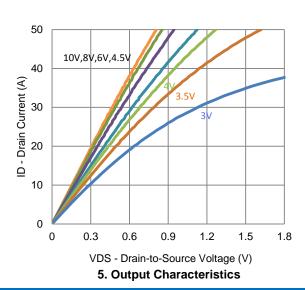
Typical Electrical Characteristics

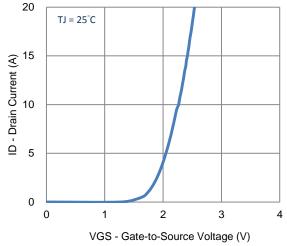


1. On-Resistance vs. Drain Current

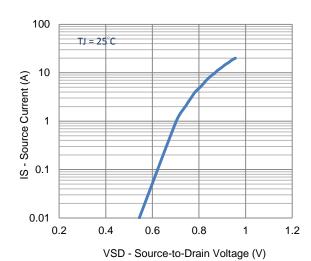


3. On-Resistance vs. Gate-to-Source Voltage

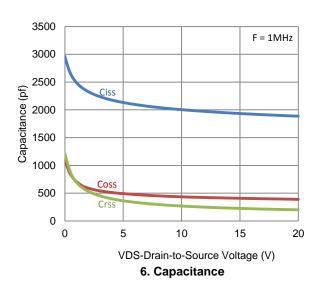




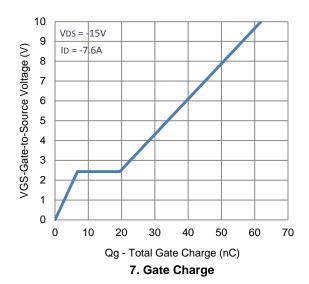
2. Transfer Characteristics

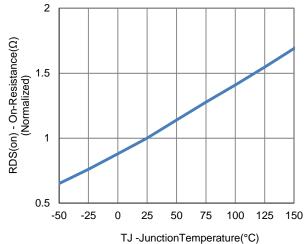


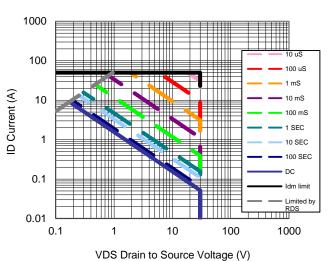
4. Drain-to-Source Forward Voltage



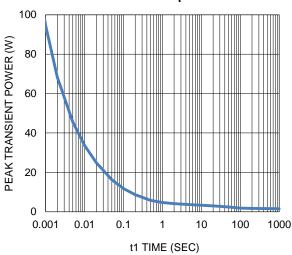
Typical Electrical Characteristics





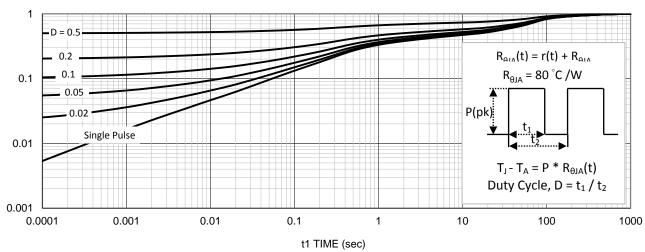






9. Safe Operating Area

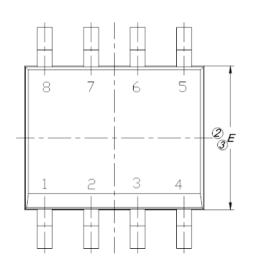
10. Single Pulse Maximum Power Dissipation

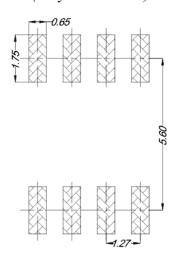


11. Normalized Thermal Transient Junction to Ambient

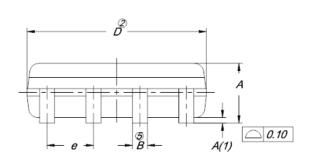
Package Information

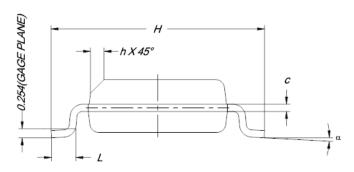
Land Pattern (Only for Reference)





| DIM | MILLIMETERS | | | | |
|------|-------------|------|------|--|--|
| DIM. | MIN. | NOM. | MAX. | | |
| Α | 1.35 | 1.55 | 1.75 | | |
| A(1) | 0.10 | 0.18 | 0.25 | | |
| В | 0.38 | 0.45 | 0.51 | | |
| С | 0.19 | 0.22 | 0.25 | | |
| D | 4.80 | 4.90 | 5.00 | | |
| E | 3.80 | 3.90 | 4.00 | | |
| е | 1.27 BSC | | | | |
| Н | 5.80 | 6.00 | 6.20 | | |
| L | 0.50 | 0.72 | 0.93 | | |
| α | 0° | 4° | 8° | | |
| h | 0.25 | 0.38 | 0.50 | | |





Note:

- 1. All Dimension Are In mm.
- Package Body Sizes Exclude Mold Flash, Protrusion Or Gate Burrs. Mold Flash, Protrusion Or Gate Burrs Shall Not Exceed 0.10 mm Per Side.
- 3. Package Body Sizes Determined At The Outermost Extremes Of The Plastic Body Exclusive Of Mold Flash, Tie Bar Burrs, Gate Burrs And Interlead Flash, But Including Any Mismatch Between The Top And Bottom Of The Plastic Body.
- 4. The Package Top May Be Smaller Than The Package Bottom.
- Dimension "B" Does Not Include Dambar Protrusion. Allowable Dambar Protrusion Shall Be 0.08 mm Total In Excess Of "B" Dimension At Maximum Material Condition. The Dambar Cannot Be Located On The Lower Radius Of The Foot.