

MT8103

P-Channel Enhancement Mode Field Effect Transistor

Product Summary

- $V_{DS} = -30V$
- $I_D = -13A$ ($V_{GS} = -10V$)
- $R_{DS(ON)} = 10m\Omega$ @ $V_{GS} = -10V$
- $R_{DS(ON)} = 14m\Omega$ @ $V_{GS} = -4.5V$

Features

- Advanced trench process technology
- High density cell design for ultra low on-resistance
- Lead free product is acquired
- RoHS compliant

Applications

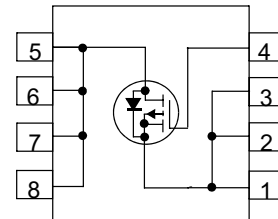
- Notebook computer
- Portable battery backs



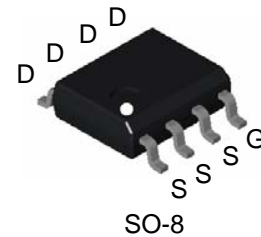
MT Semiconductor®

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Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT



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

| Symbol | Parameter | 10s | Steady State | Units |
|----------------|---|------|--------------|------------|
| V_{DS} | Drain-Source Voltage | | -30 | V |
| V_{GS} | Gate-Source Voltage | | ± 20 | V |
| I_D | Continuous Drain Current ¹ | -13 | -9 | A |
| I_{DM} | Pulsed Drain Current ² | | -50 | A |
| I_S | Continuous Source Current (Diode Conduction) ¹ | -2.7 | -1.36 | A |
| P_D | Maximum Power Dissipation ¹ | 3.0 | 1.5 | W |
| T_J, T_{stg} | Operating Junction and Storage Temperature Range | | -55 to 150 | $^\circ C$ |

Thermal Resistance Ratings

| Symbol | Parameter | Typical | Maximum | Unit |
|------------|--|-----------------|---------|--------------|
| R_{thJA} | Maximum Junction-to-Ambient ¹ | $t \leq 10$ Sec | 33 | $^\circ C/W$ |
| | | Steady State | 70 | |

Notes:

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

Electrical Characteristics (T_A=25°C, unless otherwise noted)

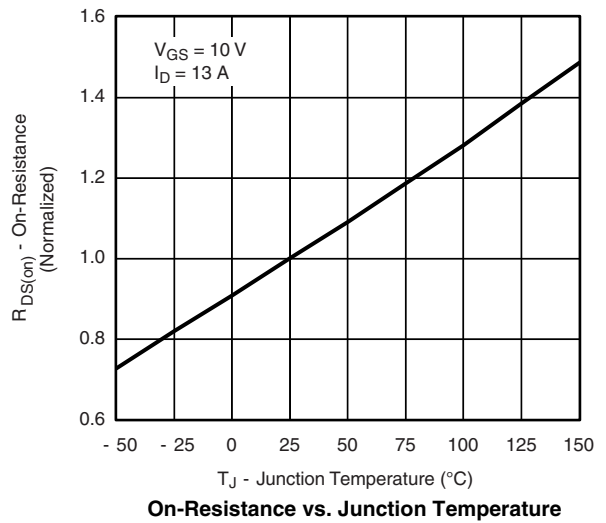
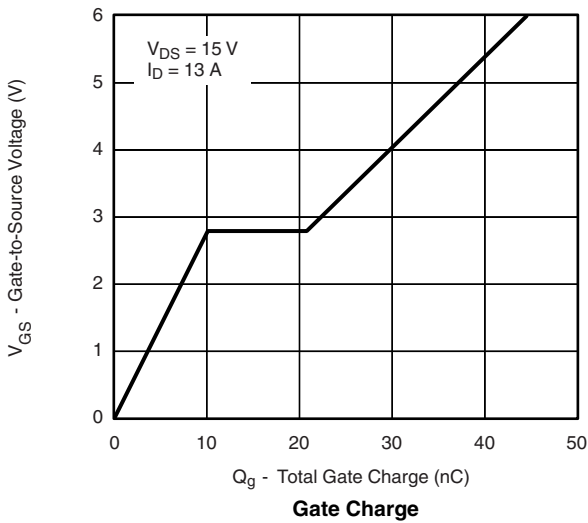
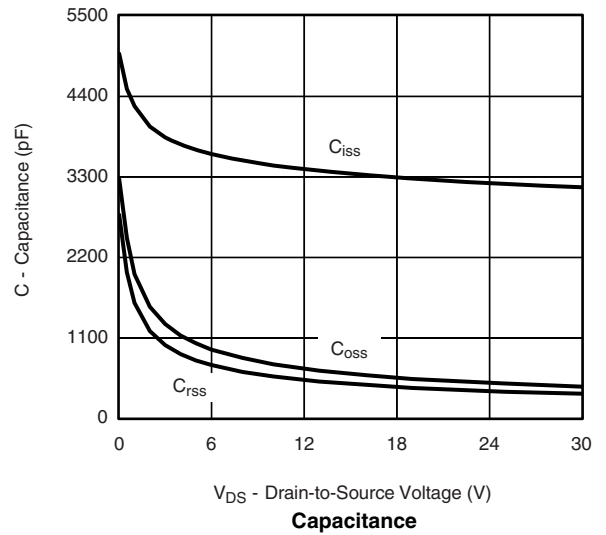
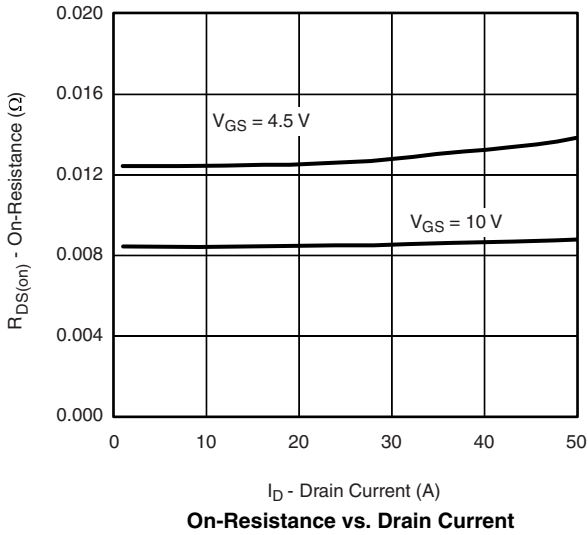
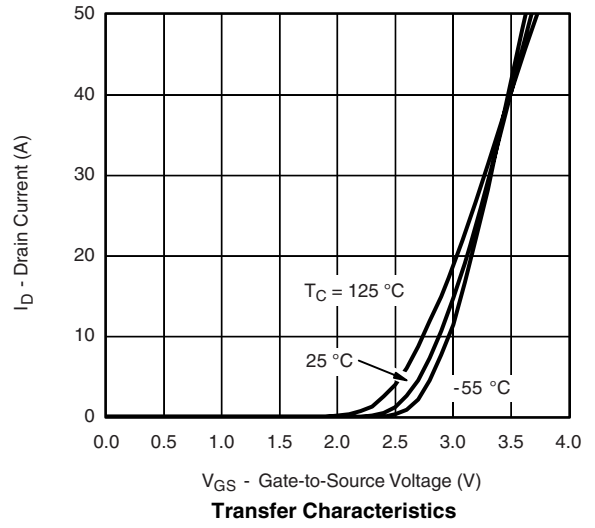
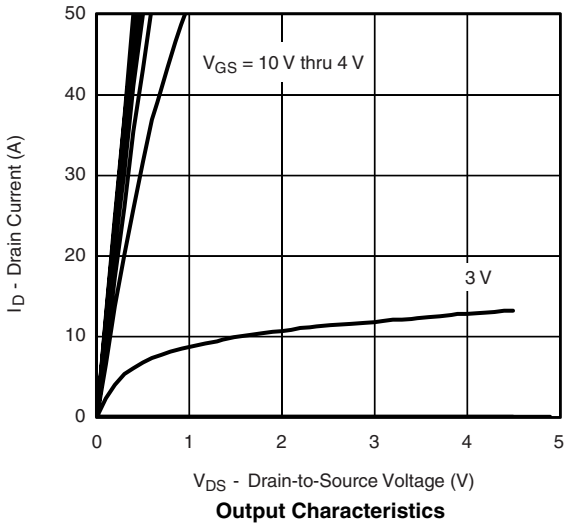
| Symbol | Parameter | Test Condition | Min | Typ | Max | Unit |
|---|---|--|------|--------|------|------|
| ● Static Characteristics | | | | | | |
| B _{VDS} | Drain-Source Breakdown Voltage | V _{GS} = 0V, I _D = -250μA | -30 | - | - | V |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} = V _{DS} , I _D = -250μA | -1.0 | -1.5 | -3.0 | V |
| I _{GSS} | Gate-Body Leakage Current | V _{GS} = ±20V, V _{DS} = 0V | - | - | ±100 | nA |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} = -24V, V _{GS} = 0V | - | - | -1 | μA |
| | | V _{DS} = -24V, V _{GS} = 0V, T _J = 70°C | - | - | -10 | |
| R _{DS(on)} | Drain Source On State Resistance ^a | V _{GS} = -10V, I _D = -13A | - | 10 | 12 | mΩ |
| | | V _{GS} = -4.5V, I _D = -10A | - | 14 | 16 | |
| g _{fs} | Forward Transconductance ^a | V _{DS} = -15V, I _D = -13A | - | 40 | - | S |
| V _{SD} | Diode Forward Voltage ^a | I _S = -2.7A, V _{GS} = 0V | - | -0.74 | -1.1 | V |
| ● Dynamic Characteristics ^b | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} = -15V, V _{GS} = 0V, f = 1MHz | - | 3340.0 | - | pF |
| C _{oss} | Output Capacitance | | - | 577.0 | - | |
| C _{rss} | Reverse Transfer Capacitance | | - | 426.0 | - | |
| Q _g | Total Gate Charge | V _{DS} = -15V, V _{GS} = -5V, I _D = -13A | - | 37.0 | - | nC |
| Q _{gs} | Gate-Source Charge | | - | 10.0 | - | |
| Q _{gd} | Gate-Drain Charge | | - | 11.0 | - | |
| t _{d(on)} | Turn-On Delay Time | V _{DD} = -15V, R _L = 15Ω I _D = -1A, V _{GEN} = -10V, R _G = 6Ω | - | 19.5 | - | nSec |
| t _r | Rise Time | | - | 10.0 | - | |
| T _{d(off)} | Turn-Off Delay Time | | - | 137.5 | - | |
| t _f | Fall Time | | - | 55.3 | - | |
| R _g | Gate Resistance | V _{GS} = 0, V _{DS} = 0, f = 1MHz | - | 3.4 | - | Ω |
| t _{rr} | Source-Drain Reverse Recovery Time | I _F = -2.1A, di/dt = 100A/μs | - | 60 | 100 | nSec |

Note:

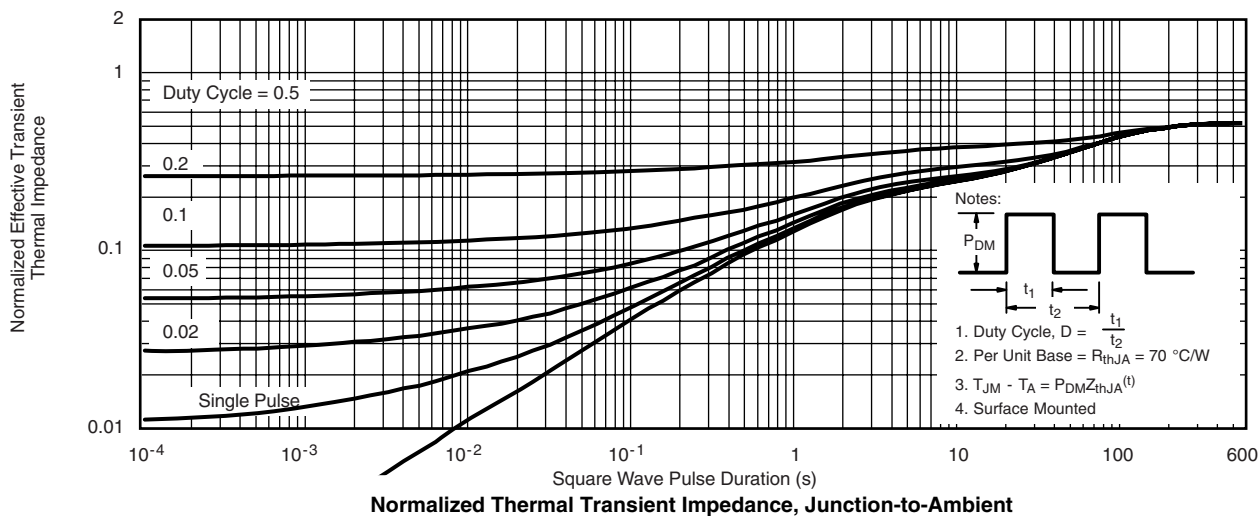
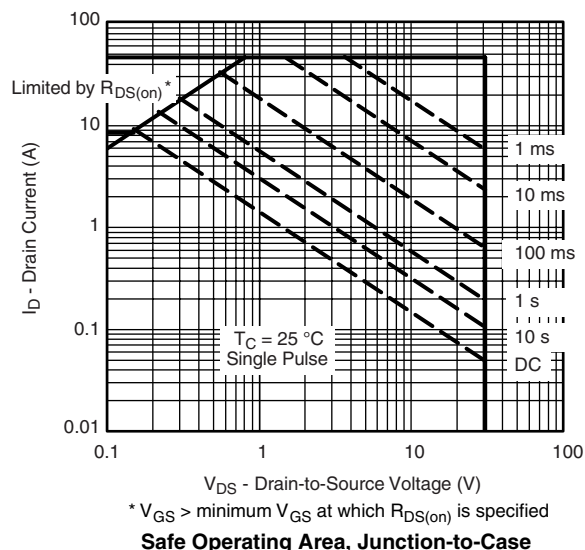
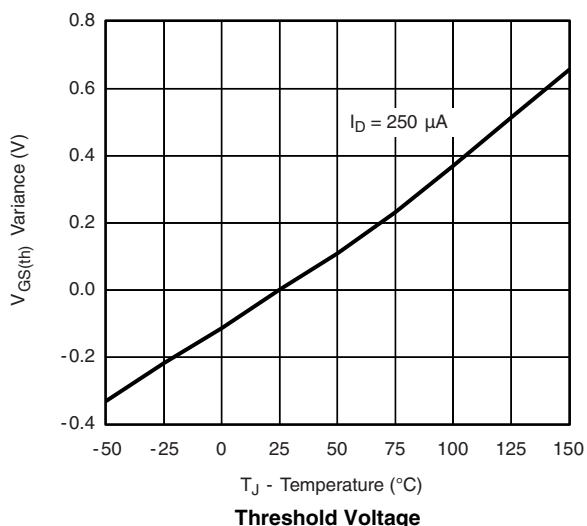
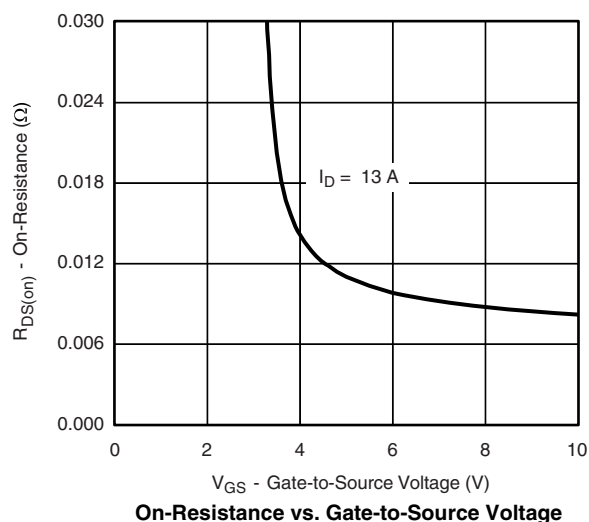
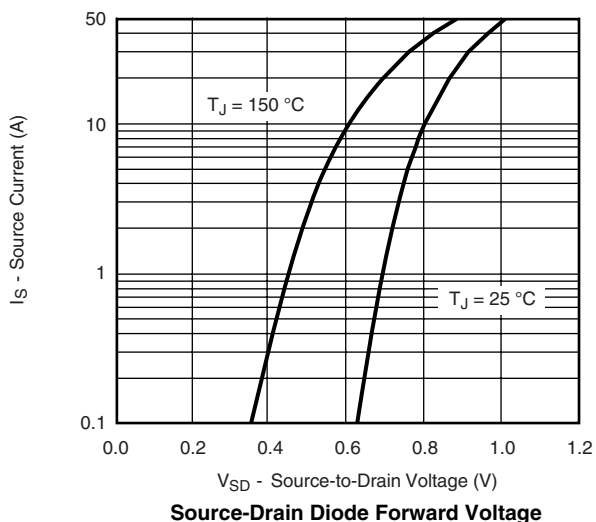
a. Pulse test; pulse width ≤ 300μs, duty cycle ≤ 2%.

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

Characteristics Curve ($T_A=25^\circ\text{C}$, unless otherwise noted)

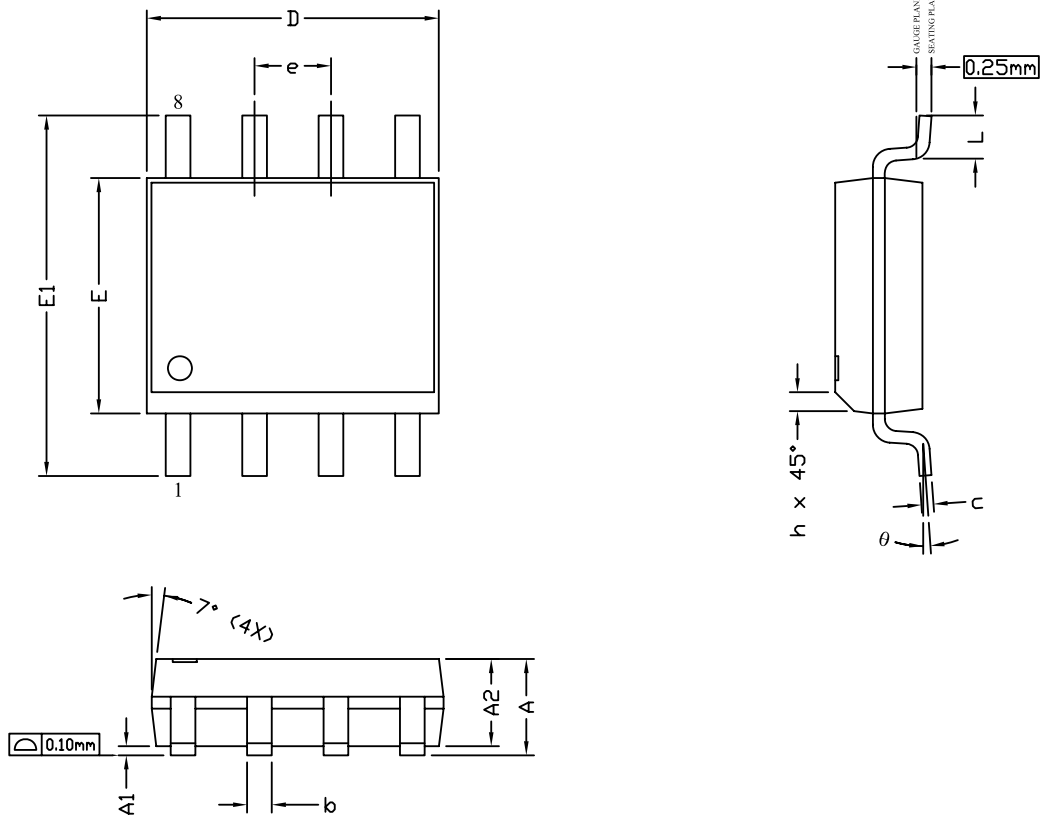


Characteristics Curve ($T_A=25^\circ\text{C}$, unless otherwise noted)

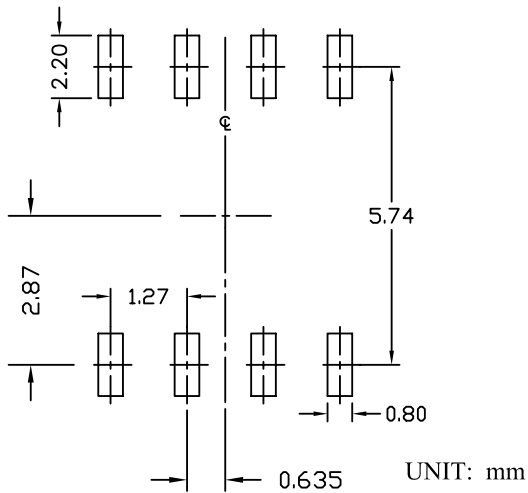


| | |
|--------------|----------|
| Document No. | PO-00004 |
| Version | rev H |

S08 PACKAGE OUTLINE



RECOMMENDED LAND PATTERN



| SYMBOLS | DIMENSIONS IN MILLIMETERS | | | DIMENSIONS IN INCHES | | |
|---------|---------------------------|------|------|----------------------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 1.35 | 1.65 | 1.75 | 0.053 | 0.065 | 0.069 |
| A1 | 0.10 | --- | 0.25 | 0.004 | --- | 0.010 |
| A2 | 1.25 | 1.50 | 1.65 | 0.049 | 0.059 | 0.065 |
| b | 0.31 | --- | 0.51 | 0.012 | --- | 0.020 |
| c | 0.17 | --- | 0.25 | 0.007 | --- | 0.010 |
| D | 4.80 | 4.90 | 5.00 | 0.189 | 0.193 | 0.197 |
| E | 3.80 | 3.90 | 4.00 | 0.150 | 0.154 | 0.157 |
| e | 1.27 BSC | | | 0.050 BSC | | |
| E1 | 5.80 | 6.00 | 6.20 | 0.228 | 0.236 | 0.244 |
| h | 0.25 | --- | 0.50 | 0.010 | --- | 0.020 |
| L | 0.40 | --- | 1.27 | 0.016 | --- | 0.050 |
| theta | 0° | --- | 8° | 0° | --- | 8° |

NOTE

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS ARE INCLUSIVE OF PLATING.
3. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 6 MILS EACH.
4. DIMENSION L IS MEASURED IN GAUGE PLANE.
5. CONTROLLING DIMENSION IS MILLIMETER.
CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.

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