**P-Channel Enhancement Mode MOSFET**

## ◆ DESCRIPTION

The MT3401 is the P-Channel logic enhancement mode power field effect transistor is produced using high cell density, DMOS trench technology.

This high-density process is especially tailored to minimize on-state resistance.

These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other Battery powered circuits, and low in-line power loss are needed in a very small outline surface mount package.

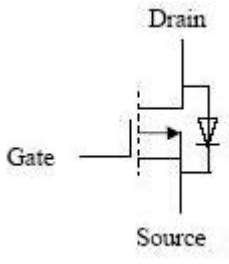
## ◆ FEATURES

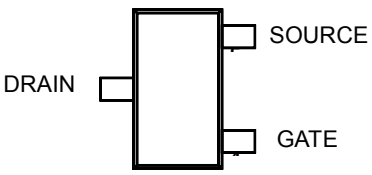
- -30V/-4.0A, $R_{DS(ON)}$ = 58 mΩ @ $V_{GS}$ = -10V
- -30V/-3.2A, $R_{DS(ON)}$ = 65 mΩ @ $V_{GS}$ = -4.5V
- -30V/-1.2A, $R_{DS(ON)}$ = 85 mΩ @ $V_{GS}$ = -2.5V
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- SOT-23-3L package design

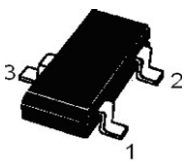
## ◆ APPLICATIONS

- POWER Management in Note
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- DSC

## ◆ PIN CONFIGURATION



## ◆ ABSOLUTE MAXIMUM RATINGS

($T_A$=25℃ Unless Otherwise Noted)

| Parameter | | Symbol | Maximum | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | -30 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±12 | V |
| Continuous Drain Current | $T_A$ = 25 ℃ | $I_D$ | -4.0 | A |
| | $T_A$ = 70 ℃ | | -3.2 | |
| Pulsed Drain Current | | $I_{DM}$ | -15 | A |
| Continuous Source Current (Diode Conduction) | | $I_S$ | -1.0 | A |
| Power Dissipation | $T_A$ = 25 ℃ | $P_D$ | 1.25 | W |
| | $T_A$ = 70 ℃ | | 0.8 | |
| Operating junction temperature range | | $T_J$ | 150 | °C |
| Storage temperature range | | $T_{STG}$ | - 55 to 150 | °C |

## ◆ THERMAL RESISTANCE RATINGS

| Thermal Resistance | Symbol | Maximum | Unit |
|---|---|---|---|
| Junction-to-Ambient | $R_{\theta JA}$ | 120 | °C/W |

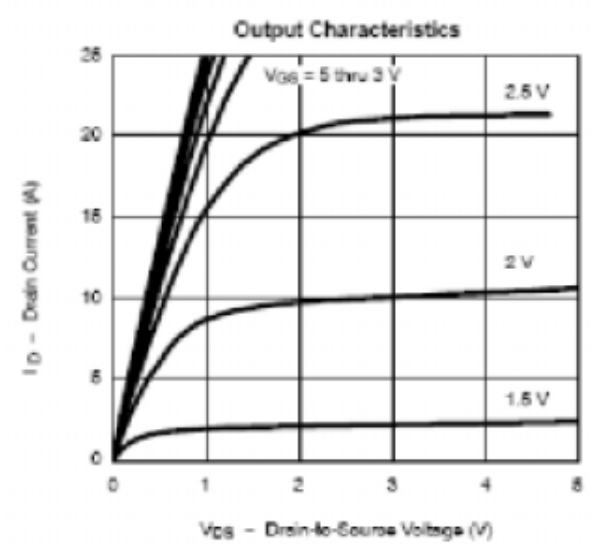
## ◆ ELECTRICAL CHARACTERISTICS

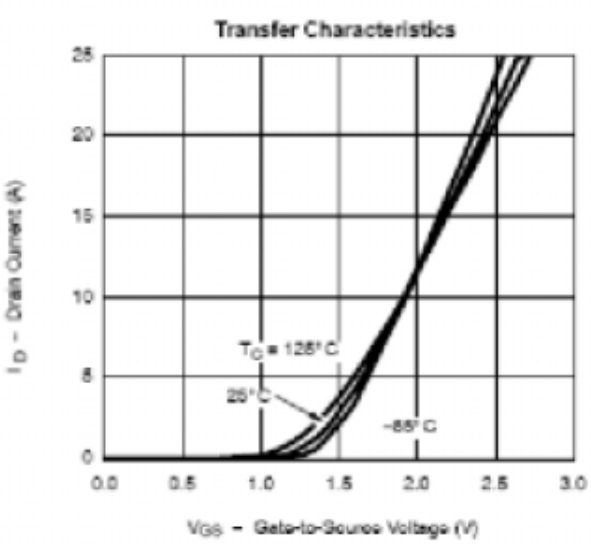
($T_A$=25℃ Unless Otherwise Noted)

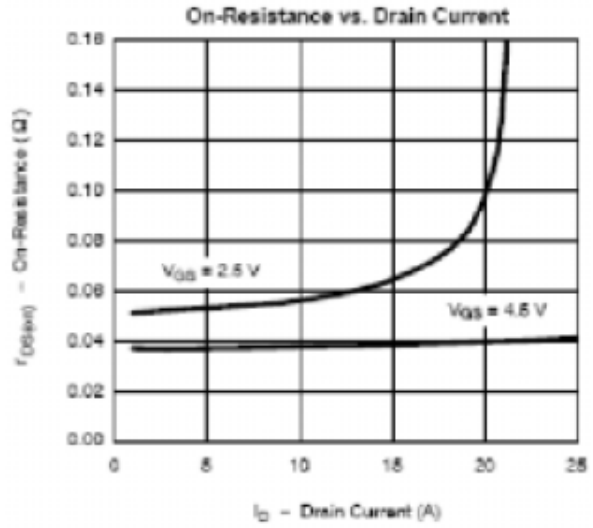
| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Parameters** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = -250μA | -30 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}$ = $V_{DS}$, $I_D$= -250μA | -0.4 | - | -1.2 | V |
| Gate Current | $I_{GSS}$ | $V_{DS}$ = 0V, $V_{GS}$ = ±12V | - | - | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = -24V, $V_{GS}$ = 0V | - | - | -1 | μA |
| | | $V_{DS}$ = -24V, $V_{GS}$ = 0V, $T_J$ = 55 ℃ | - | - | -10 | |
| Forward Trans conductance | $g_{fs}$ | $V_{DS}$ = -5V, $I_D$ = -4.0A | - | 10 | - | S |
| On-State Drain Current | $I_{D(ON)}$ | $V_{DS}$ ≦-5V, $V_{GS}$ = -10V | -10 | - | - | A |
| Drain-Source On Resistance | $R_{DS(ON)}$ | $V_{GS}$ = -10V, $I_D$ = -4.0A | - | 45 | 58 | mΩ |
| | | $V_{GS}$ = -4.5V, $I_D$ = -3.2A | - | 50 | 65 | |
| | | $V_{GS}$ = -2.5V, $I_D$ = -1.2A | - | 60 | 85 | |
| Diode Forward Voltage | $V_{SD}$ | $I_S$ = -1.0A, $V_{GS}$ = 0V | - | -0.8 | -1.2 | V |
| **Dynamic Parameters** | | | | | | |
| Input Cap. | $C_{iss}$ | $V_{DS}$ = -15V, $V_{GS}$ = 0V, F = 1MHz | - | 540 | | pF |
| Output Cap. | $C_{oss}$ | | - | 131 | | |
| Reverse Transfer Cap. | $C_{rss}$ | | - | 105 | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = -15V, $V_{GS}$ = -10V $I_D$ = -4.0A | - | 14 | 21 | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 1.9 | | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 3.7 | | |
| Turn-On Time | $T_{D(ON)}$ | $V_{DS}$ = -15V, $R_L$ = 15Ω, $I_D$ = -1A, $V_{GEN}$ = -10V, $R_G$ = 6Ω | - | 10 | 15 | nS |
| | $t_r$ | | - | 15 | 25 | |
| Turn-Off Time | $T_{D(OFF)}$ | | - | 31 | 50 | |
| | $T_f$ | | - | 20 | 30 | |

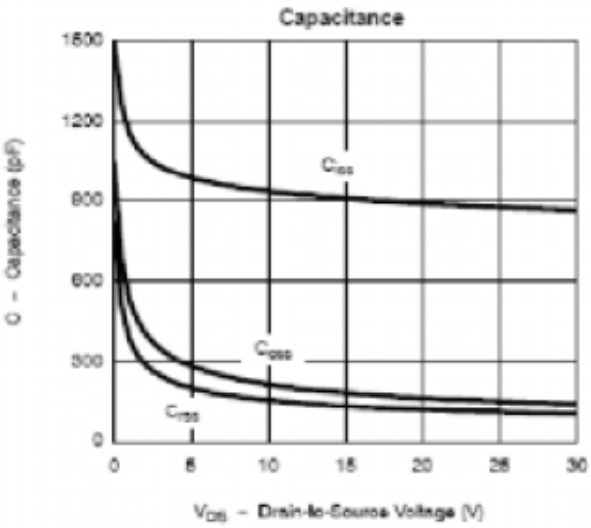
## ◆ TYPICAL CHARACTERICTICS

(25℃ Unless Noted)



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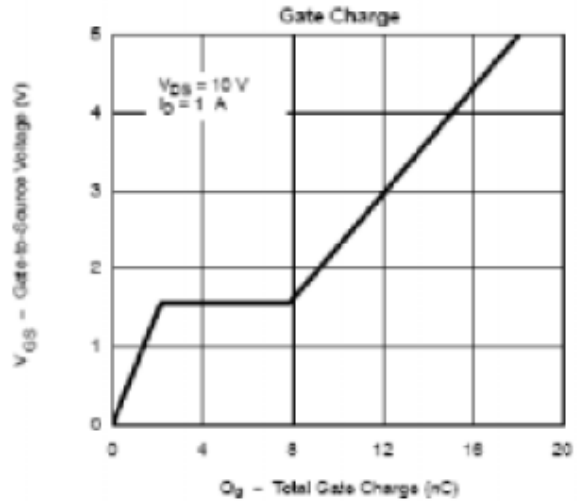


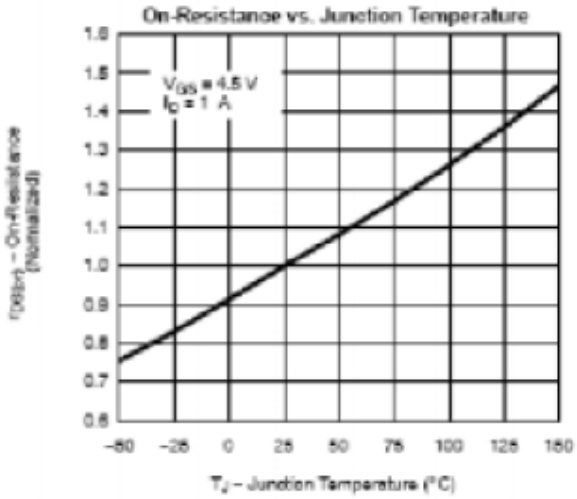


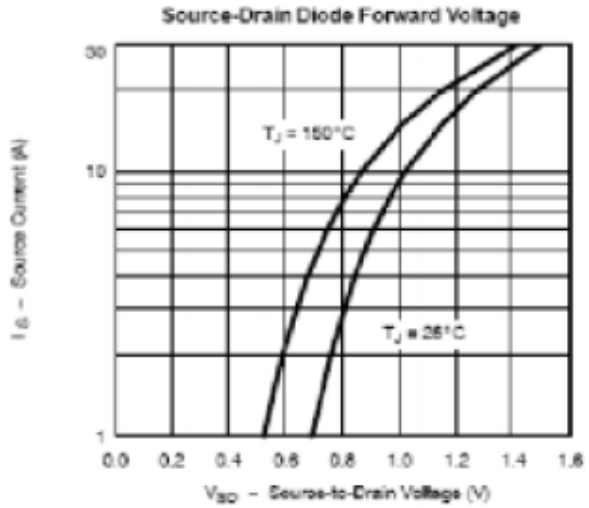


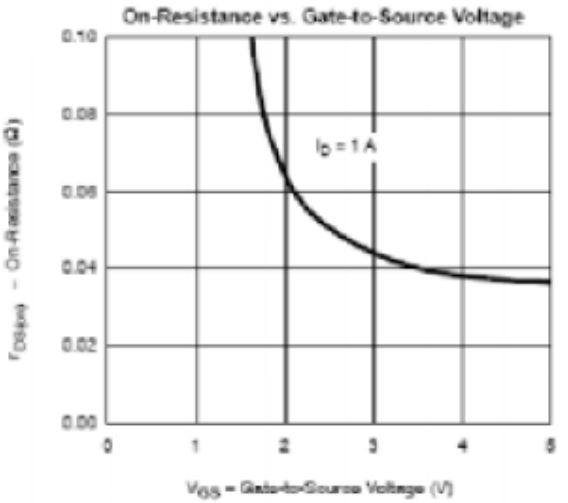

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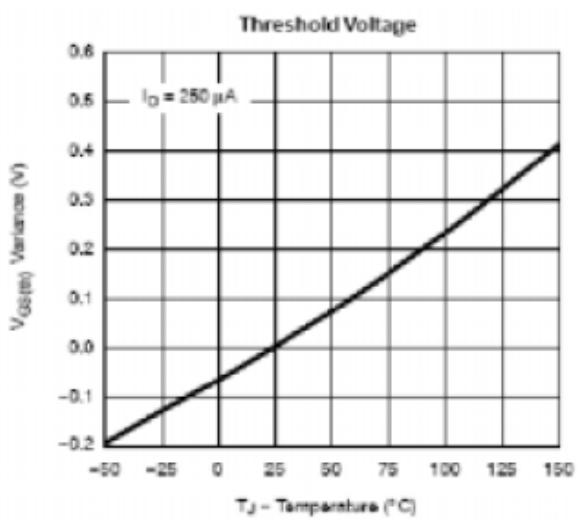
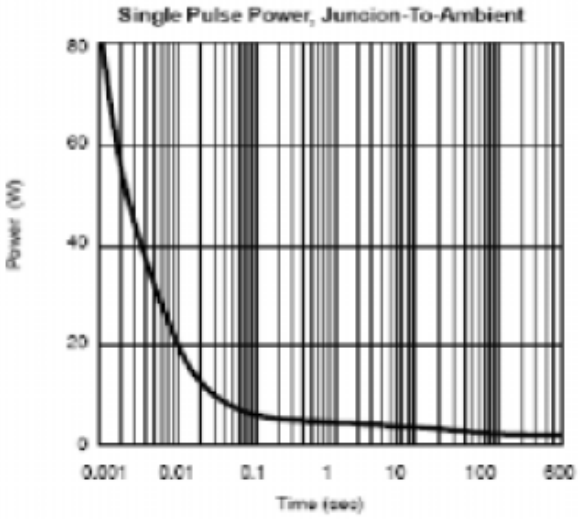
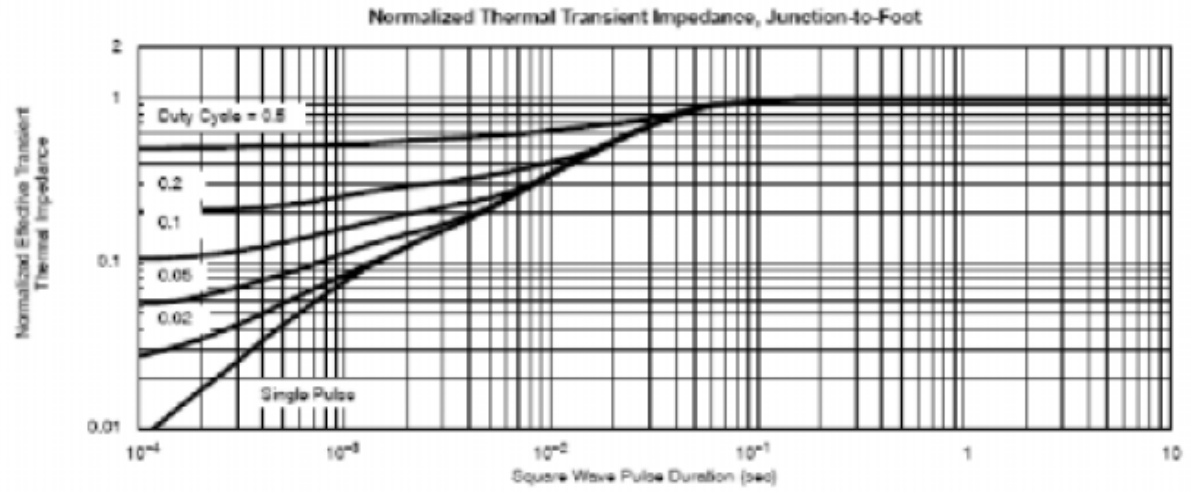
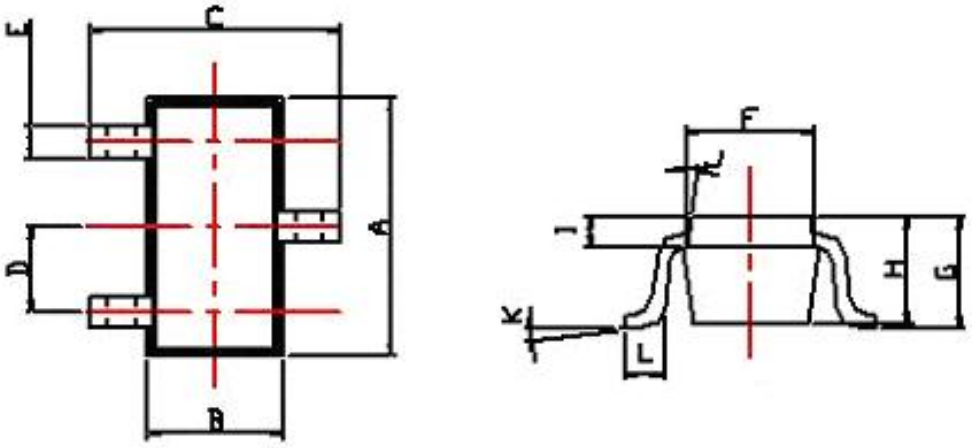


## ◆ PHYSICAL DIMENSIONS:

**3-Pin surface Mount SOT-23(S)**




| REF. | Millimeter | | REF. | Millimeter | |
|---|---|---|---|---|---|
| | Min. | Max. | | Min. | Max. |
| A | 2.70 | 3.10 | G | 0.9 | 1.4 |
| B | 1.20 | 1.66 | H | 0.8 | 1.30 |
| C | 2.37 | 2.90 | I | 0.25 | 0.7 |
| D | 0.85 | 1.15 | J | 7 ± 2°. | |
| E | 0.350 + 0.15/-0.05 | | K | 0 ~ 10°. | |
| F | 1.07 | 1.53 | L | 0.2 (MIN) | |