## DESCRIPTION

AM3400A is the N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced trench technology devices are well suited for high efficiency fast switching applications, low in-line power loss are needed in small outline surface mount package.

The AM3400A is available in SOT-23 package.

## ORDERING INFORMATION

| Package Type | Part Number | |
|---|---|---|
| SOT-23<br>SPQ: 3,000pcs/Reel | E3 | AM3400AE3R |
| | | AM3400AE3VR |
| Note | V: Halogen free Package<br>R: Tape & Reel | |
| AiT provides all RoHS products | | |

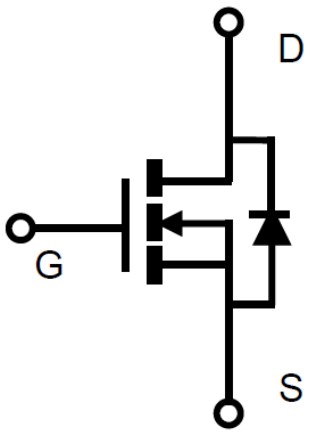
## FEATURES

- $V_{DS}$ = 30V, $I_D$ = 6.2A
  $R_{DS(ON)}$ =20mΩ(Typ.)@$V_{GS}$ = 10V
  $R_{DS(ON)}$ =23mΩ(Typ.)@$V_{GS}$ = 4.5V
  $R_{DS(ON)}$ =27mΩ(Typ.)@$V_{GS}$ = 2.5V
- Fast switch
- Low gate drive applications
- High power and current handling capability
- Available in SOT-23 Package

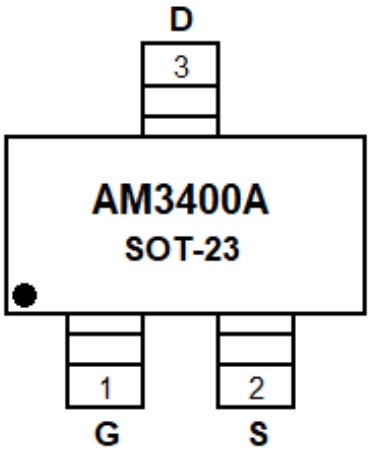
## APPLICATIONS

- Hand-Held Instruments
- Load Switch
- PWM Applications

## TYPICAL APPLICATION



## PIN DESCRIPTION




Top View

| Pin # | Symbol | Function |
|---|---|---|
| 1 | G | Gate |
| 2 | S | Source |
| 3 | D | Drain |

## ABSOLUTE MAXIMUM RATINGS

$T_A$ = 25°C, unless otherwise noted

| | | |
|---|---|---|
| $V_{DSS}$, Drain-Source Voltage | | 30V |
| $V_{GSS}$, Gate-Source Voltage | | ±12V |
| $I_D$, Continuous Drain Current ($V_{GS}$=10V) | $T_A$ = 25°C | 6.2A |
| | $T_A$= 70°C | 5 A |
| $I_{DM}$, Pulsed Drain Current[NOTE1] | | 24.8A |
| $P_D$, Power Dissipation[NOTE2] | $T_A$ = 25°C | 1.5W |
| | $T_A$= 70°C | 0.9W |
| $T_J$, Operation Junction Temperature | | −55°C ~150°C |
| $T_{STG}$, Storage Temperature Range | | −55°C ~150°C |

Stress beyond above listed “Absolute Maximum Ratings” may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## THERMAL RESISTANCE

| Parameter | | Symbol | Max | Unit |
|---|---|---|---|---|
| Thermal Resistance Junction to Ambient[NOTE3] | t≦10s | $R_{\theta JA}$ | 85 | °C/W |
| | Steady-State | | 120 | °C/W |

## ELECTRICAL CHARACTERISTICS

$T_A$ = 25°C, unless otherwise noted

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Static Parameters** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V, $I_D$=250μA | 30 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=250μA | 0.4 | 0.7 | 1.0 | V |
| Gate Leakage Current | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$=±12V | - | - | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=30V, $V_{GS}$=0V<br>$T_J$=25°C | - | - | 1 | μA |
| | | $V_{DS}$=24V,$V_{GS}$=0V<br>$T_J$=75°C | - | - | 10 | |
| Drain-source On-Resistance[NOTE4] | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=6.2A | - | 20 | 24 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=5A | - | 23 | 26 | |
| | | $V_{GS}$=2.5V, $I_D$=3.6A | - | 27 | 32 | |
| Forward Transconductance | $G_{fs}$ | $V_{DS}$=10V, $I_D$=3A | - | 7 | - | S |
| **Source-Drain Diode** | | | | | | |
| Diode Forward Voltage[NOTE2] | $V_{SD}$ | $I_S$=1A,$V_{GS}$=0V | - | 0.7 | 1.0 | V |
| Continuous Source Current | $I_S$ | | - | - | 2.1 | A |
| **Dynamic Parameters** | | | | | | |
| Total Gate Charge | $Q_g$(10V) | $V_{DS}$=15V, $V_{GS}$=10V, $I_D$=5A | - | 17 | 23 | nC |
| Total Gate Charge | $Q_g$(4.5V) | | - | 8.7 | 11.7 | |
| Gate-Source Charge | $Q_{gs}$ | | - | 1.2 | 1.6 | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 2 | 2.7 | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=15V, $V_{GS}$=0V, f=1MHz | - | 670 | 938 | pF |
| Output Capacitance | $C_{oss}$ | | - | 54 | 76 | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 45 | 63 | |
| Turn-On Time[NOTE5] | $t_{d(on)}$ | $V_{DD}$=15V, $V_{GEN}$=10V, $R_G$=3Ω, $I_D$=1A, | - | 4.2 | - | ns |
| | $t_r$ | | - | 14 | - | |
| Turn-Off Time[NOTE5] | $t_{d(off)}$ | | - | 22 | - | |
| | $t_f$ | | - | 6.6 | - | |

NOTE1: The value of $R_{\theta JA}$ is measured with the device in a still air environment with maximum junction temperature $T_{J(MAX)}$= 150°C (initial temperature $T_A$=25°C).

NOTE2: The $T_{J(MAX)}$=150°C, using junction-to-ambient thermal resistance.

NOTE3: Surface−mounted on FR-4 board using 1 sq−in pad, 2 oz Cu, in a still air environment with $T_A$=25°C.

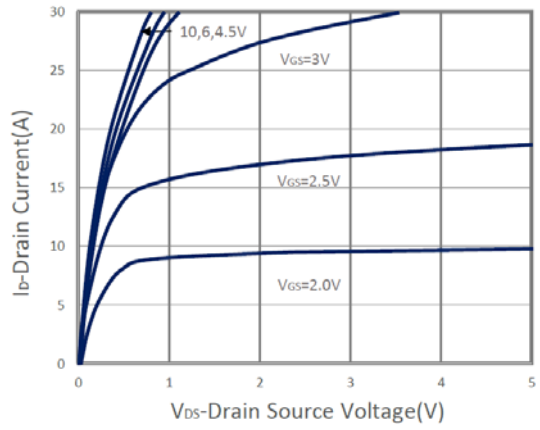
NOTE4: The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

NOTE5: Pulsed width limited by maximum junction temperature.

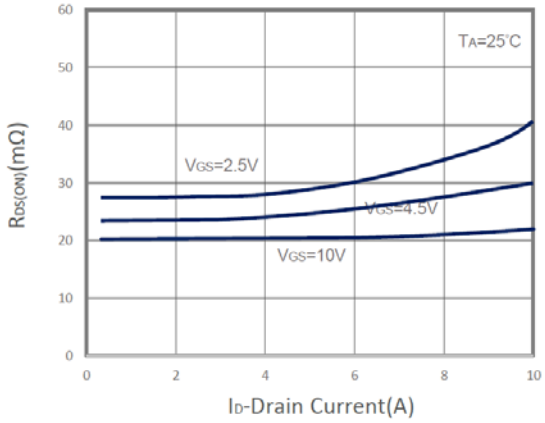
## TYPICAL ELECTRICAL CHARACTERISTICS

25℃, Unless Note

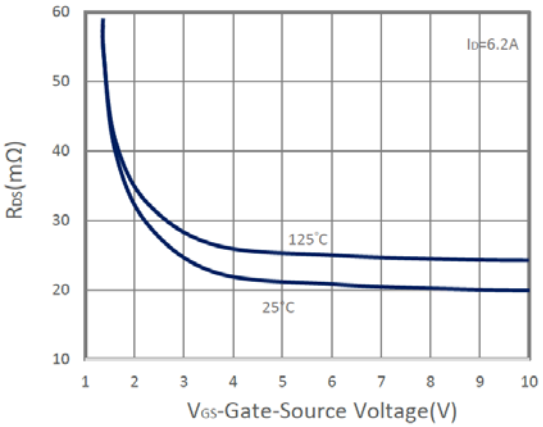
1. Output Characteristics



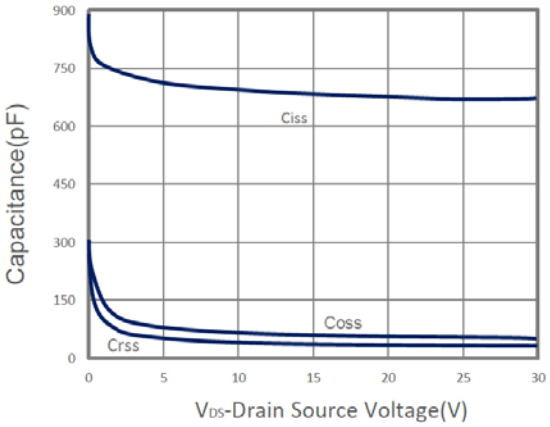

2. Drain-Source On Resistance



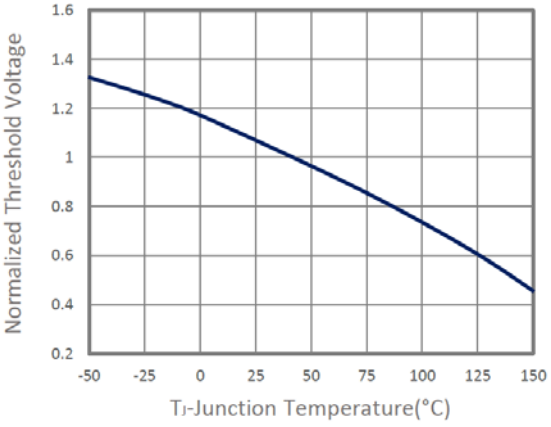

3. Gate-Source vs. On Resistance



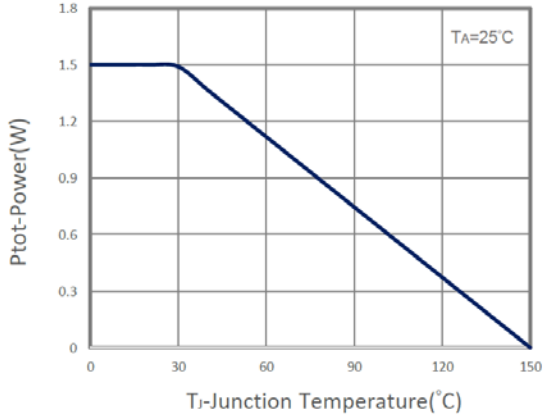

4. Capacitance



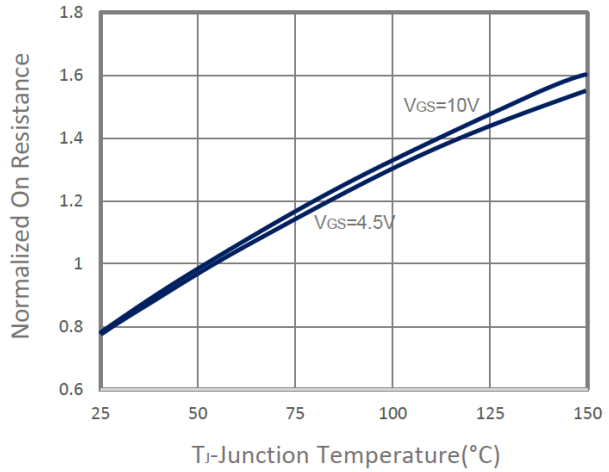

5. Gate Threshold Voltage



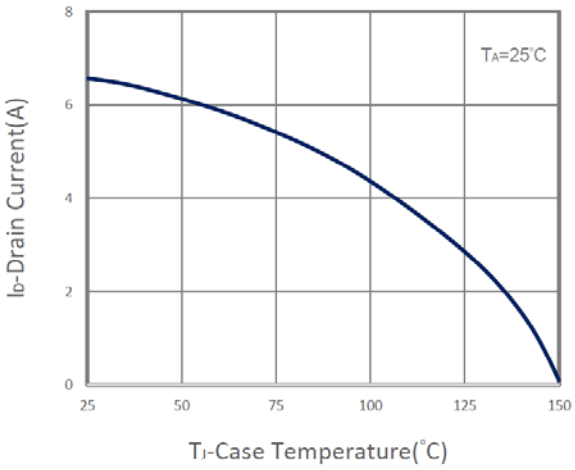

6. Power Dissipation



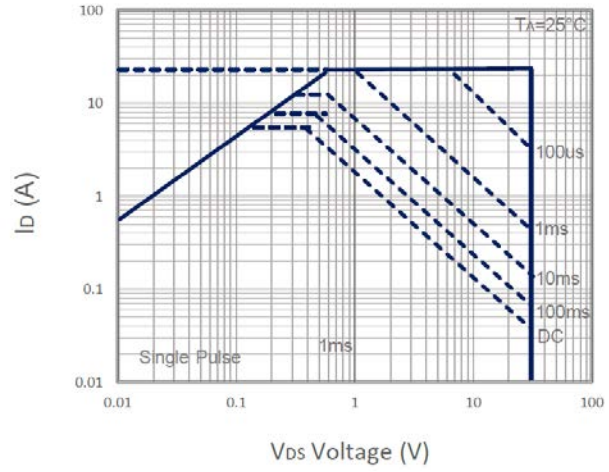
7. $R_{DS(ON)}$ vs. Junction Temperature



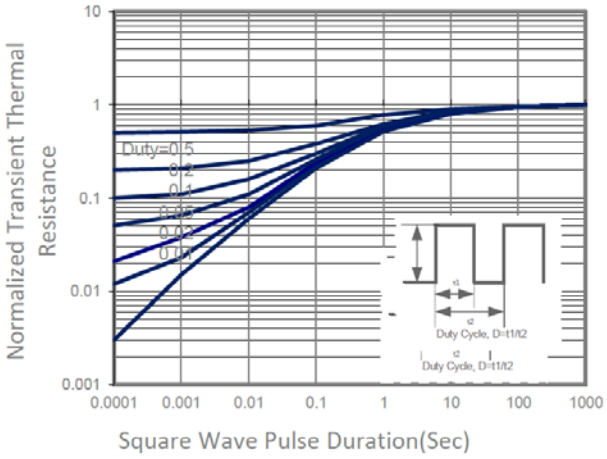

8. Drain Current vs. $T_J$



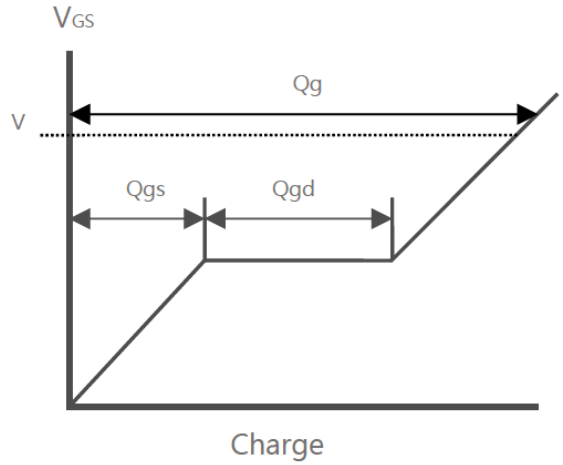

9. Maximum Safe Operation Area



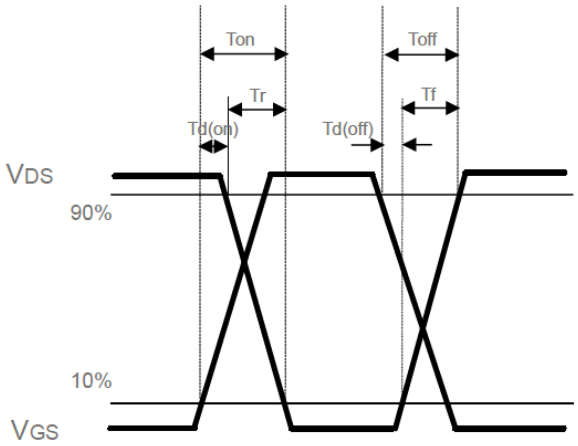

10. Thermal Transient Impedance




11. Gate Chrge Waveform

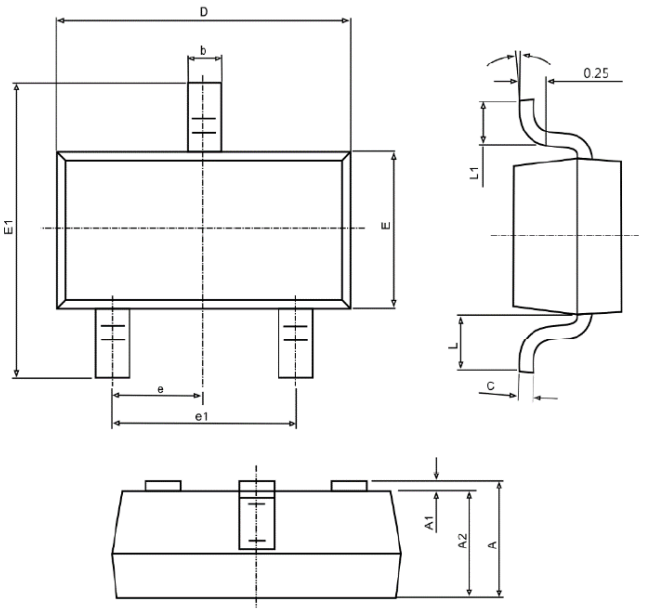



12. Switching Time Waveform

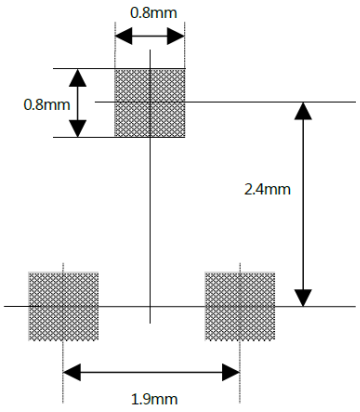


## PACKAGE INFORMATION

Dimension in SOT-23 Package (Unit: mm)




Recommended Minimum Pad(mm)




| Symbol | Millimeters | | Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 1.000 | 1.300 | 0.039 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.000 | 1.200 | 0.039 | 0.047 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.047 | 0.207 | 0.002 | 0.008 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 2.600 | 3.000 | 0.102 | 0.118 |
| e | 0.950 TYP | | 0.037 TYP | |
| e1 | 1.900 TYP | | 0.075 TYP | |
| L1 | 0.250 | 0.550 | 0.010 | 0.022 |
| θ | 0° | 8° | 0° | 8° |

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