# AT7400

## 30V N-Channel MOSFET

## Features

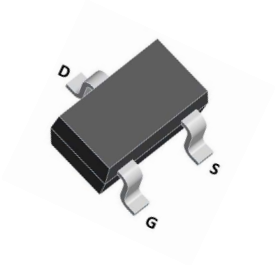
- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

## Product Summary

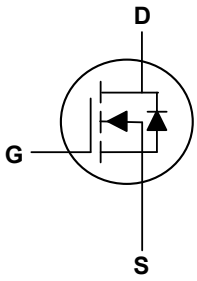
| | | |
|---|---|---|
| $V_{DS}$ | 30 | V |
| $I_D$ | 1.7 | A |
| $R_{DS(ON)}$ (at $V_{GS}$=10V) | 55 | mΩ |
| $R_{DS(ON)}$ (at $V_{GS}$=4.5V) | 65 | mΩ |

## Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Networking DC-DC Power System
- Power Tool Application




SOT-323 Top View




## Absolute Maximum Ratings($T_A$=25℃, unless otherwise noted)

| Parameter | Symbol | Rating | Units |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 30 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Continuous Drain Current[1] | $I_D$@$T_C$=25℃ | 1.7 | A |
| Continuous Drain Current[1] | $I_D$@$T_C$=70℃ | 1.3 | A |
| Pulsed Drain Current[2] | $I_{DM}$ | 15 | A |
| Total Power Dissipation[4] | $P_D$ | 0.35 | W |
| Storage Temperature Range | $T_{STG}$ | -55 to 150 | ℃ |
| Operating Junction Temperature Range | $T_J$ | -55 to 150 | ℃ |

## Thermal Characteristics

| Parameter | Symbol | Typ | Max | Unit |
|---|---|---|---|---|
| Thermal Resistance Junction-Ambient[1] | $R_{\theta JA}$ | --- | 425 | ℃/W |

## Electrical Characteristics ($T_J$=25℃, unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V , $I_D$=250uA | 30 | --- | --- | V |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}$=10V , $I_D$=1.7A | --- | 45 | 55 | mΩ |
| | | $V_{GS}$=4.5V , $I_D$=1.5A | --- | 50 | 65 | mΩ |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 0.5 | --- | 1.5 | V |
| Drain-Source Leakage Current | $I_{DSS}$ | $V_{DS}$=30V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±12V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| Forward Transconductance | $R_{fs}$ | $V_{DS}$=5V ,$I_D$=1.7A | --- | 14 | --- | S |
| Total Gate Charge | $Q_g$ | $V_{DS}$=15V , $V_{GS}$=10V , $I_D$=1.7A | --- | 12 | --- | nC |
| Gate-Source Charge | $Q_{gs}$ | | --- | 0.8 | --- | |
| Gate-Drain Charge | $Q_{gd}$ | | --- | 1.4 | --- | |
| Turn-On Delay Time | $T_{d(on)}$ | $V_{DS}$=15V , $V_{GS}$=10V , $R_G$=3Ω | --- | 4 | --- | ns |
| Rise Time | $T_r$ | | --- | 2 | --- | |
| Turn-Off Delay Time | $T_{d(off)}$ | | --- | 18 | --- | |
| Fall Time | $T_f$ | | --- | 3 | --- | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=15V , $V_{GS}$=0V , f=1MHz | --- | 244 | --- | pF |
| Output Capacitance | $C_{oss}$ | | --- | 35 | --- | |
| Reverse Transfer Capacitance | $C_{rss}$ | | --- | 16 | --- | |

## Drain-Source Diode Characteristics

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Diode Forward Voltage[2] | $V_{SD}$ | $V_{GS}$=0V , $I_S$=1A , $T_J$=25℃ | --- | --- | 1.1 | V |

**Note:**

1.Repetitive Rating: Pulse width limited by maximum junction temperature.

2.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

3.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

## Typical Characteristics

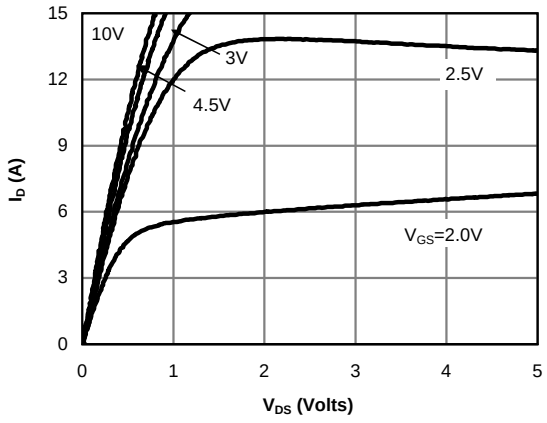



Fig 1: On-Region Characteristics (Note E)

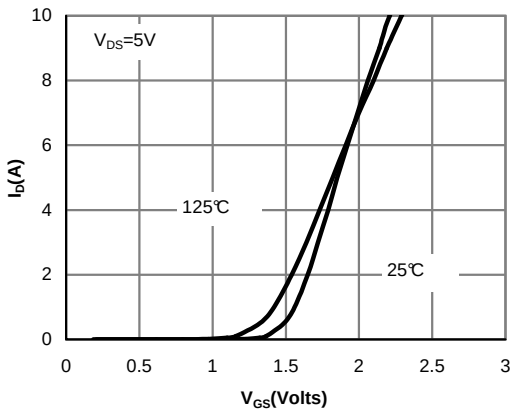



Figure 2: Transfer Characteristics (Note E)

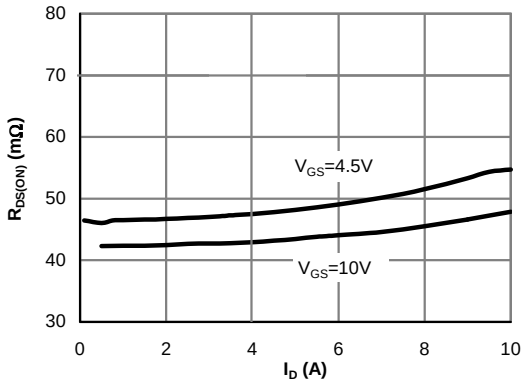



Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

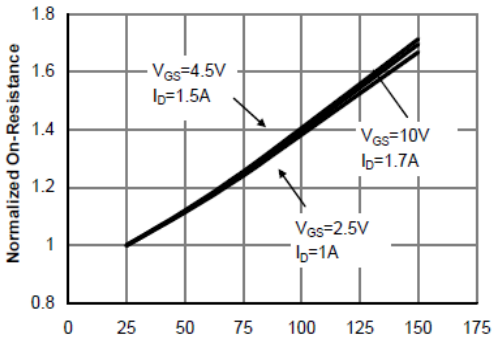



Figure 4: On-Resistance vs. Junction Temperature (Note E)

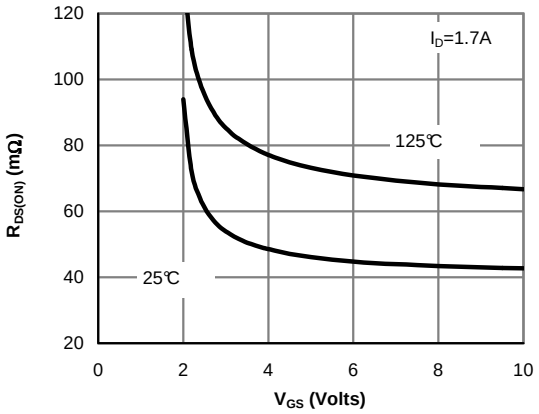



Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

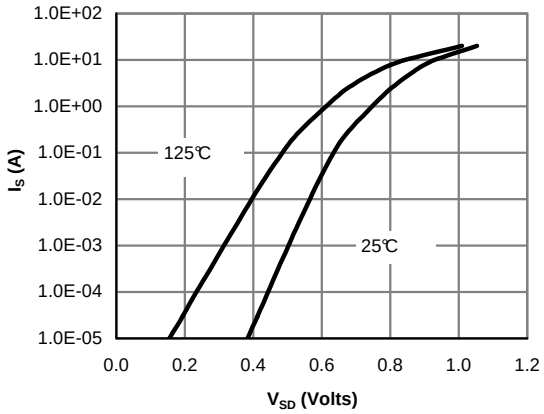



Figure 6: Body-Diode Characteristics (Note E)

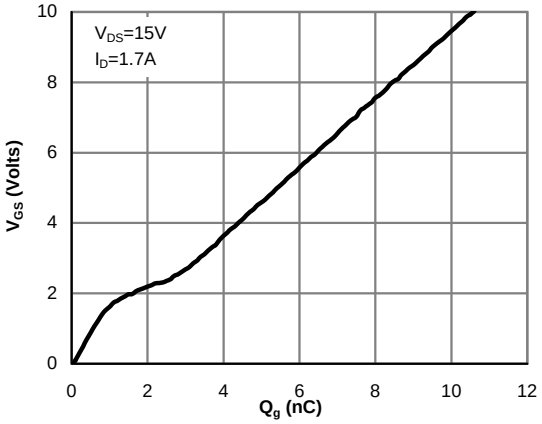



Figure 7: Gate-Charge Characteristics

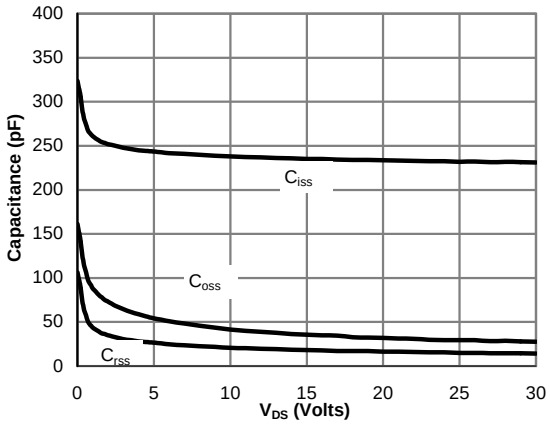



Figure 8: Capacitance Characteristics

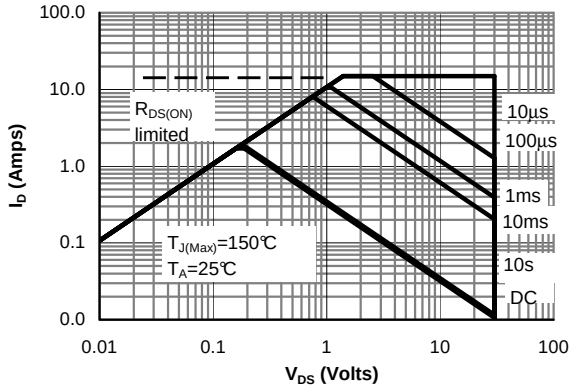



Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

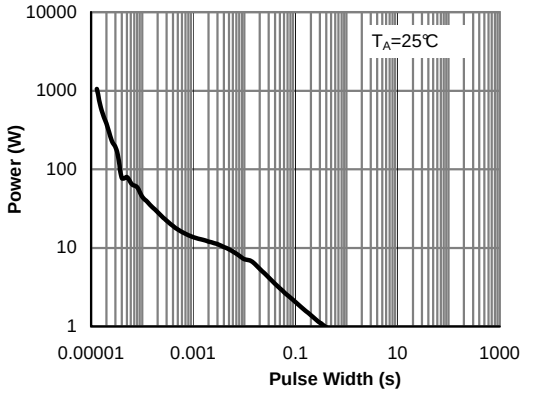



Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

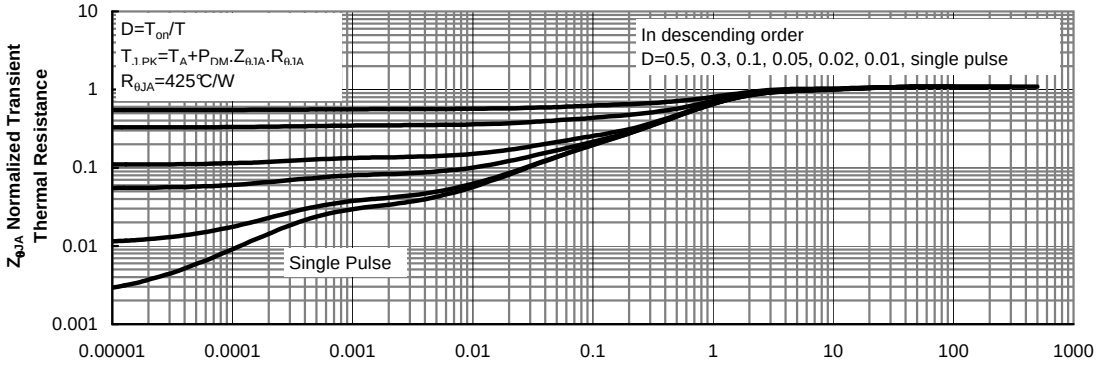
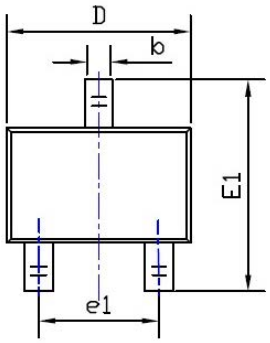
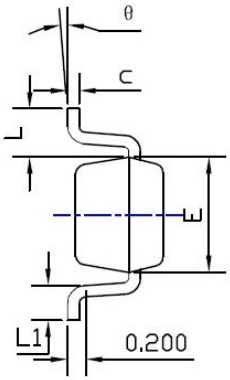



Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

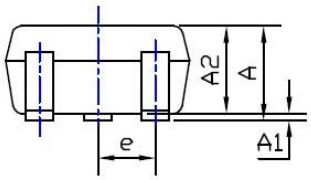
## SOT-323 Package Outline Dimensions



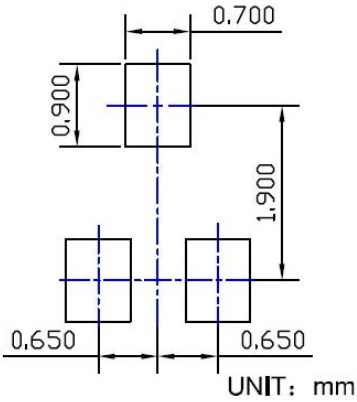

TOP VIEW




SIDE VIEW




SIDE VIEW




| Symbol | Dimensions (unit:mm) | | | Symbol | Dimensions (unit:mm) | | |
|---|---|---|---|---|---|---|---|
| | Min | Typ | Max | | Min | Typ | Max |
| A | 0.90 | 1.00 | 1.10 | $E_1$ | 2.15 | 2.30 | 2.45 |
| $A_1$ | -- | -- | 0.10 | e | -- | 0.65 | -- |
| $A_2$ | 0.90 | 0.95 | 1.00 | $e_1$ | 1.20 | 1.30 | 1.40 |
| b | 0.15 | 0.30 | 0.40 | L | -- | 0.525 | -- |
| c | 0.10 | 0.17 | 0.25 | $L_1$ | 0.26 | 0.36 | 0.46 |
| D | 1.80 | 2.00 | 2.20 | θ | 0° | | 8° |
| E | 1.15 | 1.25 | 1.35 | | | | |