



ZHEJIANG UNIÜ-NE Technology CO., LTD

浙江宇力微新能源科技有限公司



AP50N100K Data Sheet

V 1 . 1

版权归浙江宇力微新能源科技有限公司

Product Summary

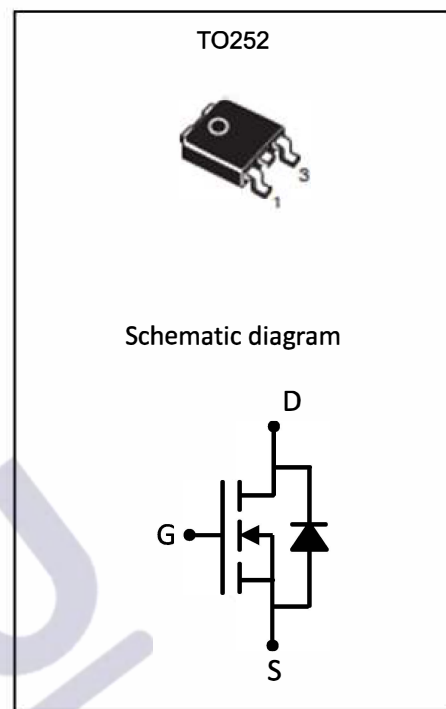
| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | I_D |
|---------------|-----------------|-------|
| 100V | 13mΩ@10V | 50A |
| | 20mΩ@4.5V | |

Feature

- Trench DMOS Power MOSFET
- Fast Switching
- Exceptional on-resistance and maximum DC current capability

Application

- DC/DC Converter
- Load Switch for Portable Devices
- Battery Switch



Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|-----------|----------------|-----------|------------|----------|
| AP50N100K | AP50N100K | TO-252-3L | | - | - |

ABSOLUTE MAXIMUM RATINGS ($T_a=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|-----------------|-----------|--------------------|
| Drain-Source Voltage | V_{DS} | 100 | V |
| Gate-Source Voltage | V_{GS} | +20/-12 | V |
| Continuous Drain Current | I_D | 50 | A |
| Pulsed Drain Current | I_{DM} | 210 | A |
| Single pulse avalanche energy | EAS | 115 | mJ |
| Power Dissipation | P_D | 30 | W |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$ | 3 | $^\circ\text{C/W}$ |
| Junction Temperature | T_J | 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{STG} | -55~ +150 | $^\circ\text{C}$ |

MOSFET ELECTRICAL CHARACTERISTICS($T_a=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Test Condition | Min | Type | Max | Unit |
|--|---------------|--|-----|------|-----------|------------|
| Static Characteristics | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = -250\mu A$ | 100 | | | V |
| Zero gate voltage drain current | I_{DSS} | $V_{DS} = 100V, V_{GS} = 0V$ | | | 1 | μA |
| Gate-body leakage current | I_{GSS} | $V_{GS} = +20V/-12V, V_{DS} = 0V$ | | | ± 100 | nA |
| Gate threshold voltage ⁽¹⁾ | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 1 | 1.5 | 2.5 | V |
| Drain-source on-resistance ⁽¹⁾ | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 25A$ | | 11 | 13 | m Ω |
| | | $V_{GS} = 4.5V, I_D = 20A$ | | 17 | 20 | |
| Forward transconductance ⁽¹⁾ | g_{FS} | $V_{DS} = 10V, I_D = 10A$ | | 10 | | S |
| Dynamic characteristics⁽²⁾ | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS} = 50V, V_{GS} = 0V, f = 1MHz$ | | 1640 | | pF |
| Output Capacitance | C_{oss} | | | 240 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 4 | | |
| Switching characteristics⁽²⁾ | | | | | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD} = 50V, I_D = 1A, R_L = 6\Omega$ $V_{GS} = 10V, R_G = 1\Omega$ | | 14.2 | | ns |
| Turn-on rise time | t_r | | | 20.8 | | |
| Turn-off delay time | $t_{d(off)}$ | | | 42 | | |
| Turn-off fall time | t_f | | | 30 | | |
| Total Gate Charge | Q_g | $V_{DS} = 50V, I_D = 10A,$ $V_{GS} = 10V$ | | 27.8 | | nC |
| Gate-Source Charge | Q_{gs} | | | 3.5 | | |
| Gate-Drain Charge | Q_{gd} | | | 8.8 | | |
| Source-Drain Diode characteristics | | | | | | |
| Diode Forward voltage ⁽¹⁾ | V_{DS} | $V_{GS} = 0V, I_S = 1A$ | | | 1 | V |

Notes:

1. Pulse test; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
2. Guaranteed by design, not subject to production testing.

Typical Electrical and Thermal Characteristics

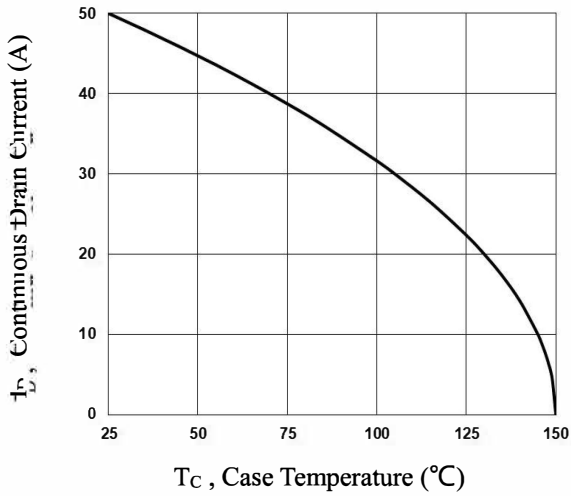


Fig.1 Continuous Drain Current vs. T_C

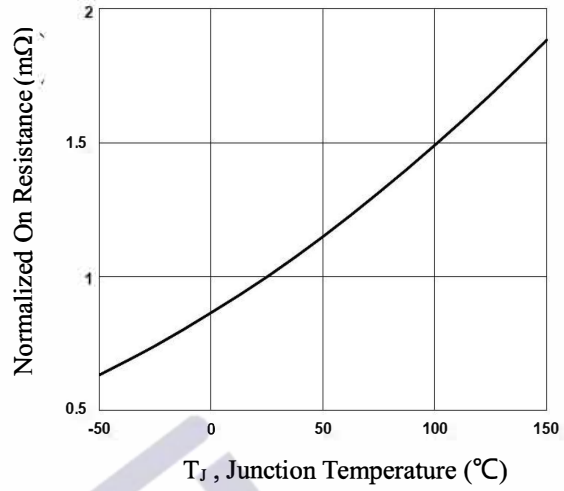


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

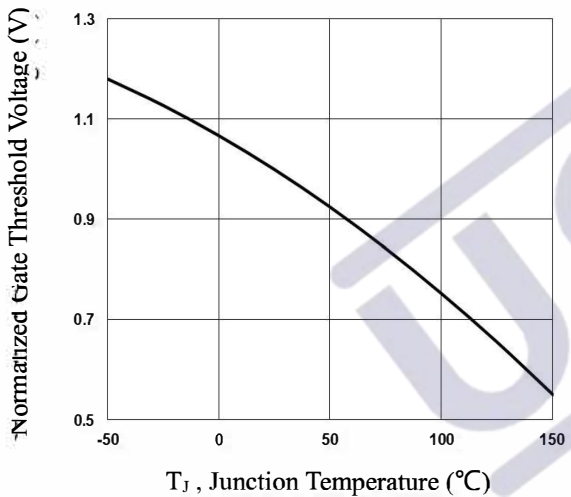


Fig.3 Normalized V_{th} vs. T_J

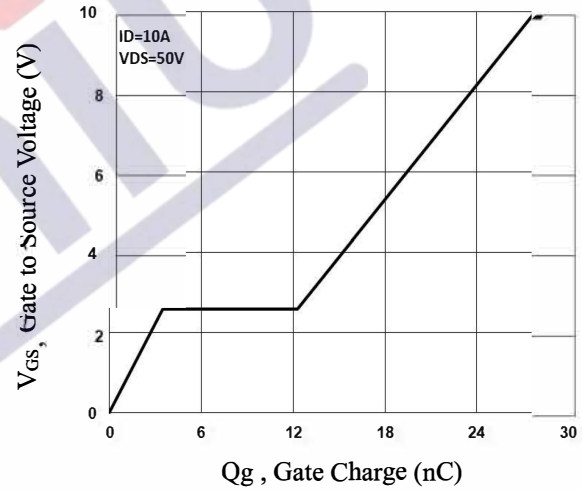


Fig.4 Gate Charge Characteristics

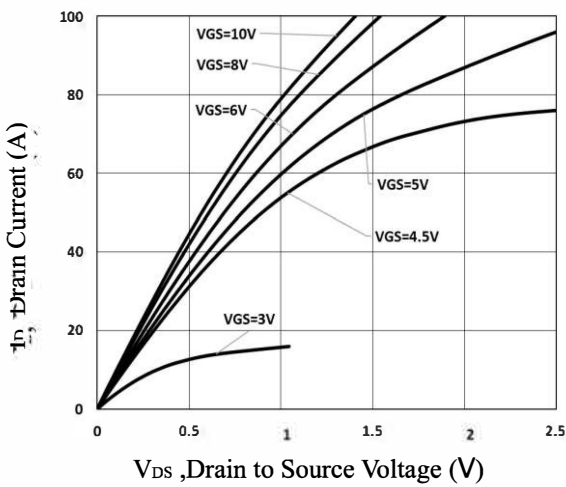


Fig.5 Typical Output Characteristics

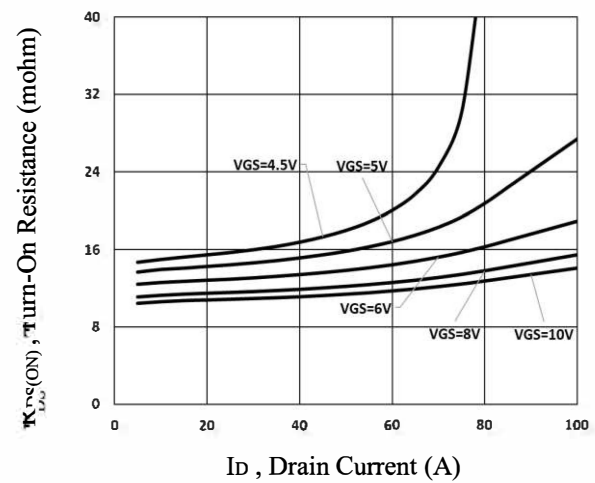


Fig.6 Turn-On Resistance vs. I_D

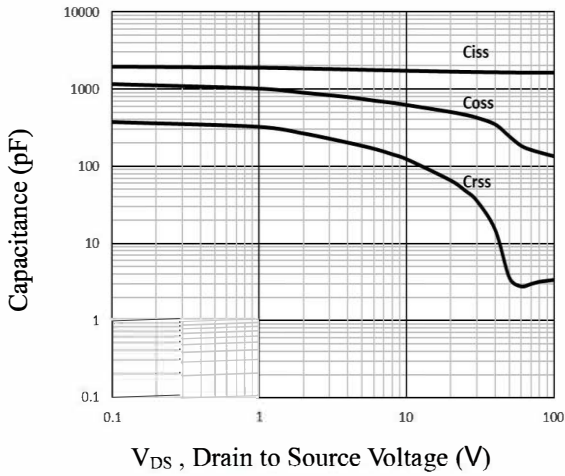


Fig.7 Capacitance Characteristics

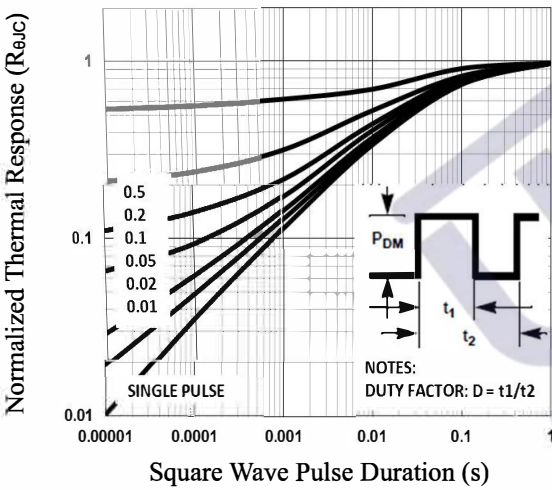


Fig.8 Normalized Transient Impedance

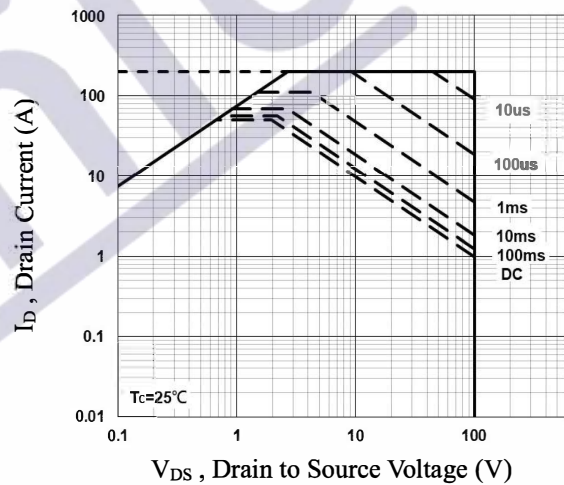


Fig.9 Maximum Safe Operation Area

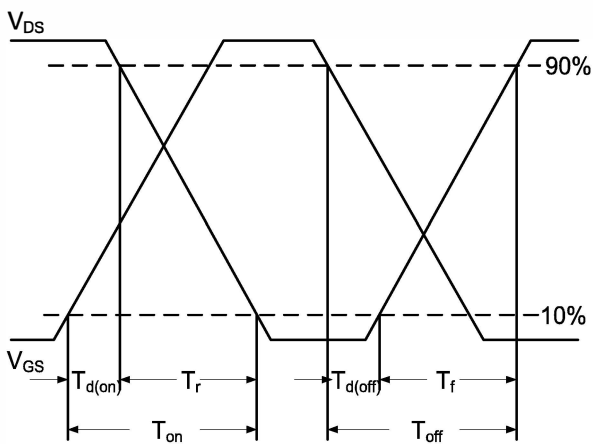


Fig.10 Switching Time Waveform

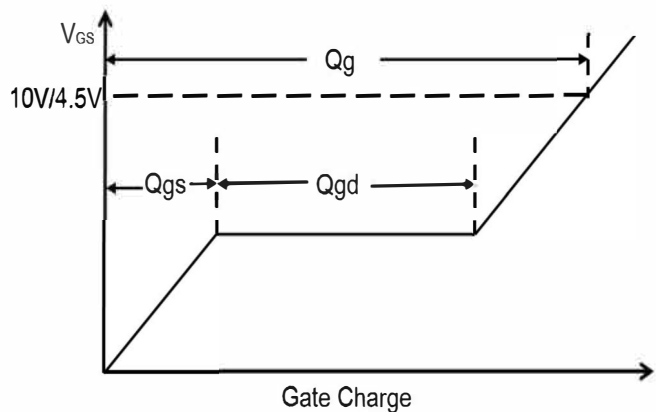
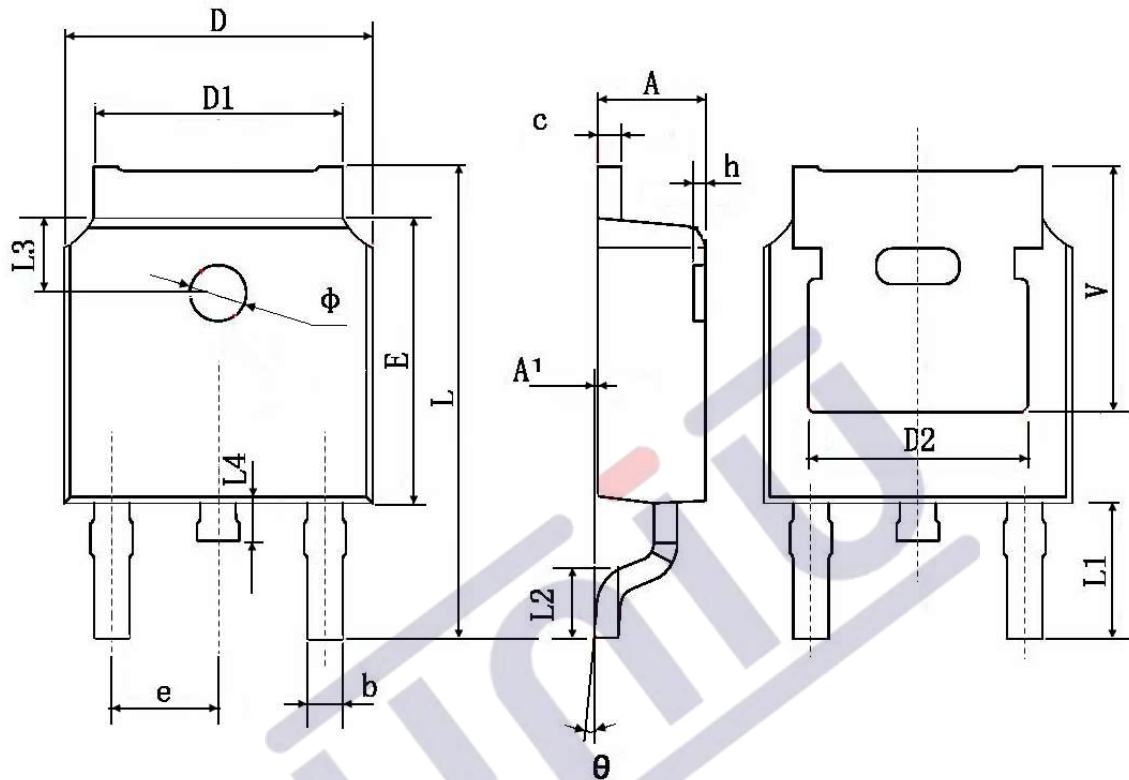


Fig.11 Gate Charge Waveform

TO-252 Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 2.200 | 2.400 | 0.087 | 0.094 |
| A1 | 0.000 | 0.127 | 0.000 | 0.005 |
| b | 0.660 | 0.860 | 0.026 | 0.034 |
| c | 0.460 | 0.580 | 0.018 | 0.023 |
| D | 6.500 | 6.700 | 0.256 | 0.264 |
| D1 | 5.100 | 5.460 | 0.201 | 0.215 |
| D2 | 4.830 TYP. | | 0.190 TYP. | |
| E | 6.000 | 6.200 | 0.236 | 0.244 |
| e | 2.186 | 2.386 | 0.086 | 0.094 |
| L | 9.800 | 10.400 | 0.386 | 0.409 |
| L1 | 2.900 TYP. | | 0.114 TYP. | |
| L2 | 1.400 | 1.700 | 0.055 | 0.067 |
| L3 | 1.600 TYP. | | 0.063 TYP. | |
| L4 | 0.600 | 1.000 | 0.024 | 0.039 |
| φ | 1.100 | 1.300 | 0.043 | 0.051 |
| θ | 0° | 8° | 0° | 8° |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| V | 5.350 TYP. | | 0.211 TYP. | |

1、版本记录

| DATE | REV. | DESCRIPTION |
|------------|------|------------------|
| 2018/04/19 | 1.0 | FirstRelease |
| 2021/11/21 | 1.1 | Layoutadjustment |

2、免责声明

浙江宇力微新能源科技有限公司保留对本文档的更改和解释权，不另行通知!

客户在下单前应获取我司最新版本资料，并验证相关信息是否最新和完整。量产方案需使用方自行验证并自担所有批量风险责任。未经我司授权，该文件不得私自复制和修改。

产品不断提升，以追求高品质、稳定性强、可靠性高、环保、节能、高效为目标，我司将竭诚为客户提供性价比高的系统开发方案、技术支持等更优秀的服务。

版权所有 浙江宇力微新能源科技有限公司/绍兴宇力半导体有限公司

3、联系我们

浙江宇力微新能源科技有限公司

总部地址：绍兴市越城区斗门街道袍渚路25号中节能科创园45幢4/5楼

电话：0575-85087896 (研发部)

传真：0575-88125157

E-mail:htw@uni-semic.com

无锡地址：无锡市锡山区先锋中路 6 号中国电子（无锡）数字芯城 1#综合楼 503室

电话:0510-85297939

E-mail:zh@uni-semic.com

深圳地址：深圳市宝安区西乡街道南昌社区宝源路泳辉国际商务大厦410

电话：0755-84510976

E-mail:htw@uni-semic.com