优尚

YOUSHANG SEMICONDUCTOR

# 设计研发新型功率器件

## 各类小信号开关

## 中低压及高压大电流等场效应管

0755-83047638
ysbdt@szyoushang.cn
www.szyoushang.cn

企业微信二维码

企业QQ二维码

## Summary

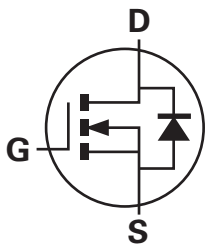
| $V_{(BR)DSS}$ | $R_{DS(on)}$ (Ω) | $I_D$ (A) |
|---|---|---|
| 20 | 0.060 @ $V_{GS}$= 4.5V | 4.0 |
| | 0.120 @ $V_{GS}$= 2.5V | 2.9 |

## Description

This new generation Trench MOSFET from Zetex features low on-resistance achievable with low (2.5V) gate drive.

## Features

- Low on-resistance
- 2.5V gate drive capability
- SOT23 package

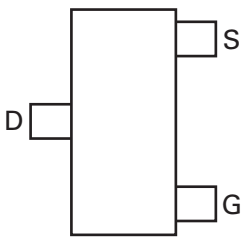



## Applications

- Buck/Boost DC-DC Converters
- Motor Control
- LED Lighting

## Ordering information

| DEVICE | Reel size (inches) | Tape width (mm) | Quantity per reel |
|---|---|---|---|
| NK-ZXMN2F34FHTA | 7 | 8 | 3000 |



Top view

## Device marking

KNB

## Absolute maximum ratings

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Drain source voltage | $V_{DSS}$ | 20 | V |
| Gate source voltage | $V_{GS}$ | ±12 | V |
| Continous Drain Current @ $V_{GS}$=4.5; $T_A$=25°C[b]<br>@ $V_{GS}$=4.5; $T_A$=70°C[b]<br>@ $V_{GS}$=4.5; $T_A$=25°C[a] | $I_D$ | 4.0<br>3.3<br>3.4 | A<br>A<br>A |
| Pulsed drain current[c] | $I_{DM}$ | 18.6 | A |
| Continuous source current (body diode)[b] | $I_S$ | 2.1 | A |
| Pulsed source current (body diode)[c] | $I_{SM}$ | 18.6 | A |
| Power dissipation at $T_A$ =25°C[a]<br>Linear derating factor | $P_D$ | 0.95<br>7.6 | W<br>mW/°C |
| Power dissipation at $T_A$ =25°C[b]<br>Linear derating factor | $P_D$ | 1.4<br>11 | W<br>mW/°C |
| Operating and storage temperature range | $T_j$, $T_{stg}$ | -55 to 150 | °C |

## Thermal resistance

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Junction to ambient[a] | $R_{\Theta JA}$ | 131 | °C/W |
| Junction to ambient[b] | $R_{\Theta JA}$ | 89 | °C/W |
| Junction to lead[d] | $R_{\Theta JL}$ | 68 | °C/W |

**NOTES**:

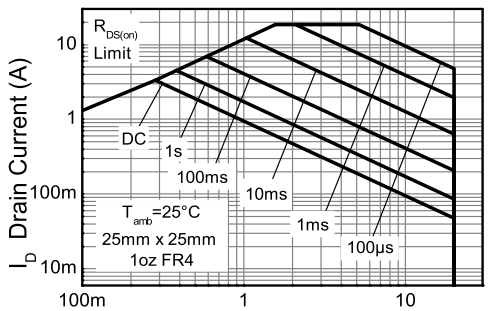
(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(b) For a device surface mounted on FR4 PCB measured at t≤ 5 sec.

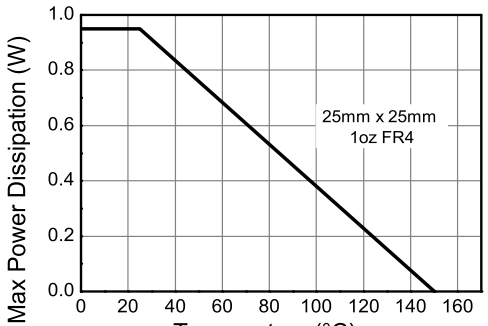
(c) Repetitive rating - 25mm x 25mm FR4 PCB, D=0.02, pulse width 300μs - pulse width limited by maximum junction temperature.

(d) Thermal resistance from junction to solder-point (at end of drain lead).

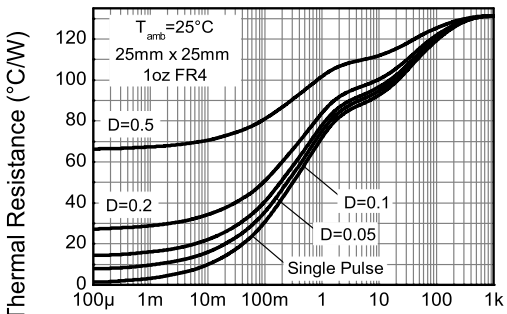
## Thermal characteristics



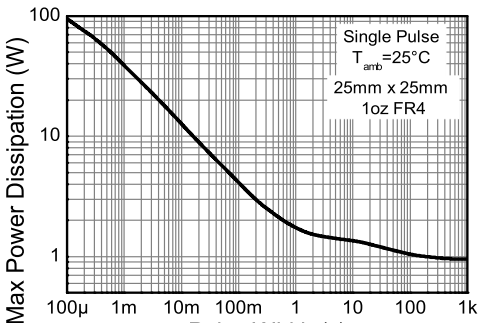

**Safe Operating Area**




**Derating Curve**




**Transient Thermal Impedance**



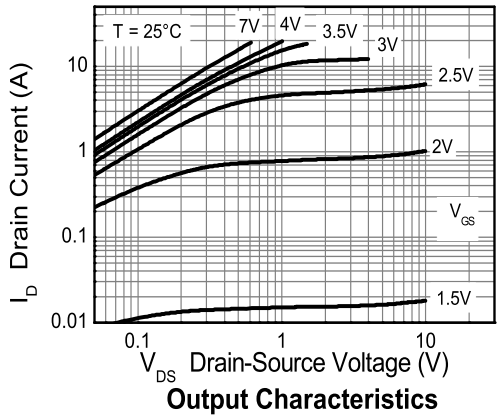

**Pulse Power Dissipation**

## Electrical characteristics (at $T_{amb}$ = 25°C unless otherwise stated)

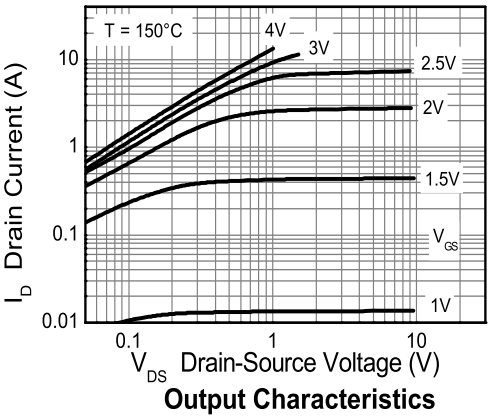
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | 20 | | | V | $I_D$= 250μA, $V_{GS}$=0V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | | | 1 | μA | $V_{DS}$= 20V, $V_{GS}$=0V |
| Gate-Body Leakage | $I_{GSS}$ | | | 100 | nA | $V_{GS}$=±12V, $V_{DS}$=0V |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | 0.5 | 0.8 | 1.5 | V | $I_D$= 250μA, $V_{DS}$=$V_{GS}$ |
| Static Drain-Source On-State Resistance (*) | $R_{DS(on)}$ | | | 0.060<br>0.120 | Ω<br>Ω | $V_{GS}$= 4.5V, $I_D$= 2.5A<br>$V_{GS}$= 2.5V, $I_D$= 1.0A |
| Forward Transconductance(*)(†) | $g_{fs}$ | | 7.5 | | S | $V_{DS}$= 10V, $I_D$= 2.5A |
| **Dynamic** (†) | | | | | | |
| Input Capacitance | $C_{iss}$ | | 277 | | pF | $V_{DS}$= 10V, $V_{GS}$=0V<br>f=1MHz |
| Output Capacitance | $C_{oss}$ | | 65 | | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | | 35 | | pF | |
| **Switching** (‡)(†) | | | | | | |
| Turn-On-Delay Time | $t_{d(on)}$ | | 2.65 | | ns | $V_{DD}$= 10V, $V_{GS}$= 4.5V<br>$I_D$= 1A<br>$R_G$ ≈ 6.0Ω |
| Rise Time | $t_r$ | | 4.2 | | ns | |
| Turn-Off Delay Time | $t_{d(off)}$ | | 9.9 | | ns | |
| Fall Time | $t_f$ | | 5.1 | | ns | |
| Total Gate Charge | $Q_g$ | | 2.8 | | nC | $V_{DS}$= 10V, $V_{GS}$= 4.5V<br>$I_D$= 2.5A |
| Gate-Source Charge | $Q_{gs}$ | | 0.61 | | nC | |
| Gate Drain Charge | $Q_{gd}$ | | 0.63 | | nC | |
| **Source-drain diode** | | | | | | |
| Diode Forward Voltage(*) | $V_{SD}$ | | 0.73 | 1.2 | V | $I_S$= 1.25A, $V_{GS}$=0V |
| Reverse recovery time(†) | $t_{rr}$ | | 6.5 | | ns | $T_j$=25°C, $I_F$=1.65A<br>di/dt=100A/μs |
| Reverse recovery charge(†) | $Q_{rr}$ | | 1.4 | | nC | |

**NOTES:**
(*) Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤2%.
(†) For design aid only, not subject to production testing.
(‡) Switching characteristics are independent of operating junction temperature.

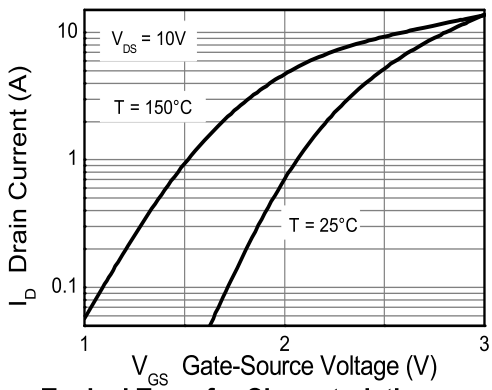
## Typical characteristics



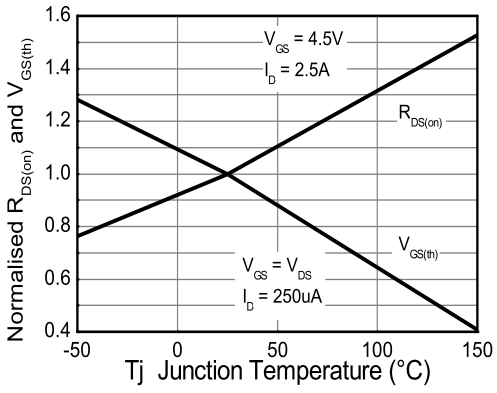
**Output Characteristics**



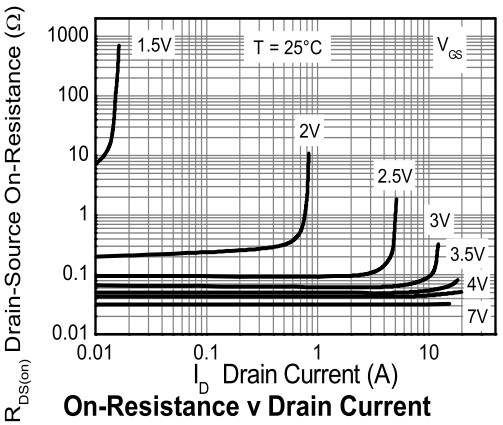
**Output Characteristics**



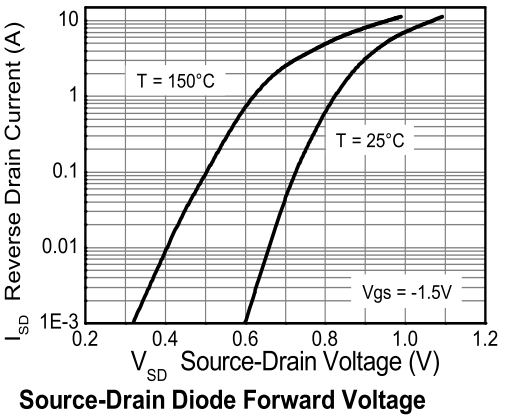
**Typical Transfer Characteristics**



**Normalised Curves v Temperature**

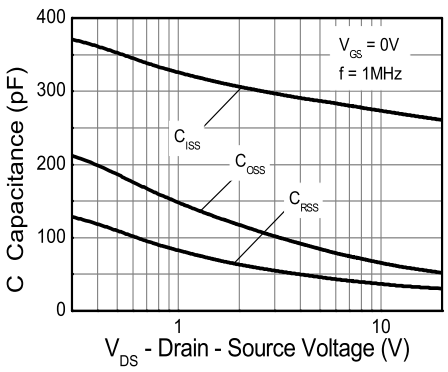


**On-Resistance v Drain Current**

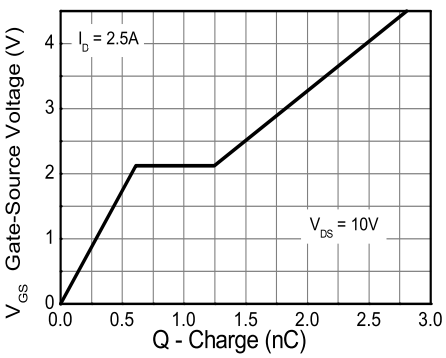


**Source-Drain Diode Forward Voltage**

## Typical characteristics

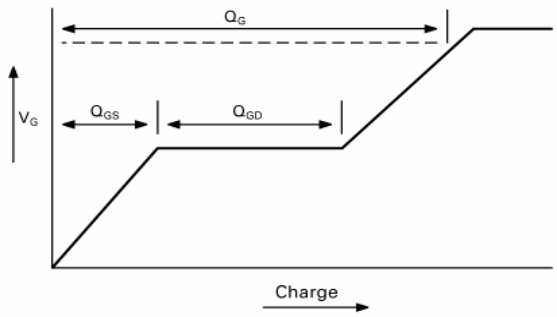



Capacitance v Drain-Source Voltage

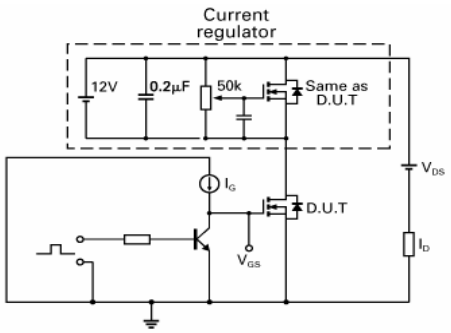



Gate-Source Voltage v Gate Charge

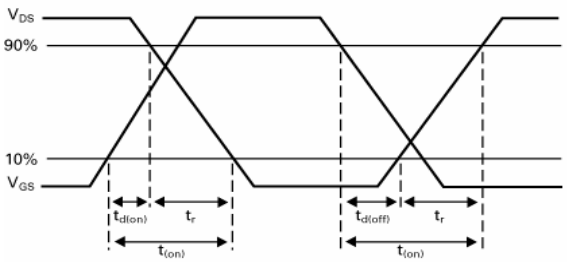
## Test circuits



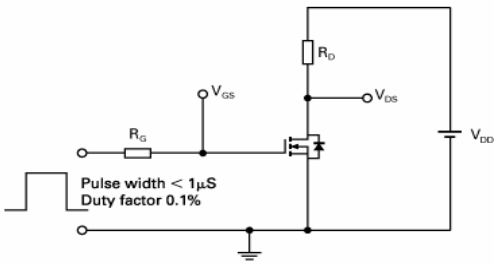

Basic gate charge waveform




Gate charge test circuit

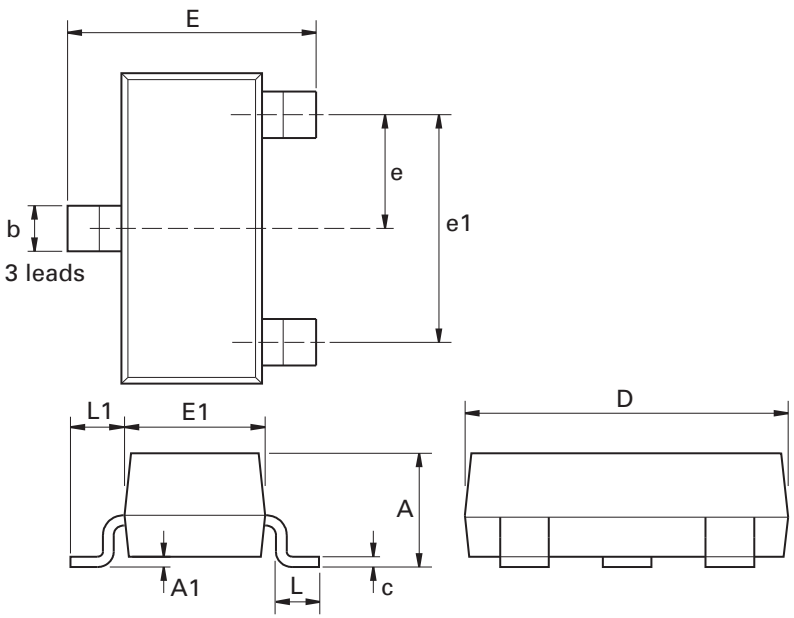



Switching time waveforms




Switching time test circuit

## Package outline - SOT23




| Dim. | Millimeters | | Inches | | Dim. | Millimeters | | Inches | |
|---|---|---|---|---|---|---|---|---|---|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | - | 1.12 | - | 0.044 | e1 | 1.90 NOM | | 0.075 NOM | |
| A1 | 0.01 | 0.10 | 0.0004 | 0.004 | E | 2.10 | 2.64 | 0.083 | 0.104 |
| b | 0.30 | 0.50 | 0.012 | 0.020 | E1 | 1.20 | 1.40 | 0.047 | 0.055 |
| c | 0.085 | 0.20 | 0.003 | 0.008 | L | 0.25 | 0.60 | 0.0098 | 0.0236 |
| D | 2.80 | 3.04 | 0.110 | 0.120 | L1 | 0.45 | 0.62 | 0.018 | 0.024 |
| e | 0.95 NOM | | 0.037 NOM | | - | - | - | - | - |

**Note:** Controlling dimensions are in millimeters. Approximate dimensions are provided in inches