# KST3702R

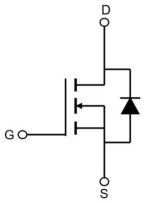
## 20V N-Channel MOSFET

## General Description

The KST3702R is N-Channel enhancement MOSFET Transistor. Uses advanced trench technology and design to provide excellent $R_{DS}$(ON) .with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit.

**SOT-723 Plastic-Encapsulate**




## Product Summary

| $V_{DS}$ (V) | $R_{DS(on)}$ (mΩ) | $I_D$ (A) |
|---|---|---|
| 20 | 230 at $V_{GS}$ = 4.5 V | 1.2 |
| | 350 at $V_{GS}$ = 2.5 V | 0.88 |

## Features

- High-Side Switching
- Low On-Resistance
- Low Threshold
- Fast Switching Speed

## Applications

- Drivers:Relays, Solenoids, Lamps, Hammers, Displays, Memories
- Battery Operated Systems
- Power Supply Converter Circuits
- Load/Power Switching Cell Phones, Pagers

## Absolute Maximum Ratings $T_C$=25℃ unless otherwise noted

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 20 | V |
| $V_{GS}$ | Gate-Source Voltage | ±8 | V |
| $I_D$ | Drain Current – Continuous ($T_C$=25℃) | 1.2 | A |
| | Drain Current – Continuous ($T_C$=100℃) | 0.4 | A |
| $I_{DM}$ | Drain Current – Pulsed[1] | 3.2 | A |
| $P_D$ | Power Dissipation ($T_C$=25℃) | 0.3 | W |
| | Power Dissipation ($T_C$=100℃) | 0.003 | W/℃ |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | ℃ |

## Thermal Characteristics

| Symbol | Parameter | Typ. | Max. | Unit |
|---|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance Junction to ambient | --- | 180 | ℃/W |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | --- | 1.75 | ℃/W |

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

### Off Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=250uA | 20 | --- | --- | V |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=16V , $V_{GS}$=0V , $T_J$=25 | --- | --- | 1 | uA |
| | | $V_{DS}$=16V , $V_{GS}$=0V , $T_J$=125℃ | --- | --- | 10 | uA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±8V , $V_{DS}$=0V | --- | --- | ±20 | uA |

### On Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}$=4.5V , $I_D$=0.5A | --- | 230 | --- | mΩ |
| | | $V_{GS}$=2.5V , $I_D$=0.4A | --- | 350 | --- | mΩ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 0.4 | 0.6 | 1.0 | V |
| gfs | Forward Transconductance | $V_{DS}$=5V , $I_S$=0.8A | --- | 1 | --- | S |

### Dynamic and switching Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| $Q_g$ | Total Gate Charge | $V_{DS}$=10V , $V_{GS}$=4.5V , $I_D$=0.5A | --- | 1.3 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 0.5 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 0.6 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=10V,$I_D$=500mA , $V_{GS}$=4.5V,$R_G$=6Ω | --- | 2.7 | --- | ns |
| $T_r$ | Rise Time | | --- | 17 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 12 | --- | |
| $T_f$ | Fall Time | | --- | 9.8 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=10V , $V_{GS}$=0V , F=1MHz | --- | 89 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 11 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 8 | --- | |

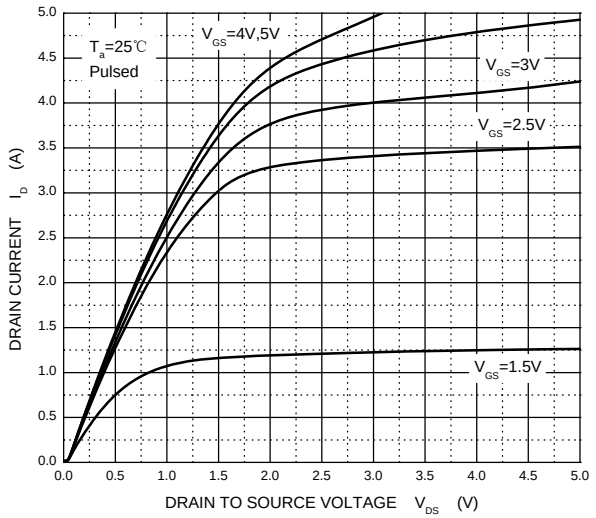
### Drain-Source Diode Characteristics and Maximum Ratings

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current | $V_G$=$V_D$=0V , Force Current | --- | --- | 0.68 | A |
| $I_{SM}$ | Pulsed Source Current | | --- | --- | 1.2 | A |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$=0V , $I_S$=1A , $T_J$=25℃ | --- | --- | 1.0 | V |

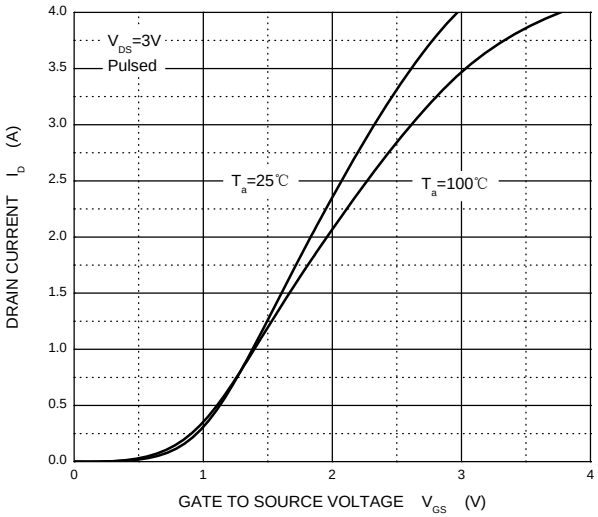
Note :

**1.** Repetitive Rating: Pulse width limited by maximum junction temperature.
**2.** Surface Mounted on FR4 Board, t ≤ 10 sec.
**3.** Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
**4.** Guaranteed by design, not subject to production

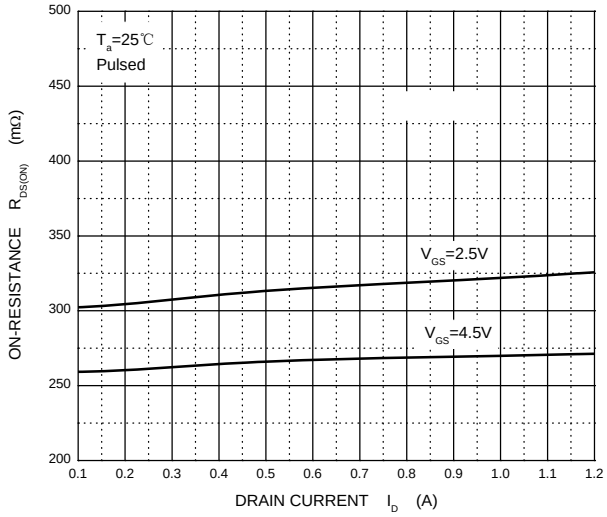
**Output Characteristics**



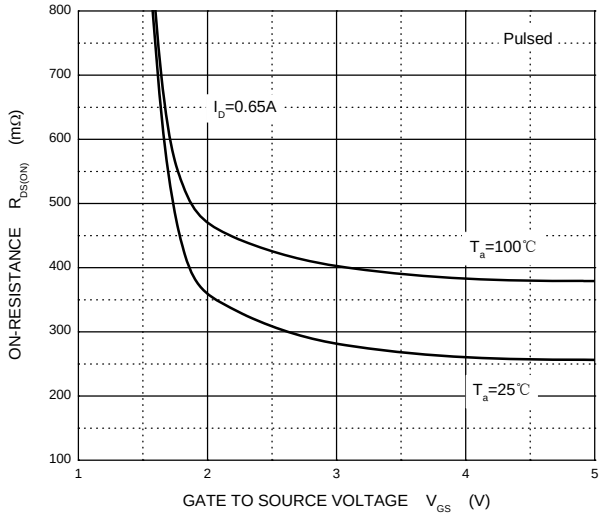

**Transfer Characteristics**



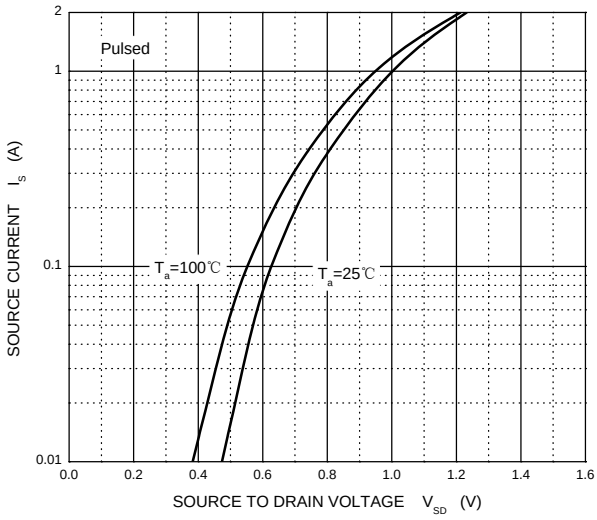

**$R_{DS(ON)}$ —— $I_D$**



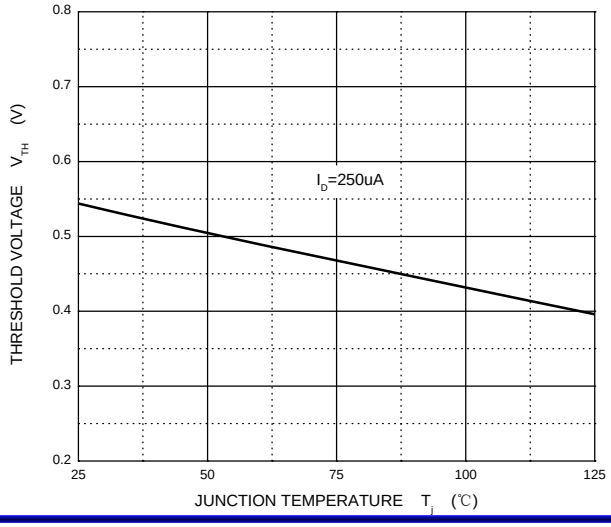

**$R_{DS(ON)}$ —— $V_{GS}$**




**$I_S$ —— $V_{SD}$**




**Threshold Voltage**



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