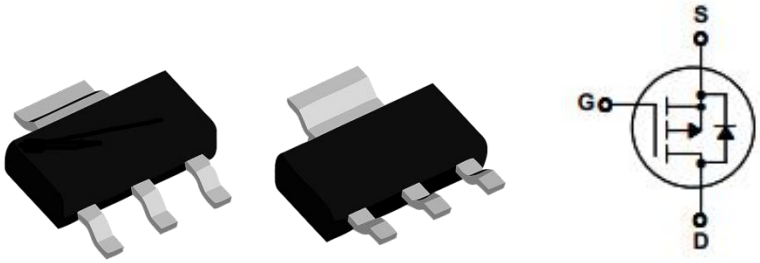
## Description

This P-channel MOSFETS use advanced trench technology and design to provide excellent RDS(on) with low gate charge. It can be used in a wide variety of applications.

## Features

| BVDSS | RDSON | ID |
|---|---|---|
| -30V | 0.065 Ω | -5A |

1) Low gate charge.
2) Green device available.
3) Advanced high cell denity trench technology for ultra RDS(ON)
4) Excellent package for good heat dissipation.




SOT-223

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

| Symbol | Parameter | Ratings | Units |
|---|---|---|---|
| VDS | Drain-Source Voltage | -30 | V |
| VGS | Gate-Source Voltage | ±20 | V |
| ID | Continuous Drain Current-1 | -5 | A |
| | Continuous Drain Current-T=100℃ | -15 | |
| | Pulsed Drain Current2 | — | |
| EAS | Single Pulse Avalanche Energy3 | — | mJ |
| PD | Power Dissipation4 | 3 | W |
| TJ, TSTG | Operating and Storage Junction Temperature Range | -66 to +150 | ℃ |

## Thermal Characteristics

| Symbol | Parameter | Ratings | Units |
|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case1 | 42 | ℃/W |
| $R_{\theta JA}$ | Thermal Resistance ,Junction to Ambient1 | 12 | |

## Package Marking and Ordering Information

| Part NO. | Marking | Package |
|---|---|---|
| KTSMT452AP | KSMT452AP | SOT-223 |

## Electrical Characteristics $T_C$=25℃ unless otherwise noted

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Sourtce Breakdown Voltage | $V_{DS}$=0V,$I_D$=250μA | -30 | — | — | v |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=0V, $V_{DS}$=32V | — | — | -1 | μA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{DS}$=±20V, $V_{DS}$=0A | — | — | ±100 | nA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | GATE-Source Threshold Voltage | $V_{DS}$=VDS, $I_D$=250μA | -1 | -1.6 | -2.8 | V |
| $R_{DS(ON)}$ | Drain-Source On Resistance[2] | $V_{DS}$=10V,$I_D$=6A | — | 0.052 | 0.065 | Ω |
| | | $V_{DS}$=2.5V,$I_D$=5A | — | 0.075 | 0.13 | |
| $G_{FS}$ | Forward Transconductance | $V_{DS}$=5V,$I_D$=12A | — | — | — | S |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=15V,$V_{GS}$=0V, f=1MHz | — | 600 | — | pF |
| $C_{oss}$ | Output Capacitance | | — | 430 | — | |
| $C_{rss}$ | Reverse Transfer Capacitance | | — | 160 | — | |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DS}$=20V, $V_{GS}$=10V,$R_{GEN}$=3.3Ω | — | 9 | 20 | ns |
| $t_r$ | Rise Time | | — | 20 | 30 | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | — | 40 | 50 | ns |
| $t_f$ | Fall Time | | — | 19 | 40 | ns |
| $Q_g$ | Total Gate Charge | $V_{GS}$=4.5V, $V_{DS}$=20V, $I_D$=6A | — | 22 | 30 | nC |
| $Q_{gs}$ | Gate-Source Charge | | — | 32 | — | nC |
| $Q_{gd}$ | Gate-Drain “Miller” Charge | | — | 52 | — | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| $V_{SD}$ | Source-Drain Diode ForwardVoltage[2] | $V_{GS}$=0V,$I_S$ =1A | — | -0.85 | -1.2 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_F$=7A,di/dt=100A/μS | — | — | 100 | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | — | — | — | nC |

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board 2OZ copper.
2. The data tested by pulse width≤300us,duty cycle≤2%
3. The EAS data shows Max. rating. The test condition is $V_{DD}$=25v,$V_{GS}$=10V,L=0.1mH,$i_{AS}$=17.8A
4. The power dissipation is limited by 150℃ junction temperature.

## Typical Characteristics $T_J$=25℃ unless otherwise noted

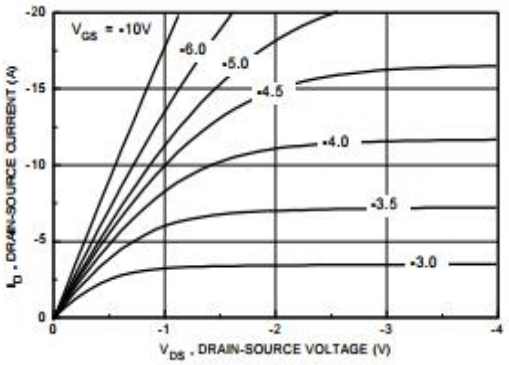



Figure 1. On-Region Characteristics

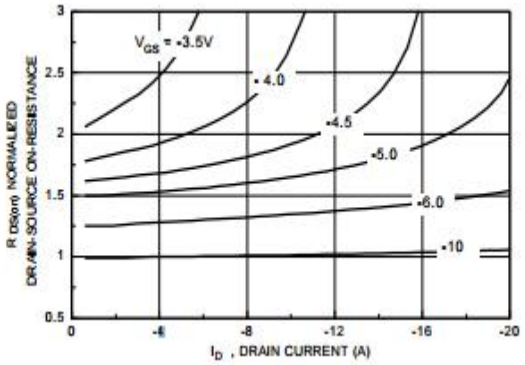



Figure 2. On-Resistance Variation with Gate Voltage and Drain Current.

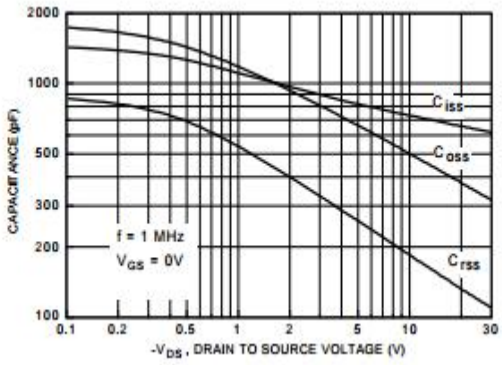



Figure 3. Capacitance Characteristics

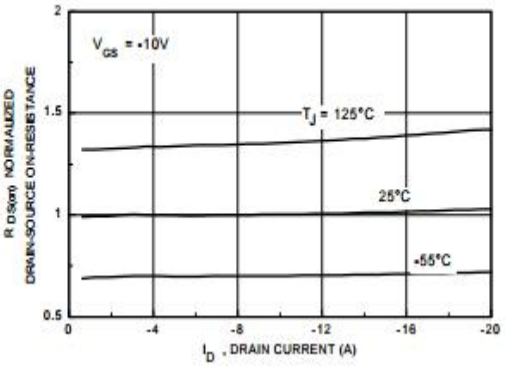



Figure 4. On-Resistance Variation vs. Drain Current and Gate Voltage

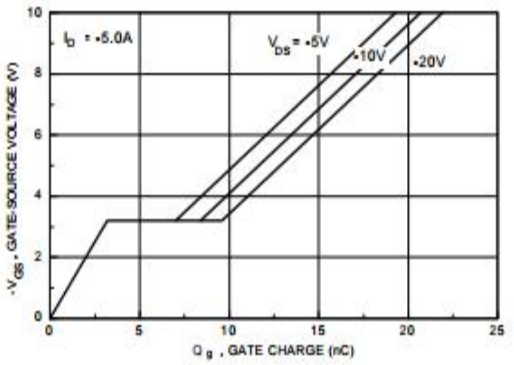



Figure 5. Gate Charge Characteristics

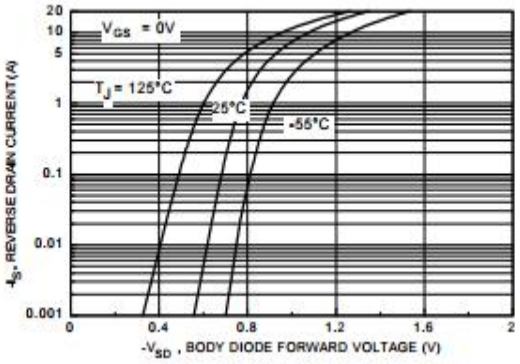



Figure 6. Body Diode Forward Voltage Variation vs. Source Current and Temperature

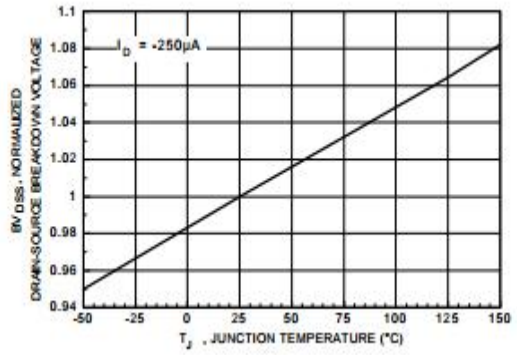



Figure 7.Breakdown Voltage Variation vs. Temperature

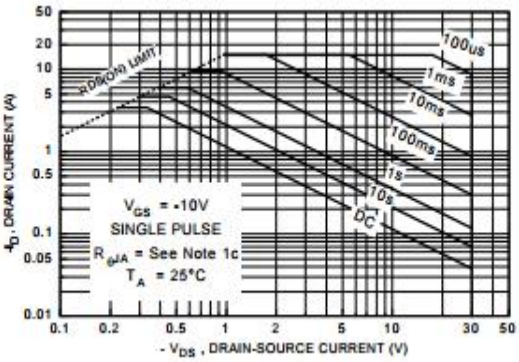



Figure 8.Maximum Safe Operating Area

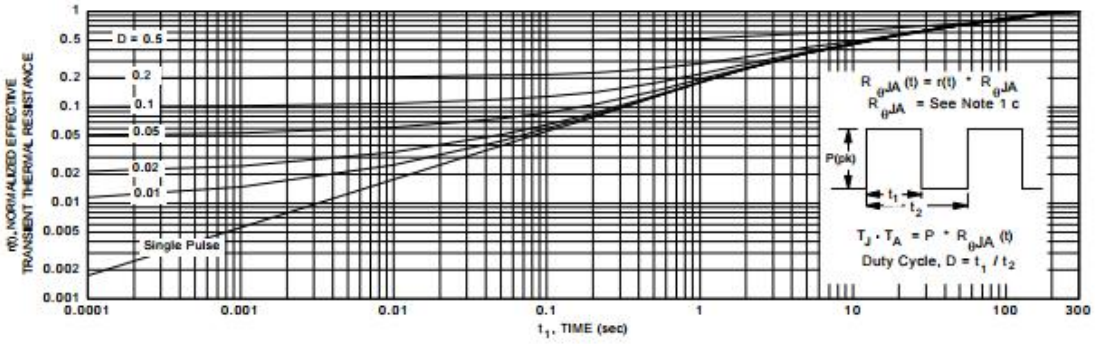



Figure 9. Transient Thermal Response Curve