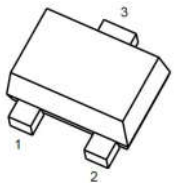
20V N-Channel MOSFET

## Product Summary

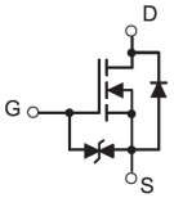
| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | $I_D$ |
|---|---|---|
| 20V | 160mΩ@4.5V | 0.75A |
| | 220mΩ@2.5V | |

**SOT-723**

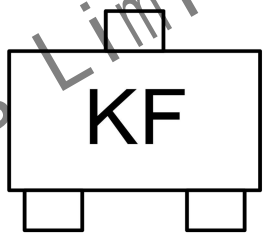



PIN1:GATE
PIN2:SOURCE
PIN3:DRAIN

**Schematic diagram**




**Marking**




## Features

- Very Low On-resistance $R_{DS(ON)}$
- LowCrss
- Fast switching
- Improved dv/dt capability
- ESD Protected Up to 2.0KV (HBM)

## Applications

- PWM application
- Load switch



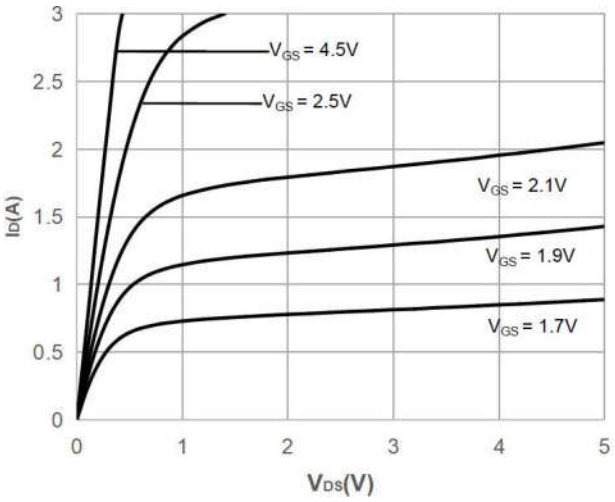
## Absolute Maximum rating（$T_A$ = 25℃ unless otherwise noted）

| Parameter | | Symbol | Value | Units |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 20 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±12 | V |
| Drain Current | $T_A$ = 25℃ | $I_D$ | 0.75 | A |
| | $T_A$ = 100℃ | | 0.5 | A |
| Drain Current - Pulsed | | $I_{DM}$ | 3 | A |
| Power Dissipation | $T_A$ = 25℃ | $P_D$ | 0.15 | W |
| Thermal Resistance, Junction-to-Ambient | | $R_{\theta JA}$ | 833 | ℃/W |
| Operating and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to +150 | ℃ |

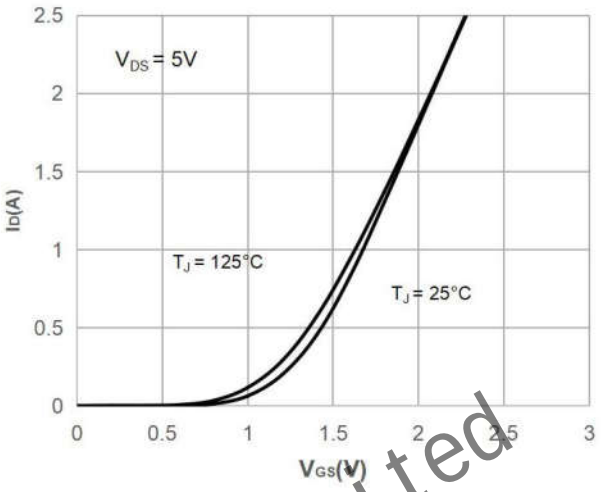
## Electrical Characteristics（$T_A$ = 25℃ unless otherwise noted）

| Parameter | Symbol | Test Condition | Min | Type | Max | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain - Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$= 0V, $I_D$= 250μA | 20 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$= 20V, $V_{GS}$= 0V | | | 1 | μA |
| Gate - Body Leakage Current | $I_{GSS}$ | $V_{GS}$= ±10V, $V_{DS}$= 0V | | | ±10 | μA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$= $V_{GS}$, $I_D$= 250μA | 0.4 | 0.7 | 1.0 | V |
| Drain-source On-resistance | $R_{DS(on)}$ | $V_{GS}$= 4.5V, $I_D$= 0.5A | | 160 | 300 | mΩ |
| | | $V_{GS}$= 2.5V, $I_D$= 0.3A | | 220 | 400 | |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$= 10V, $V_{GS}$= 0V, f= 1MHz | | 53 | | pF |
| Output Capacitance | $C_{oss}$ | | | 14 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 10 | | |
| **Switching Characteristics** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$= 10V, $V_{GS}$= 4.5V, $I_D$= 0.8A | | 1 | | nC |
| Gate-source Charge | $Q_{gs}$ | | | 0.26 | | |
| Gate-drain Charge | $Q_{gd}$ | | | 0.21 | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{GS}$= 4.5V, $V_{DS}$= 10V, $I_D$= 0.5A, $R_{GEN}$= 10Ω | | 2 | | ns |
| Turn-on Rise Time | $t_r$ | | | 19 | | |
| Turn-off Delay Time | $t_{d(off)}$ | | | 10 | | |
| Turn-off Fall Time | $t_f$ | | | 22 | | |
| **Source - Drain Diode Characteristics** | | | | | | |
| Diode Forward Voltage | $V_{SD}$ | $V_{GS}$= 0V, $I_S$= 0.8A | | | 1.2 | V |

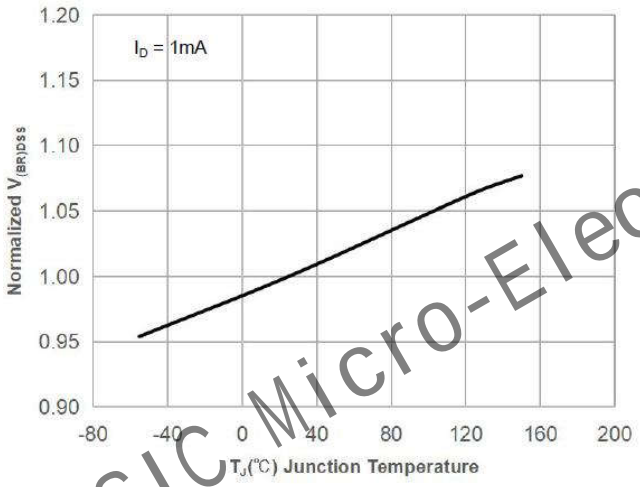
## Typical Characteristic



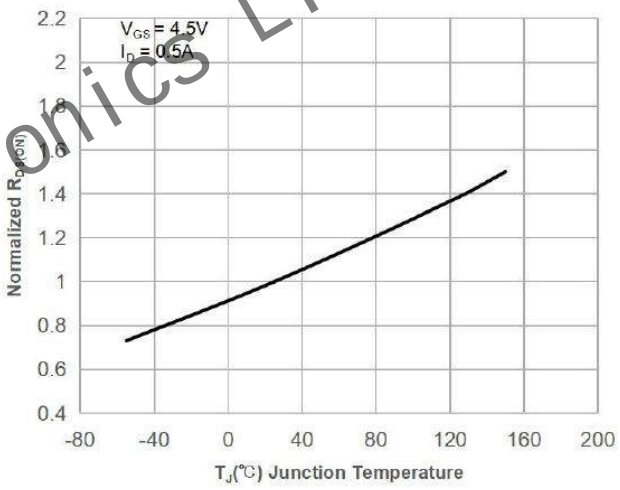

**Output Characteristics**



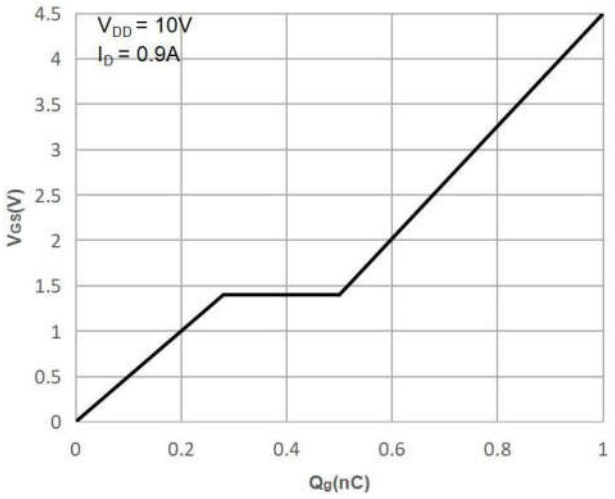

**Transfer Characteristics**



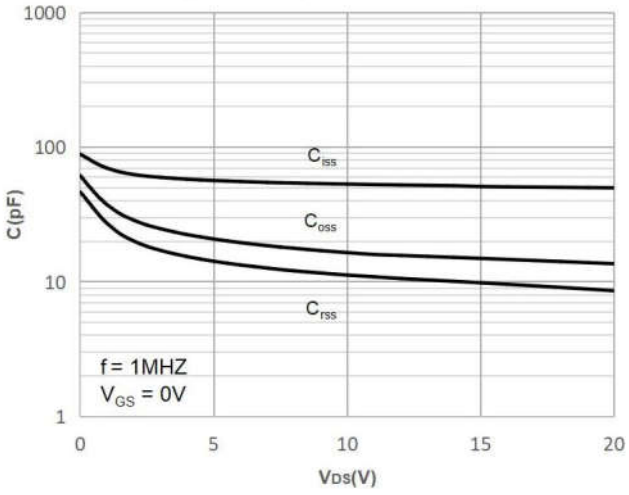

**$BV_{DSS}$ vs Junction Temperature**



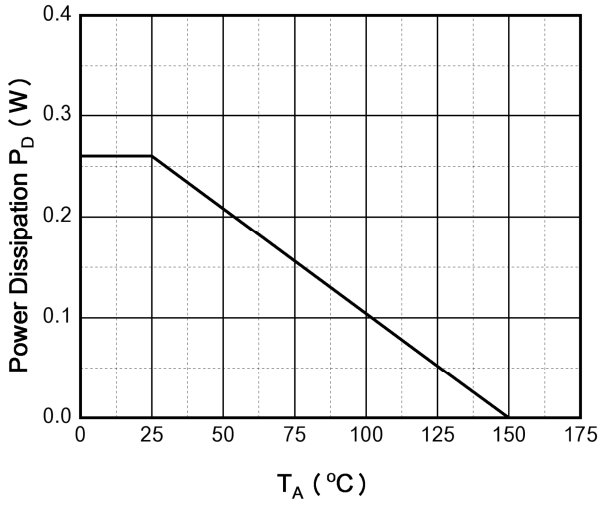

**$R_{DS(ON)}$ vs Junction Temperature**



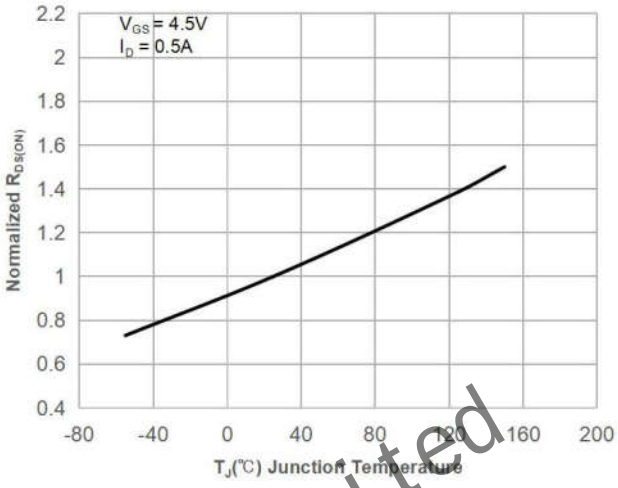

**Gate Charge Characteristics**



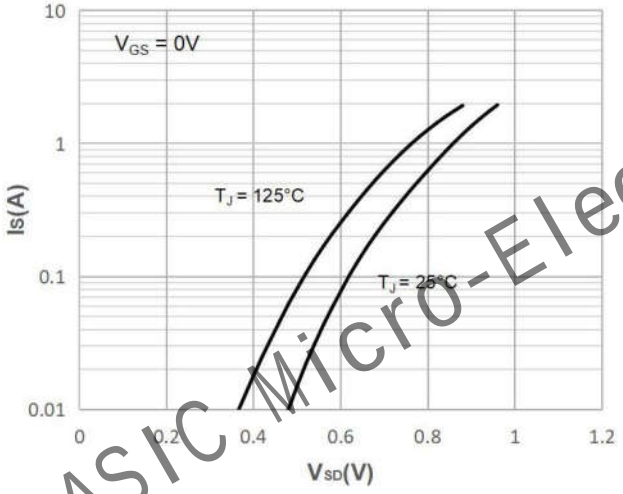

**Capacitance Characteristics**



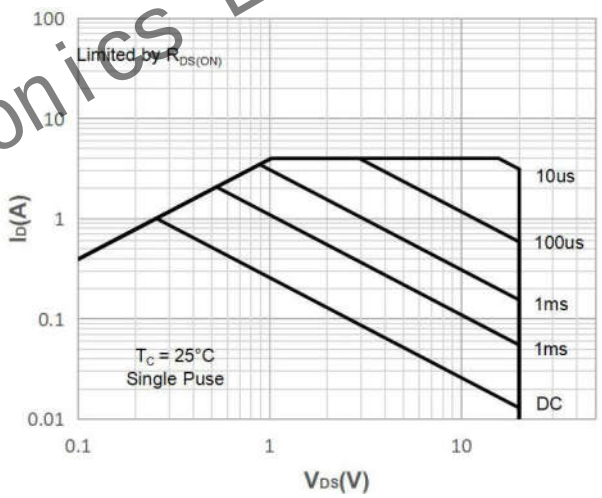

**Power Dissipation**




**Drain Current**



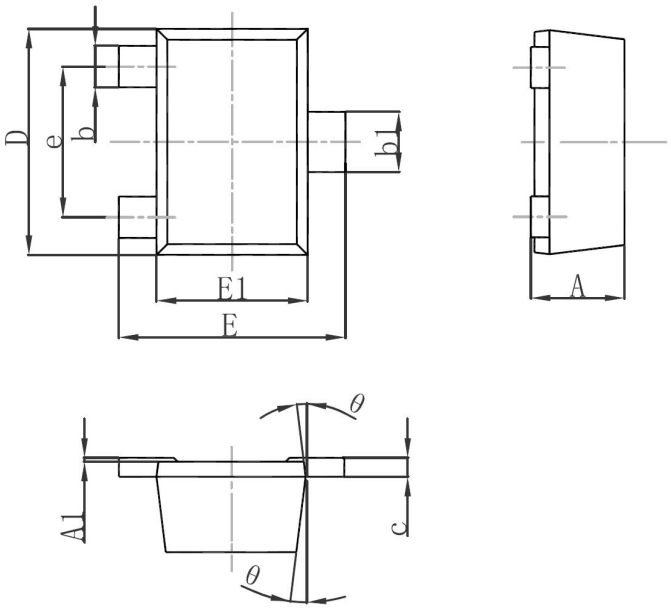

**Body-Diode Characteristics**




**Maximum Safe Operating Area**

## Dimension

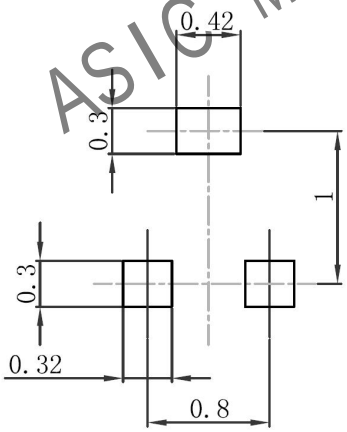
**SOT-723**




| Symbol | Millimeters | | Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 0.350 | 0.500 | 0.015 | 0.020 |
| A1 | 0.000 | 0.050 | 0.000 | 0.002 |
| b | 0.170 | 0.270 | 0.007 | 0.011 |
| b1 | 0.270 | 0.370 | 0.011 | 0.015 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 1.150 | 1.250 | 0.045 | 0.049 |
| E | 1.150 | 1.250 | 0.045 | 0.049 |
| E1 | 0.750 | 0.850 | 0.030 | 0.033 |
| e | 0.800TYP. | | 0.031TYP. | |
| θ | 7° REF. | | 7° REF. | |



## Recommended Land Pattern




Note:

1. Controlling dimension: in millimeters
2. General tolerance: ±0.05mm
3. The pad layout is for reference only
4. Unit: mm