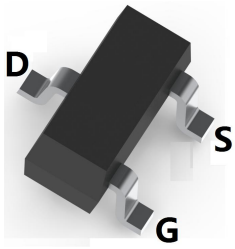
HKT Hottech Electronic

# 2N7002KT

MOSFET (N-CHANNEL)



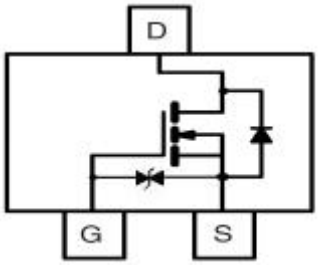

SOT-523

## FEATURES

- Low On-Resistance: $R_{DS(ON)}$
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage

## MECHANICAL DATA

- Case: SOT-523
- Case Material: Molded Plastic. UL flammability
- Classification Rating: 94V-0
- Weight: 0.008 grams (approximate)




## MAXIMUM RATINGS ($T_A$ = 25°C unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-source voltage | $V_{DS}$ | 60 | V |
| Gate-source voltage | $V_{GS}$ | ±20V | V |
| Continuous drain current | $I_D$ | 340 | mA |
| Pulsed drain current (Note 1) | $I_{DM}$ | 800 | mA |
| Power dissipation | $P_D$ | 0.15 | W |
| Thermal resistance from Junction to ambient | $R_{\theta JA}$ | 357 | °C/W |
| Junction And Storage temperature Range | $T_J$,$T_{STG}$ | -65 ~+150 | °C |

## ELECTRICAL CHARACTERISTICS ($T_A$ = 25°C unless otherwise specified)

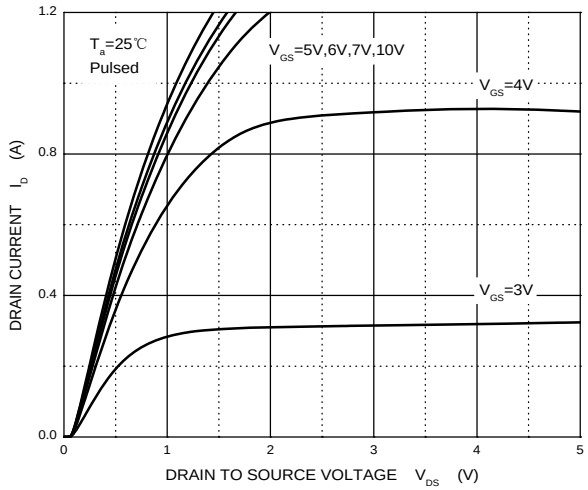
| Parameter | Symb | Min | Typ | Max | Unit | Conditions |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-Source breakdown voltage | $V_{(BR)DSS}$ | 60 | | | V | $V_{GS}$=0V, $I_D$=250μA |
| Gate-threshold voltage (note 1) | $V_{GS(}$ | 1 | 1.3 | 2.5 | V | $V_{DS}$= $V_{GS}$, $I_D$=1mA |
| Zero gate voltage drain current | $I_{DSS}$ | | | 1 | μA | $V_{DS}$=48V, $V_{GS}$=0V |
| Gate-body leakage current | $I_{GSS}$ | | | ±10 | μA | $V_{DS}$=0V, $V_{GS}$=±20V |
| | | | | ±200 | nA | $V_{DS}$=0V, $V_{GS}$=±10V |
| | | | | ±100 | nA | $V_{DS}$=0V, $V_{GS}$=±5V |
| Drain-source on-resistance (note 1) | $R_{DS(ON)}$ | | 1.1 | 4.0 | Ω | $V_{GS}$=4.5V, $I_D$=0.2A |
| | | | 0.9 | 4.0 | Ω | $V_{GS}$=10V, $I_D$=0.5A |
| Diode forward voltage (note 1) | $V_{SD}$ | | | 1.5 | V | $I_S$=0.3A, $V_{GS}$=0V |
| Gate-Source Breakdown Voltage | $BV_{GSO}$ | ±21.5 | | ±30 | V | Igs=±1mA (Open Drain) |
| Recovered charge | $Q_r$ | | 30 | | nC | $V_{GS}$=0V,$I_S$=0.3A,$V_R$=25V, dIs/dt=-100A/μS |
| **Dynamic Characteristics** | | | | | | |
| Input capacitance | $C_{iss}$ | | | 40 | pF | $V_{DS}$=10V, $V_{GS}$=0V, f=1MHz |
| Output capacitance | $C_{oss}$ | | | 30 | pF | |
| Reverse transfer capacitance | $C_{rss}$ | | | 10 | pF | |
| **Switching Characteristics** | | | | | | |
| Turn-on delay time | $t_{d(on)}$ | | 3 | | nS | $V_{DD}$=50V,$V_{GS}$=10V,$R_G$=50Ω, $R_{GS}$=50Ω,$R_L$=250Ω |
| Turn-off delay time | $t_{d(off)}$ | | 15 | | nS | |
| Reverse recovery time | $t_{rr}$ | | 26 | | nS | $V_{GS}$=0V,$I_S$=0.3A,$V_R$=25V, dIs/dt=-100A/μS |

Note:1. Pulse test ; Pulse width ≤300μs, Duty cycle ≤ 2% .

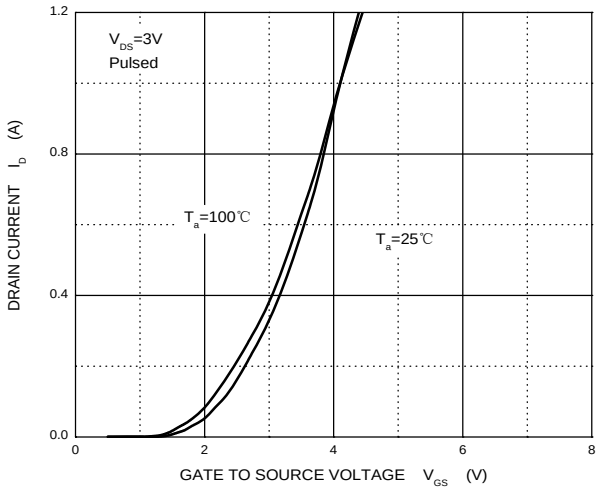
# MOSFET (N-CHANNEL)

## Typical Characteristics

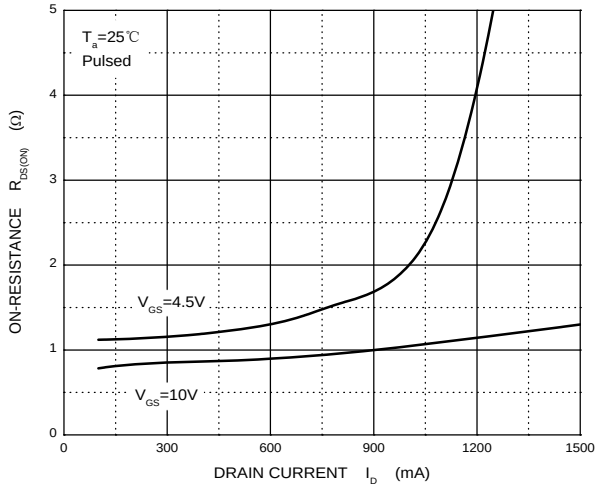
**Output Characteristics**



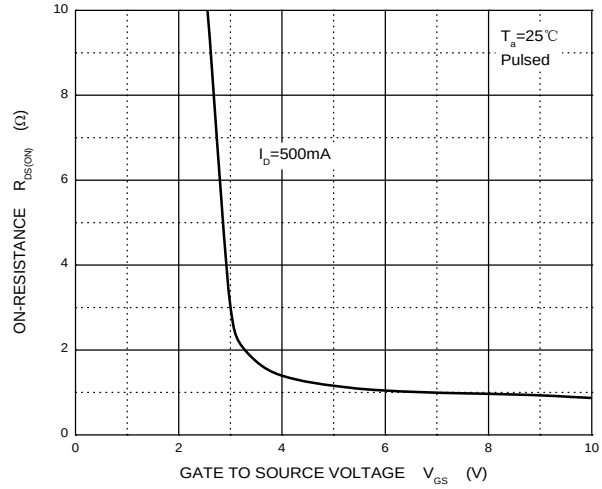

**Transfer Characteristics**



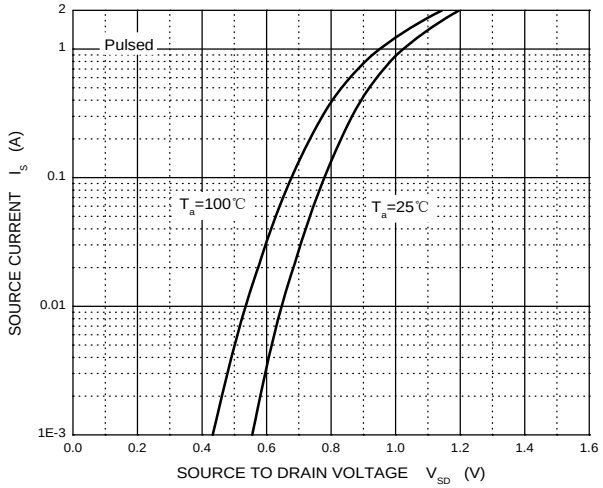

**$R_{DS(ON)}$ —— $I_D$**



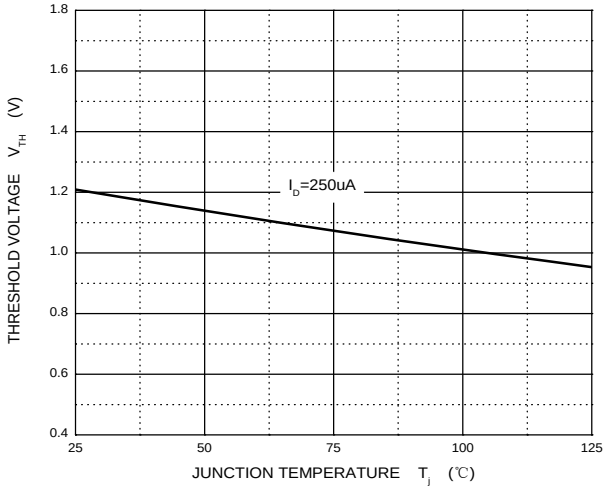

**$R_{DS(ON)}$ —— $V_{GS}$**




**$I_S$ —— $V_{SD}$**




**Threshold Voltage**



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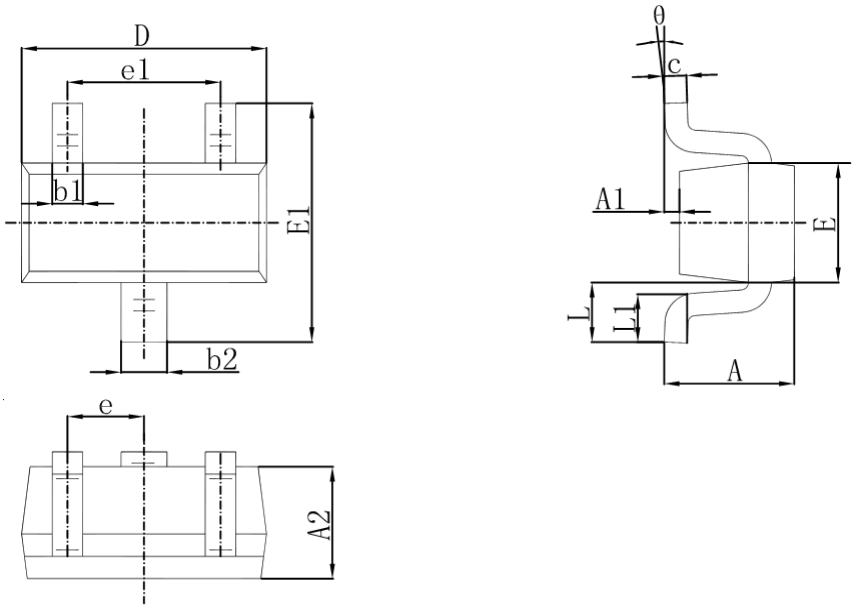
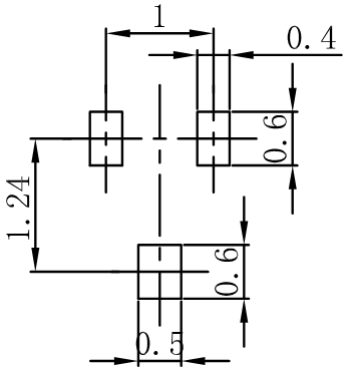
## SOT-523 PACKAGE OUTLINE DIMENSION




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 0.700 | 0.900 | 0.028 | 0.035 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.700 | 0.800 | 0.028 | 0.031 |
| b1 | 0.150 | 0.250 | 0.006 | 0.010 |
| b2 | 0.250 | 0.350 | 0.010 | 0.014 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 1.500 | 1.700 | 0.059 | 0.067 |
| E | 0.700 | 0.900 | 0.028 | 0.035 |
| E1 | 1.450 | 1.750 | 0.057 | 0.069<br>069 |
| e | 0.500 TYP. | | 0.020 TYP. | |
| e1 | 0.900 | 1.100 | 0.350 | 0.043 |
| L | 0.400 REF | | 0.016 REF. | |
| L1 | 0.260 | 0.460 | 0.010 | 0.018 |
| θ | 0° | 8° | 0° | 8° |

## SOT-523 SUGGESTED PAD LAYOUT




**Note:**

1.Controlling dimension: in millimeters

2.General tolerance: ±0.05mm

3.The pad layout is for reference purposes only

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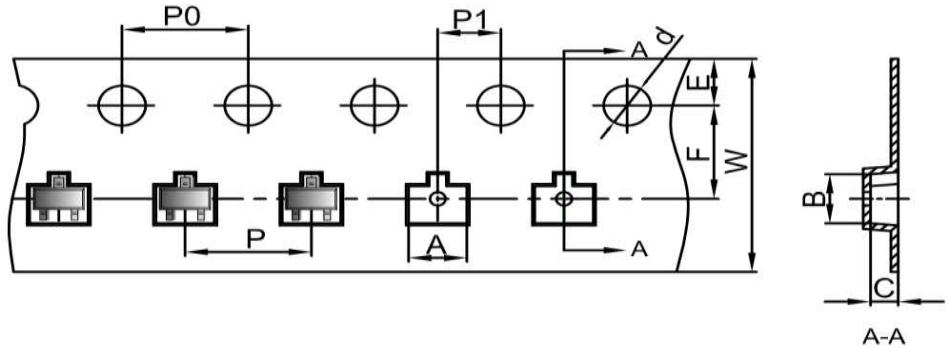
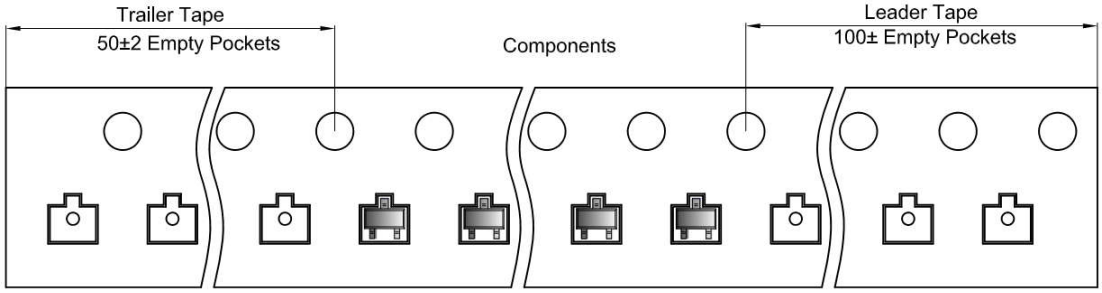
# SOT-523 TAPE AND REEL

## SOT-523 Embossed Carrier Tape

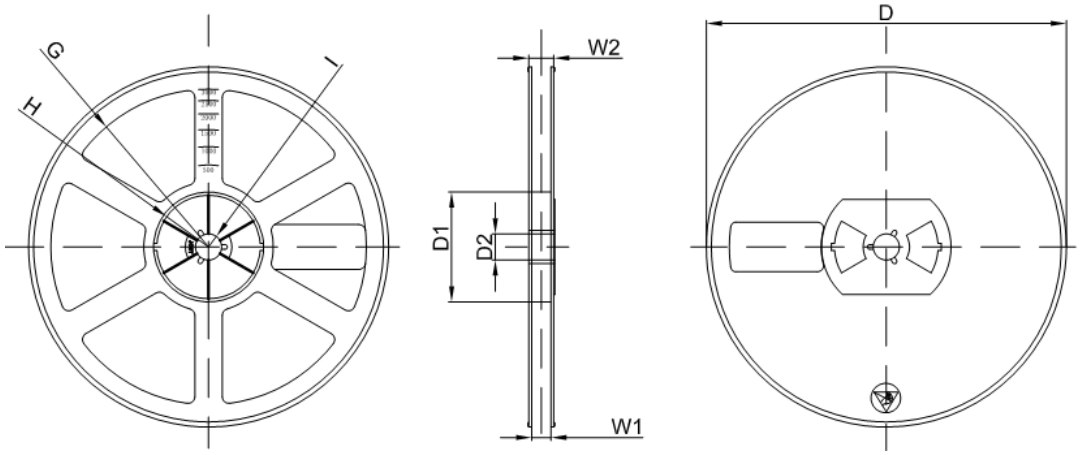



| | DIMENSIONS ARE IN MILLIMETER | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| TYPE | A | B | C | d | E | F | P0 | P | P1 | W |
| SOT-523 | 1.85 | 1.85 | 0.875 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |

## SOT-523 Tape Leader and Trailer




## SOT-523 Reel




| | DIMENSIONS ARE IN MILLIMETER | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| REEL OPTION | D | D1 | D2 | G | H | I | W1 | W2 |
| 7" DIA | Ø178 | 54.40 | 13.00 | R78 | R25.60 | R6.50 | 9.50 | 12.30 |