# TPM20NB4S6

## 20V Dual N-Channel Enhancement Mode MOSFET



### Product Summary

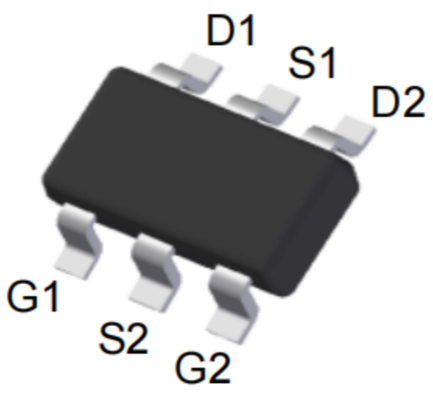
| | |
|---|---|
| $BV_{DSS}$ | 20V |
| $R_{DS(ON)}$ | 45mΩ |
| $I_D$ | 4A |

### Application

- *Notebook*
- *Load Switch*
- *Networking*
- *Hand-held Instruments*

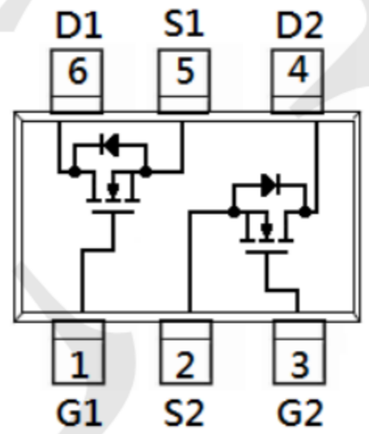
### Package and Pin Configuration

**SOT23-6**




Top View

### Circuit diagram




### Marking:



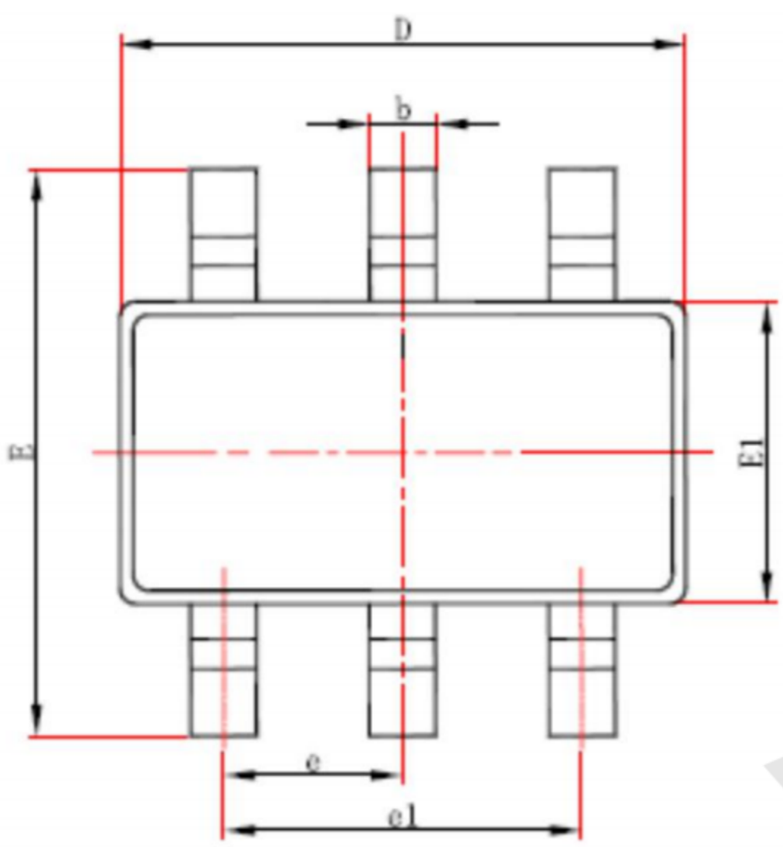

### Absolute Maximum Ratings ($T_A$=25°C unless otherwise noted)

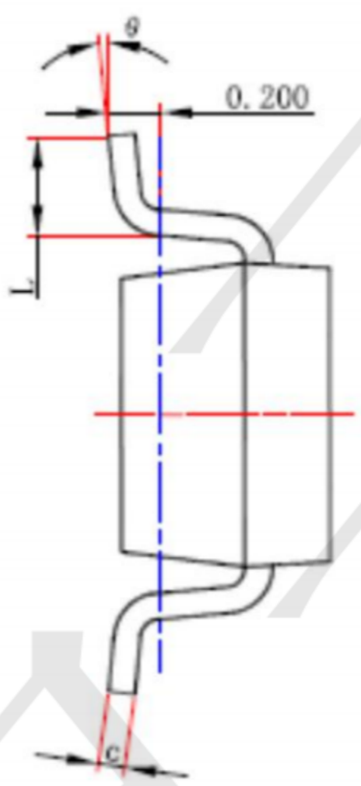
| PARAMETER | | SYMBOL | LIMIT | UNITS |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 20 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±12 | V |
| Continuous Drain Current | | $I_D$ | 4 | A |
| Pulsed Drain Current | | $I_{DM}$ | 10 | A |
| Power Dissipation | $T_a$=25°C | $P_D$ | 1.25 | W |
| | Derate above 25°C | | 10 | mW/°C |
| Operating Junction and Storage Temperature Range | | $T_J$,$T_{STG}$ | -55~150 | °C |
| Typical Thermal Resistance - Junction to Ambient(Note 3) | | $R_{\theta JA}$ | 100 | °C/W |

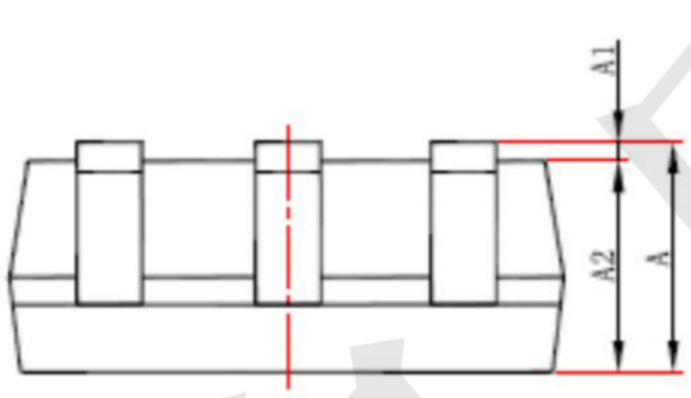
## Electrical Characteristics ( $T_A$ = 25°C unless otherwise noted )

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNITS |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V, $I_D$=250uA | 20 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=250uA | 0.4 | 0.6 | 1.2 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}$=4.5V, $I_D$=4 A | - | 45 | 36 | mΩ |
| | | V =2.5V, I =3.7A | | 60 | 45 | |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=20V, $V_{GS}$=0V | - | 0.01 | 1 | uA |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±12V, $V_{DS}$=0V | - | | ±100 | nA |
| **Dynamic** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$=10V, $I_D$=4.0A, $V_{GS}$=4.5V(Note 1,2) | - | 7 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 1.3 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 2 | - | |
| Input Capacitance | Ciss | $V_{DS}$=10V, $V_{GS}$=0V, f=1.0MHZ | - | 513 | - | pF |
| Output Capacitance | Coss | | - | 74 | - | |
| Reverse Transfer Capacitance | Crss | | - | 60 | - | |
| **Switching** | | | | | | |
| Turn-On Delay Time | $td_{(on)}$ | $V_{DD}$=10V, $I_D$=4.0A, $V_{GS}$=4.5V, $R_G$=6Ω(Note 1,2) | - | 6.2 | - | ns |
| Turn-On Rise Time | tr | | | 56 | | |
| Turn-Off Delay Time | $td_{(off)}$ | | - | 23 | - | |
| Turn-Off Fall Time | tf | | - | 13 | - | |
| **Drain-Source Diode** | | | | | | |
| Maximum Continuous Drain-Source Diode Forward Current | $I_S$ | --- | - | - | 1.5 | A |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=1.0A, $V_{GS}$=0V | - | 0.71 | 1.2 | V |

## SOT23-6 Package Outline Dimensions




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E1 | 1.500 | 1.700 | 0.059 | 0.067 |
| E | 2.650 | 2.950 | 0.104 | 0.116 |
| e | 0.950(BSC) | | 0.037(BSC) | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |