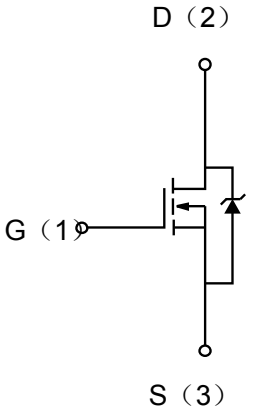
## Description

The enhancement mode MOS is extremely high density cell and low on-resistance.

| MOSFET Product Summary | | |
|---|---|---|
| $V_{DS}$(V) | $R_{DS(on)}$(Ω) | $I_D$(A) |
| 600 | 1.1@ $V_{GS}$=10V | 7.0 |




## Absolute maximum rating@25℃

| Rating | | Symbol | Value | Units |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 600 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | | $I_D$ | 7 | A |
| Total Power Dissipation | $T_A$=25℃ | $P_D$ | 30 | W |
| | Derate above 25ºC | $P_D$ | 0.24 | W /℃ |
| Junction and Storage Temperature Range | | $T_J$,$T_{STG}$ | -50 to 150 | ℃ |
| Maximum lead temperature for soldering purpose, 1/8”from case for 5 seconds | | $T_L$ | 300 | ℃ |

**Thermal Characteristics**

| Parameter | Symbol | Conditions | Value | Units |
|---|---|---|---|---|
| Maximum Junction-to-Ambient | $R_{\theta JA}$ | Drain lead soldered to water cooled heatsink, $P_D$ adjusted for a peak junction temperature of +150℃ | 4.17 | ℃/W |
| Maximum Junction-to-Case | $R_{\theta JC}$ | 1 cubic foot chamber, free air. | 62 | ℃/W |

## Electrical characteristics per line@25℃( unless otherwise specified)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| **STATIC PARAMETERS** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $I_D$ =250μA,$V_{GS}$=0V | 600 | | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ =600V,$V_{GS}$=0V | - | - | 10 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{DS}$ =0V,$V_{GS}$=±20V | - | - | ±1 | μA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$, $I_D$ =250μA | 2 | | 4 | V |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$ =3.5A | - | 1.1 | 1.25 | Ω |
| Forward Tran conductance | $g_{FS}$ | $V_{DS}$ =15V, $I_D$ =3.5A | | 6.0 | | S |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=7A,$V_{GS}$=0V | | | 1.5 | V |
| Maximum Body-Diode Continuous Current | $I_S$ | | | | 7 | A |
| Maximum Body-Diode Pulse Current | $I_{SM}$ | | | | 28 | A |
| **DYNAMIC PARAMETERS** | | | | | | |
| Input Capacitance | $C_{ISS}$ | $V_{GS}$=0V, $V_{DS}$ =25V, f=1MHz | | 1100 | | pF |
| Output Capacitance | $C_{OSS}$ | | | 110 | | pF |
| Reverse Transfer Capacitance | $C_{RSS}$ | | | 13 | | pF |
| **SWITCHING PARAMETERS** | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$=300V, $V_{GS}$ =10V, $R_G$=4.7Ω, $I_D$ =7A | - | 13 | | ns |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 28 | | ns |
| Turn-On Rise Time | $t_r$ | | | 10 | | ns |
| Turn-Off Fall Time | $t_f$ | | | 8 | | ns |
| Total Gate Charge | $Q_g$ | $V_{DS}$=300V $I_D$ =7A | | 28 | | nC |
| Gate Source Charge | $Q_{gs}$ | | | 5.5 | | nC |
| Gate Drain Charge | $Q_{gd}$ | | | 11.5 | | nC |
| Body Diode Reverse Recovery Time | $t_{rr}$ | $I_F$=7A,dI/dt=100A/μs,$V_{GS}$=0V | | 350 | | ns |
| Body Diode Reverse Recovery Charge | $Q_{rr}$ | $I_F$=7A,dI/dt=100A/μs,$V_{GS}$=0V | | 1590 | | nC |

## Typical Characteristics

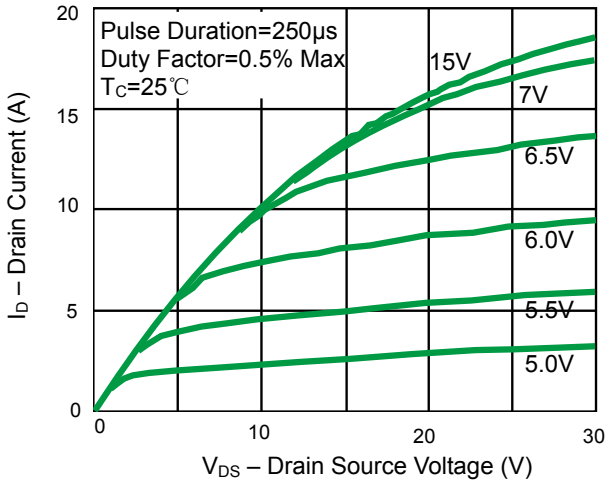



Fig 1. Typical Output Characteristics

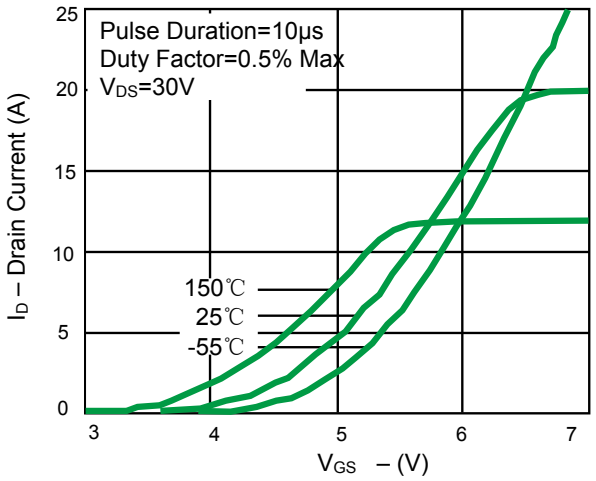



Fig 2. Transfer Characteristics

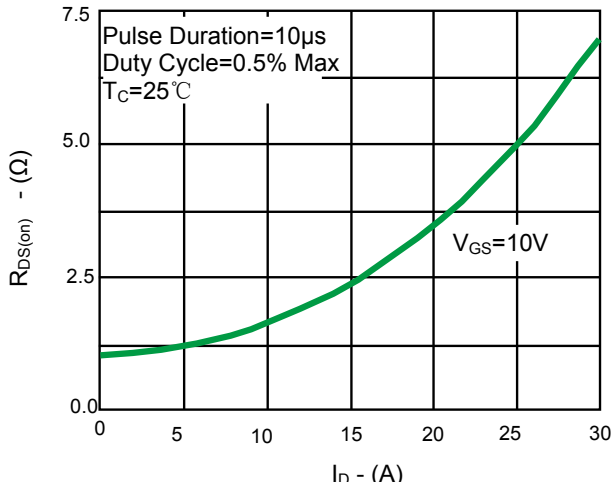



Fig 3. On-Resistance vs. Drain Current and Gate Voltage

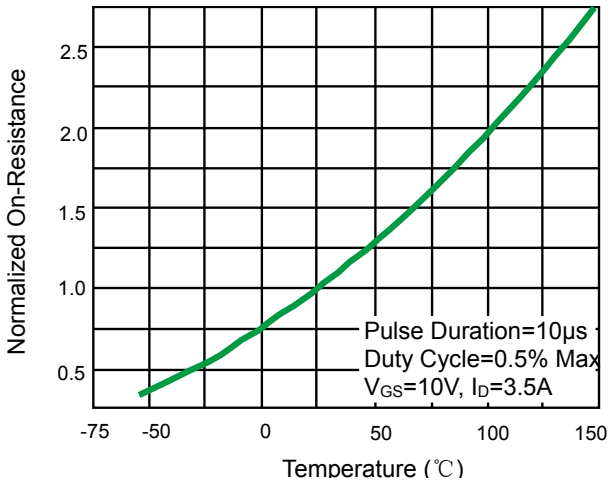
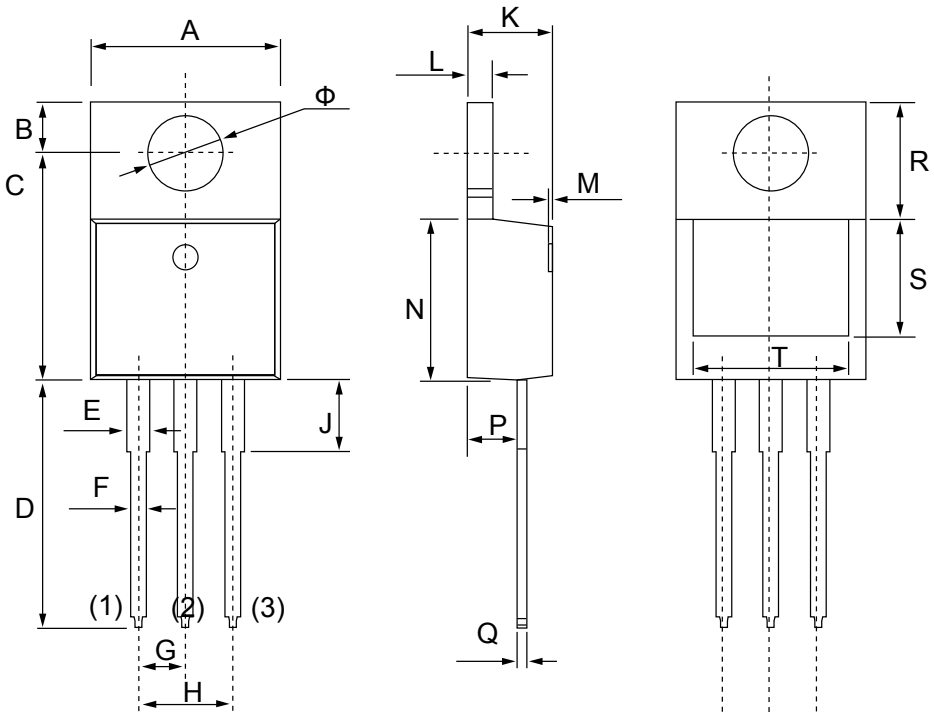


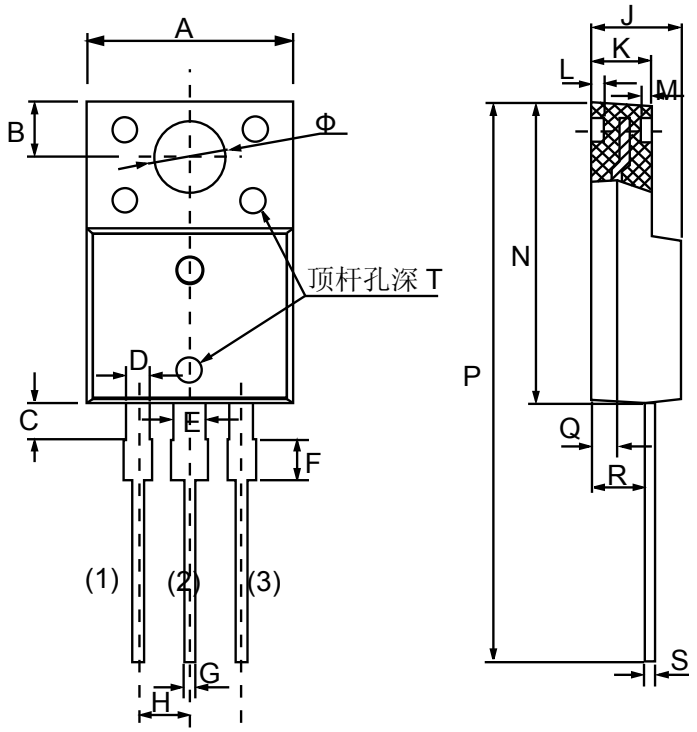

Fig 4. On-Resistance vs. Junction Temperature

## Product dimension(PNMTO600V7)(TO-220)




| Dim | Millimeters | | Inches | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | 10.010 | 10.350 | 0.394 | 0.407 |
| B | 2.590 | 2.890 | 0.102 | 0.114 |
| C | 12.060 | 12.460 | 0.475 | 0.491 |
| D | 13.400 | 13.800 | 0.528 | 0.543 |
| E | 1.170 | 1.370 | 0.046 | 0.054 |
| F | 0.710 | 0.910 | 0.028 | 0.036 |
| G | 2.540 TYP. | | 0.100 TYP. | |
| H | 4.980 | 5.180 | 0.196 | 0.204 |
| J | 3.560 | 3.960 | 0.140 | 0.156 |
| K | 4.470 | 4.670 | 0.176 | 0.184 |
| L | 1.200 | 1.400 | 0.047 | 0.055 |
| M | 0.000 | 0.300 | 0.000 | 0.012 |
| N | 8.500 | 8.900 | 0.335 | 0.350 |
| P | 2.520 | 2.820 | 0.099 | 0.111 |
| Q | 0.380 | 0.520 | 0.014 | 0.020 |
| R | 6.600 REF. | | 0.260 REF. | |
| S | 6.060 REF. | | 0.239 REF. | |
| T | 8.440 REF. | | 0.332 REF. | |
| Φ | 3.735 | 3.935 | 0.147 | 0.155 |

## Product dimension (PNMTOF600V7)(TO-220F)




| Dim | Millimeters | | Inches | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | 9.960 | 10.360 | 0.392 | 0.408 |
| B | 2.700 REF | | 0.106 REF | |
| C | 1.700 | 1.900 | 0.067 | 0.075 |
| D | 1.100 | 1.350 | 0.043 | 0.053 |
| E | 1.500 | 1.750 | 0.059 | 0.069 |
| F | 1.900 | 2.100 | 0.075 | 0.083 |
| G | 0.500 | 0.750 | 0.020 | 0.030 |
| H | 2.540 TYP | | 0.100 TYP | |
| J | 4.300 | 4.700 | 0.169 | 0.185 |
| K | 2.800 | 3.200 | 0.110 | 0.126 |
| L | 0.800 REF | | 0.031 REF | |
| M | 0.500 REF | | 0.020 REF | |
| N | 14.800 | 15.200 | 0.583 | 0.598 |
| P | 28.000 | 28.400 | 1.102 | 1.118 |
| Q | 1.300 REF | | 0.051 REF | |
| R | 2.500 | 2.900 | 0.098 | 0.114 |
| S | 0.500 | 0.750 | 0.020 | 0.030 |
| T | 0.000 | 0.300 | 0.000 | 0.012 |
| Φ | 3.500 REF | | 0.138 REF | |

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