RECTRON SEMICONDUCTOR
TECHNICAL SPECIFICATION

# RMP7N600LD

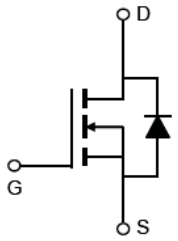
## N-Channel Power MOSFET

### Features

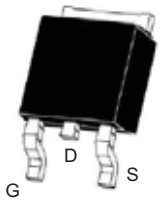
- 600V, 7A, $R_{DS(ON)}$(Max.) =1.3Ω@VGS=10V.
- Low Crss
- Fast Switching
- 100% Avalanche Tested

### Application

- Adapter
- LCD Panel Power
- E-Bike Charger
- Switching Mode Power Supply
- Halogen-free



Schematic diagram



TO-252 -2Ltop view

### Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|---|---|---|---|---|---|
| 7N600 | RMP7N600LD | TO-252-2L | -- | -- | -- |

### Absolute Maximum Ratings Tc = 25˚C unless otherwise noted

| Symbol | Parameter | Limit | Unit |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage [a] | 600 | V |
| $V_{GS}$ | Gate-Source Voltage | ± 30 | V |
| $I_D$ | Drain Current-Continuous, $T_C$ =25°C | 7 | A |
| | Drain Current-Continuous, $T_C$ =100°C | 4 | A |
| $I_{DM}$ | Drain Current-Pulsed [b] | 28 | A |
| $P_D$ | Maximum Power Dissipation @ $T_J$ =25°C | 106 | W |
| EAS | Single Pulsed Avalanche Energy [d] | 245 | mJ |
| $T_J$, $T_{STG}$ | Operating and Store Temperature Range | -55 to 150 | °C |

### Thermal Characteristics

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction-Case Max. | 1.18 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient Max | 110 | °C/W |

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

### Off Characteristics

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$ = 0V, $I_D$ = 250μA | 600 | - | - | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$ = 600V, $V_{GS}$ = 0V | - | - | 1 | μA |
| $I_{GSS}$ | Forward Gate Body Leakage Current | $V_{DS}$ = 0V, $V_{GS}$ = ±30V | - | - | ±100 | nA |

### On Characteristics

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_{GS}$(th) | Gate Threshold Voltage | $V_{DS}$ = $V_{GS}$, $I_D$ =250μA | 2 | - | 4 | V |
| $R_{DS}$(on) | Static Drain-Source On-Resistance [c] | $V_{GS}$ = 10V, $I_D$ =3.5A | - | 1.0 | 1.3 | Ω |

### Dynamic Characteristics

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Ciss | Input Capacitance | $V_{DS}$ = 25V, $V_{GS}$ = 0V, f = 1.0MHz | - | 1135 | - | pF |
| Coss | Output Capacitance | | - | 88 | - | pF |
| Crss | Reverse Transfer Capacitance | | - | 4.6 | - | pF |

### On Characteristics

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DD}$ = 300V, $I_D$ =7A, $R_G$ = 10Ω,$V_{GS}$=10V | - | 19 | - | ns |
| $t_r$ | Turn-On Rise Time | | - | 21 | - | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | - | 42 | - | ns |
| $t_f$ | Turn-Off Fall Time | | - | 19 | - | ns |
| Qg | Total Gate Charge | $V_{DS}$ = 480V, $I_D$ =7A, $V_{GS}$ = 10V | - | 24 | | nC |
| Qgs | Gate-Source Charge | | - | 4.9 | - | nC |
| Qgd | Gate-Drain Charge | | - | 9.5 | - | nC |

### Drain-Source Diode Characteristics

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Drain-Source Diode Forward Continuous Current | $V_{GS}$ = 0V | - | - | 7 | A |
| $I_{SM}$ | Maximum Pulsed Current | $V_{GS}$ = 0V | - | - | 28 | A |
| $V_{SD}$ | Drain-Source Diode Forward Voltage | $V_{GS}$ = 0V, $I_S$ = 7A | - | | 1.4 | V |

Notes:

a. $T_J$=-55 ℃ to +150 ℃

b. Repetitive rating; pulse width limited by maximum junction temperature.

c. Pulse width≦300us; duty cycle≦2%

d. L=10mH, $V_{DD}$=50V,$I_{as}$=7A,Rg=25Ω Starting TJ=25 ℃

# RATING AND CHARACTERISTICS CURVES (RMP7N600LD)

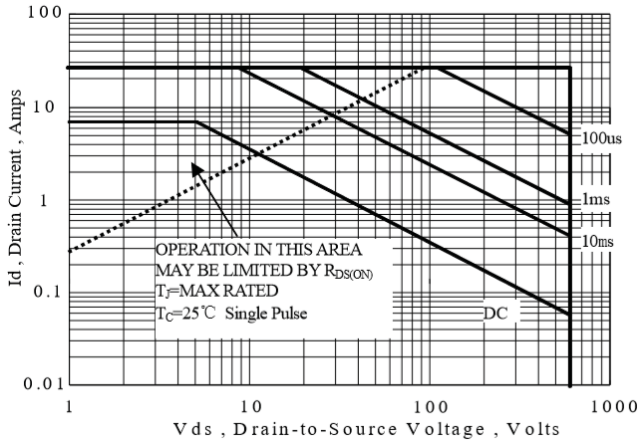



Figure 1. Maximum Safe Operating Area

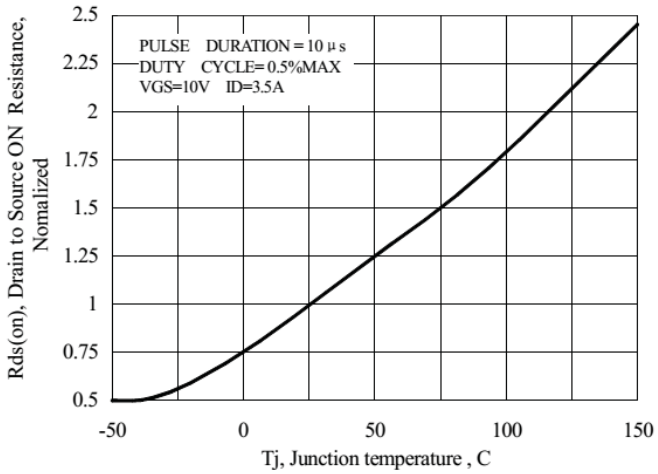



Figure 2. Normalized On-Resistance Variation with Temperature

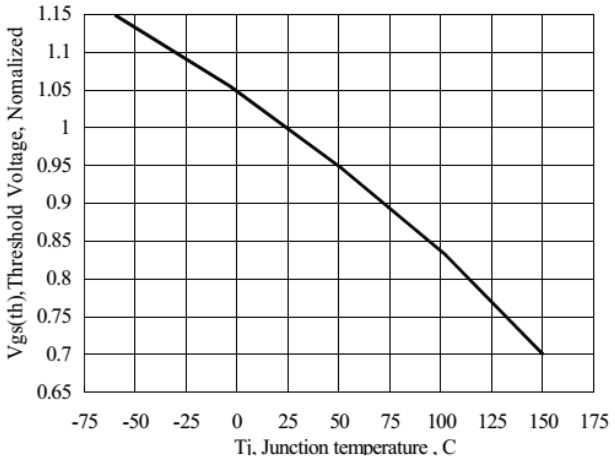



Figure 3. Typical Theshold Voltage vs Junction Temperature

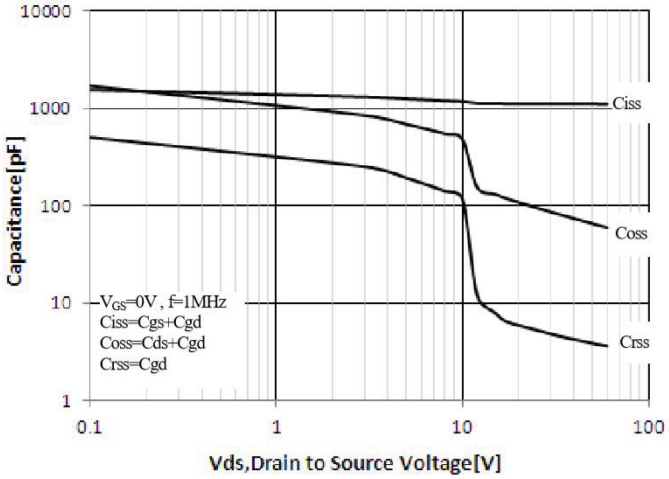



Figure 4. Capacitance Characteristics

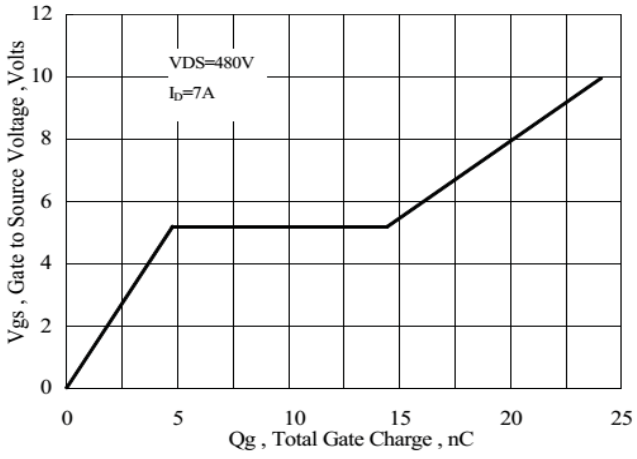



Figure 5. Gate Charge Characteristics

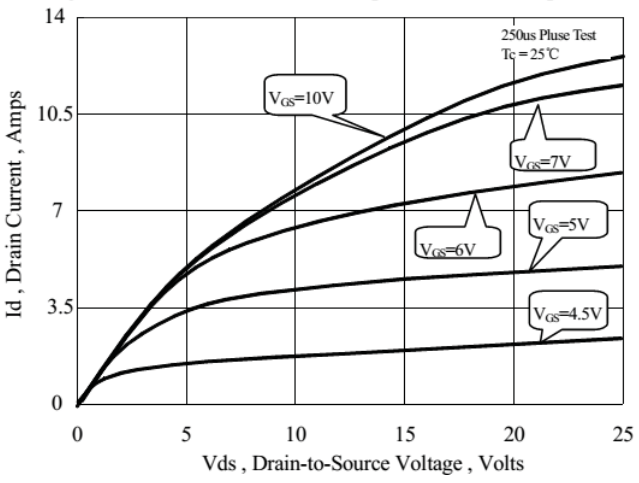



Figure 6. On-State Characteristics

## RATING AND CHARACTERISTICS CURVES (RMP7N600LD)

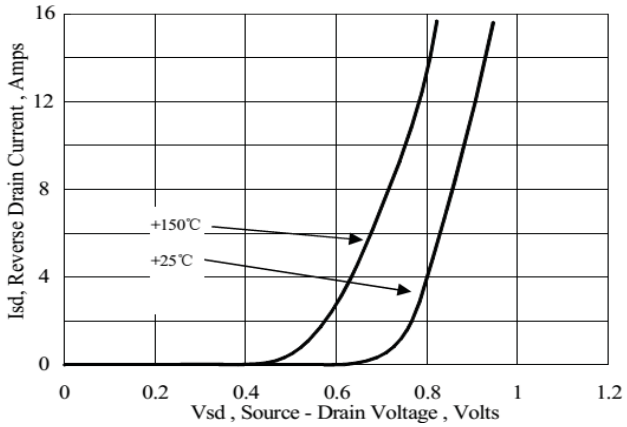



Figure 7. Typical Body Diode Transfer Characteristics

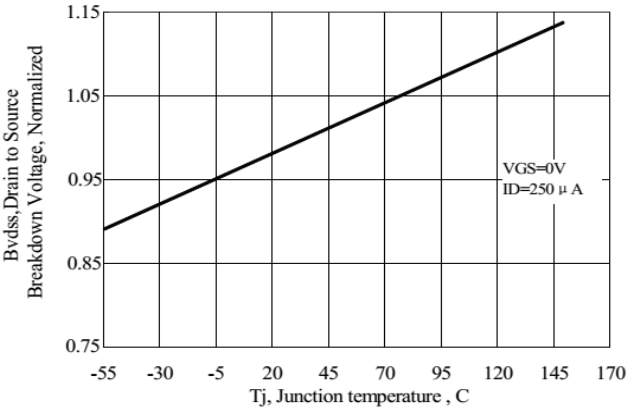



Figure 8. Typical Breakdown Voltage vs Junction Temperature

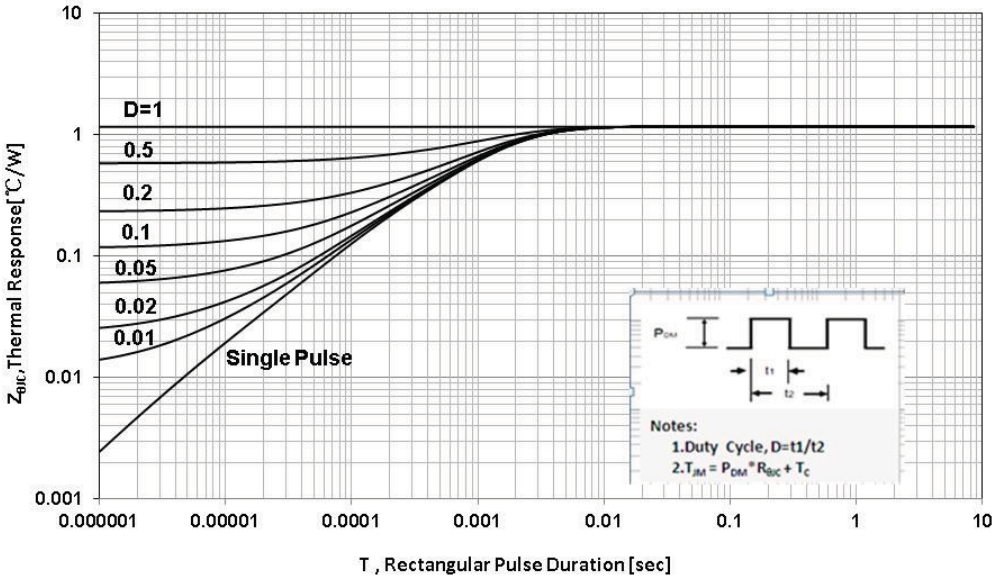
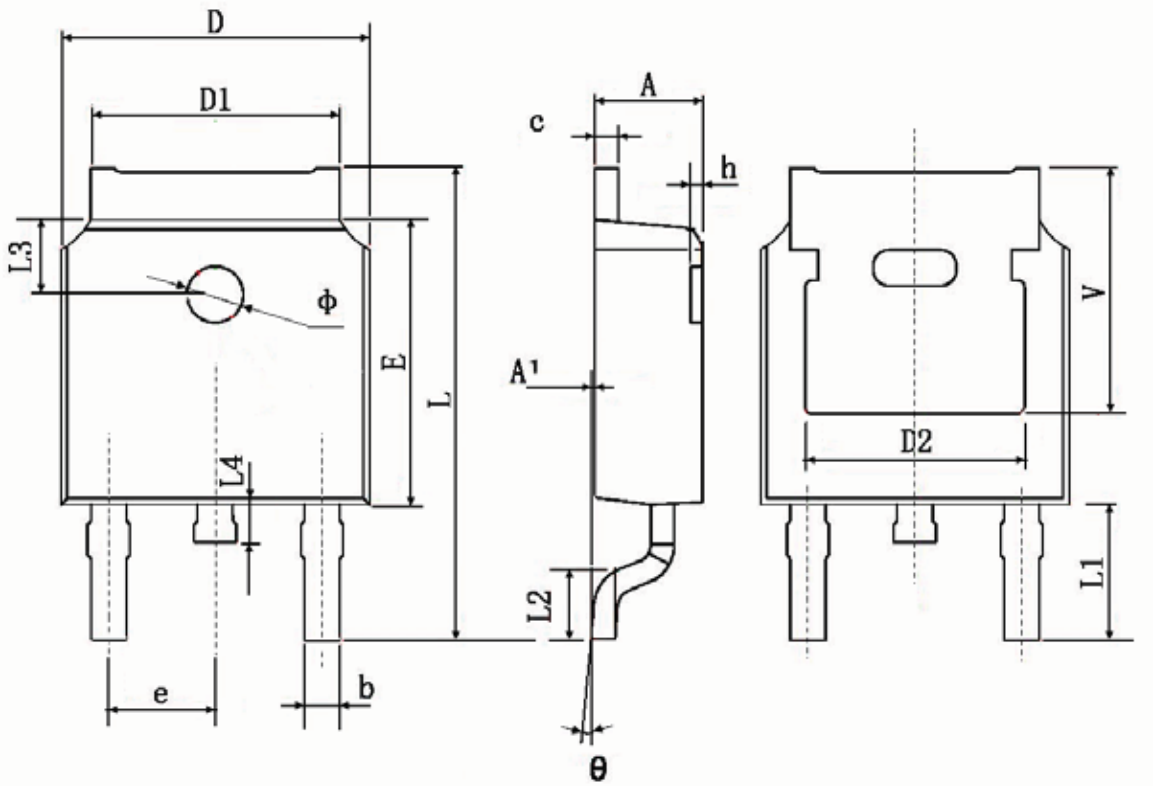



Figure 9. Normalized Effective Transient Thermal Impedance With Pulse Duration

## TO-252-2L Package Information




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 2.200 | 2.400 | 0.087 | 0.094 |
| A1 | 0.000 | 0.127 | 0.000 | 0.005 |
| b | 0.660 | 0.860 | 0.026 | 0.034 |
| c | 0.460 | 0.580 | 0.018 | 0.023 |
| D | 6.500 | 6.700 | 0.256 | 0.264 |
| D1 | 5.100 | 5.460 | 0.201 | 0.215 |
| D2 | 4.83 TYP. | | 0.190 TYP. | |
| E | 6.000 | 6.200 | 0.236 | 0.244 |
| e | 2.186 | 2.386 | 0.086 | 0.094 |
| L | 9.800 | 10.400 | 0.386 | 0.409 |
| L1 | 2.900 TYP. | | 0.114 TYP. | |
| L2 | 1.400 | 1.700 | 0.055 | 0.067 |
| L3 | 1.600 TYP. | | 0.063 TYP. | |
| L4 | 0.600 | 1.000 | 0.024 | 0.039 |
| Φ | 1.100 | 1.300 | 0.043 | 0.051 |
| θ | 0° | 8° | 0° | 8° |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| V | 5.350 TYP. | | 0.211 TYP. | |

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