

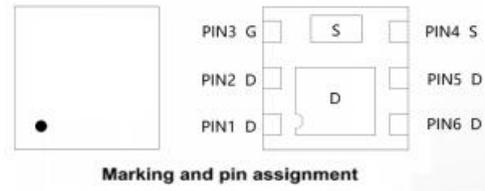
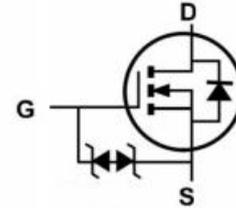
N-Channel Enhancement Mosfet

Features

- 30V,12A
 $R_{DS(ON)} < 25m\Omega @ V_{GS}=10V$ TYP:17m Ω
 $R_{DS(ON)} < 26m\Omega @ V_{GS}=4.5V$ TYP:19m Ω
- Advanced Trench Technology
- Lead free product is acquired
- ESD>2KV

Applications

- Interfacing Switching
- Load Switch
- PWM applications
- P/N suffix V means AEC-Q101 qualified, e.g:RM12N30ED2V
- Halogen-free



Package Marking and Ordering Information

| Device Marking | Device | Device Package | Packaging Code | Reel Size | Quantity (PCS) |
|----------------|-------------|----------------|----------------|-----------|----------------|
| 12N03EP | RM12N30ED2V | PQFN2X2 | -T | 7inch | 3000 |

ABSOLUTE MAXIMUM RATINGS (T_J=25°C unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|--|------------------|-----------|------|
| Drain-Source Voltage | V _{DS} | 30 | V |
| Gate-Source Voltage | V _{GS} | ±12 | V |
| Continuous Drain Current (T _c =25°C) | I _D | 12 | A |
| Continuous Drain Current (T _c =100°C) | I _D | 7.5 | A |
| Pulsed Drain Current ⁽¹⁾ | I _{DM} | 48 | A |
| Drain Power Dissipation | P _D | 19.2 | W |
| Single Pulsed Avalanche Energy ⁽²⁾ | E _{AS} | 25 | mJ |
| Thermal Resistance from Junction to Ambient ⁽³⁾ | R _{θJA} | 45 | °C/W |
| Thermal Resistance from Junction to Case | R _{θJC} | 6.5 | °C/W |
| Junction Temperature | T _J | -55~ +150 | °C |
| Storage Temperature | T _{STG} | -55~ +150 | °C |

Notes:

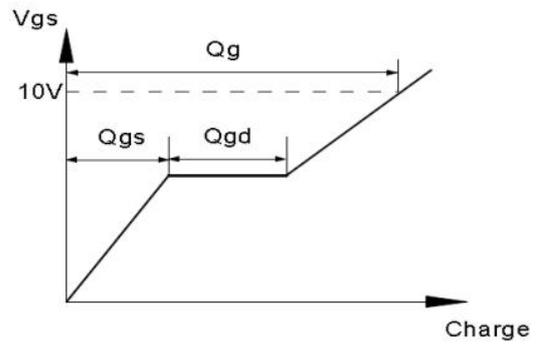
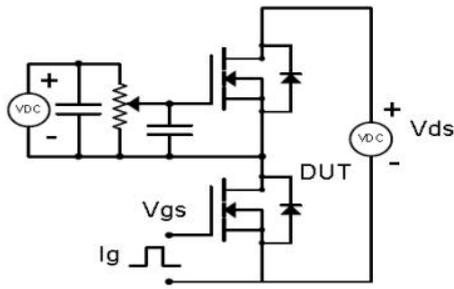
- 1) Repetitive Rating: pulse width limited by maximum junction temperature
- 2) EAS condition : T_J=25°C, V_{DD} 15V, V_G=10V, L=0.5mH, R_g=25 Ω , I_{AS} 10A
- 3) The value of R_{θJA} Mounted on FR4 Board (25.4mm*25.4mm*t1.6mm) With 2oz Copper TA=25°C

MOSFET ELECTRICAL CHARACTERISTICS($T_J=25^{\circ}\text{C}$ unless otherwise noted)

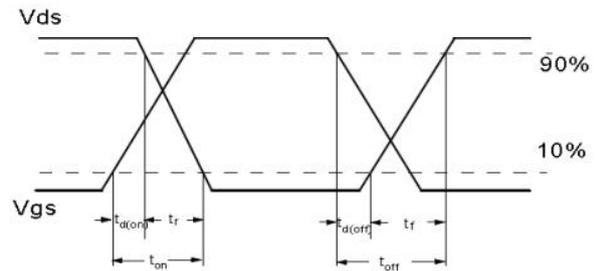
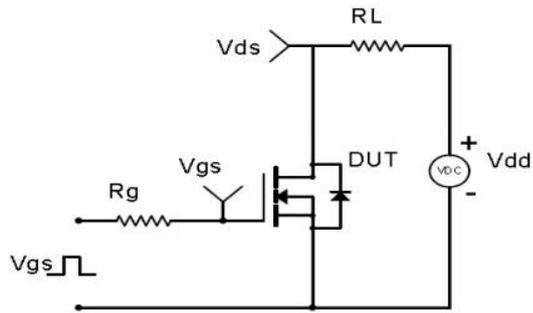
| Parameter | Symbol | Test Condition | Min | Type | Max | Unit |
|---|---------------|---|-----|------|-----------|-----------|
| Static Characteristics | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$ | 30 | 33 | - | V |
| Zero gate voltage drain current | I_{DSS} | $V_{DS} = 30V, V_{GS} = 0V$ | - | - | 1 | μA |
| Gate-body leakage current | I_{GSS} | $V_{GS} = \pm 12V, V_{DS} = 0V$ | - | - | ± 100 | nA |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 0.4 | 1.0 | 1.5 | V |
| Drain-source on-resistance | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 3A$ | - | 17 | 25 | $m\Omega$ |
| | | $V_{GS} = 4.5V, I_D = 2A$ | - | 19 | 26 | $m\Omega$ |
| Forward transconductance | R_g | $V_{GS} = 0V, V_{DS} = 0V, f = 1.0MHz$ | - | 1.9 | - | Ω |
| Dynamic characteristics | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS} = 15V, V_{GS} = 0V, f = 1MHz$ | - | 700 | - | pF |
| Output Capacitance | C_{oss} | | - | 66 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 52 | - | |
| Switching characteristics | | | | | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD} = 10V, I_D = 3A, R_G = 3.0\Omega, V_{GS} = 10V$ | - | 12 | - | nS |
| Turn-on rise time | t_r | | - | 52 | - | |
| Turn-off delay time | $t_{d(off)}$ | | - | 17 | - | |
| Turn-off fall time | t_f | | - | 10 | - | |
| Total Gate Charge | Q_g | $V_{DS} = 20V, I_D = 2A, V_{GS} = 10V$ | - | 18 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 1.46 | - | |
| Gate-Drain Charge | Q_{gd} | | - | 2.06 | - | |
| Source-Drain Diode characteristics | | | | | | |
| Diode Forward voltage | V_{SD} | $T_J = 25^{\circ}\text{C}, V_{GS} = 0V, I_S = 2A$ | - | 0.8 | 1.1 | V |
| Diode Forward current | I_S | $T_C = 25^{\circ}\text{C}$ | - | - | 12 | A |
| Body Diode Reverse Recovery Time | T_{rr} | $T_J = 25^{\circ}\text{C}, V_D = 20V,$ | - | 8.5 | - | nS |
| Body Diode Reverse Recovery Charge | Q_{rr} | $di/dt = 100A/\mu s, I_F = 3A$ | - | 2.2 | - | nC |

Test Circuit & Waveform

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



RATING AND CHARACTERISTICS CURVES (RM12N30ED2V)

Figure 1. Output Characteristics

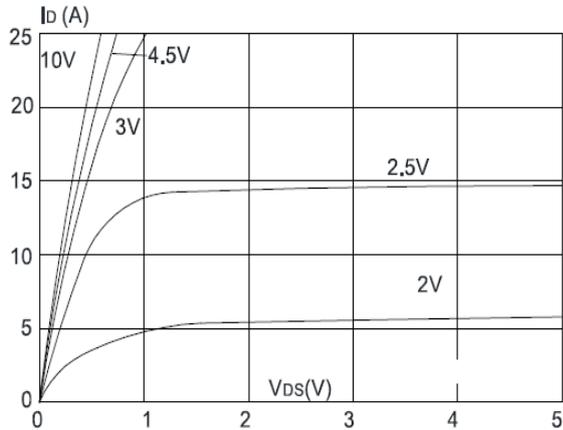


Figure 2. Transfer Characteristics

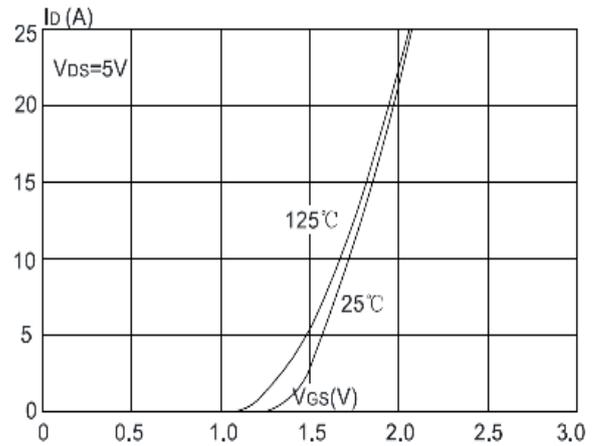


Figure 3. Source Drain Forward Characteristics

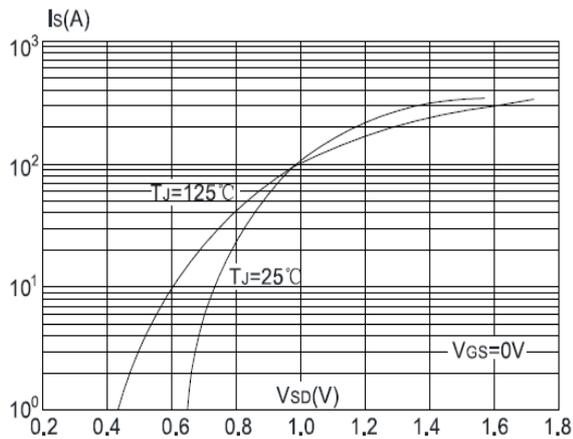


Figure 4. Gate-Charge Characteristics

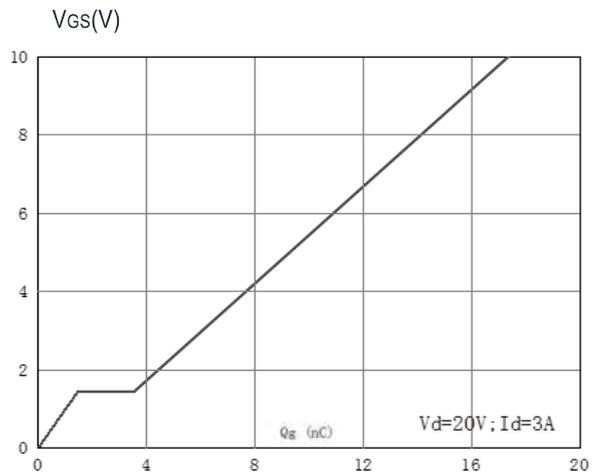


Figure 5. On-Resistance vs. Drain Current and Gate Voltage

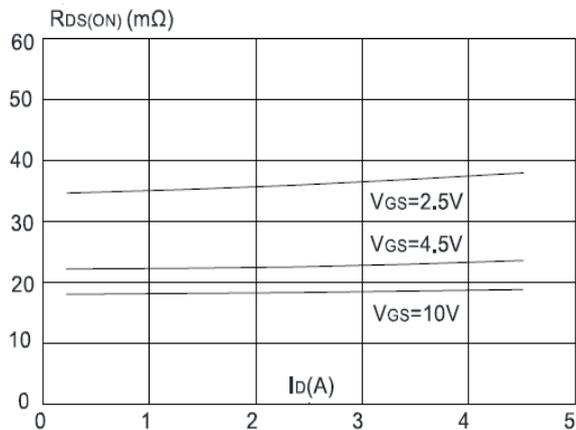
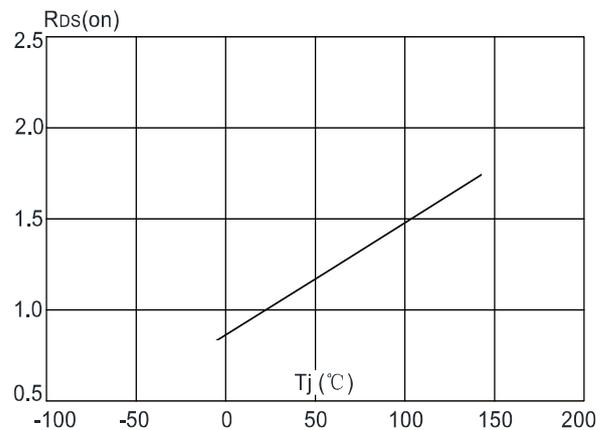


Figure 6. $R_{DS(on)}$ vs Junction Temperature



RATING AND CHARACTERISTICS CURVES (RM12N30ED2V)

Figure 7: V_{th} vs Junction Temperature

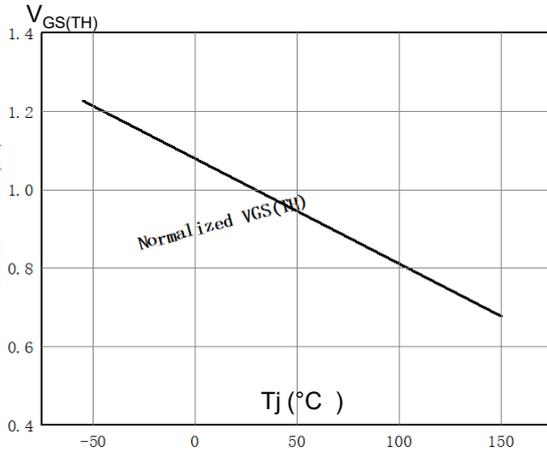


Figure 8: $V_{BR(DSS)}$ vs. Junction Temperature

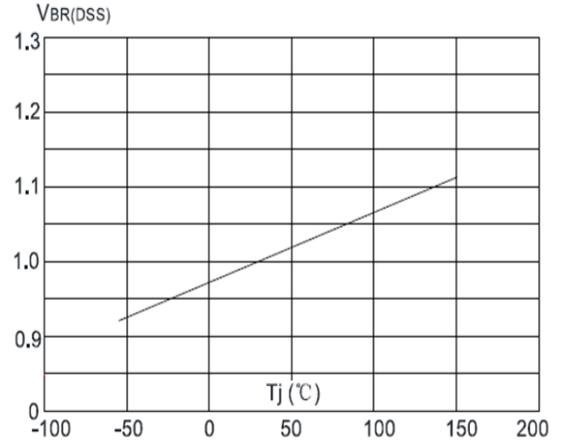


Figure 9. Capacitance

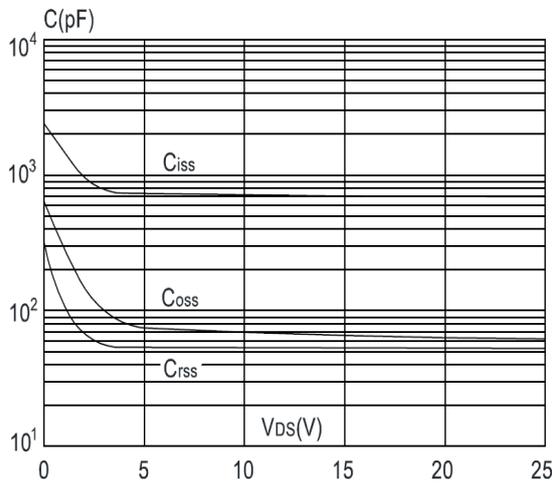


Figure 10. On-Resistance vs. Gate-Source Voltage

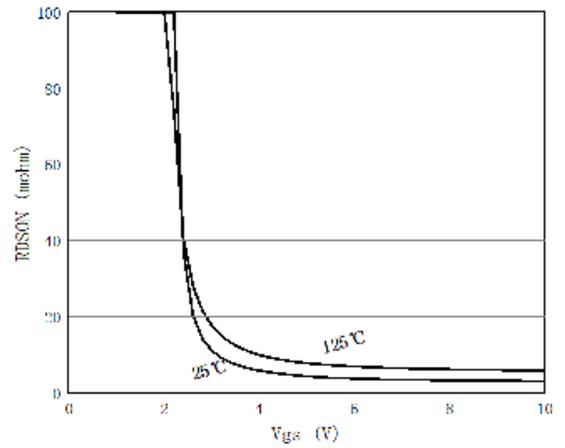


Figure 11. Current De-rating

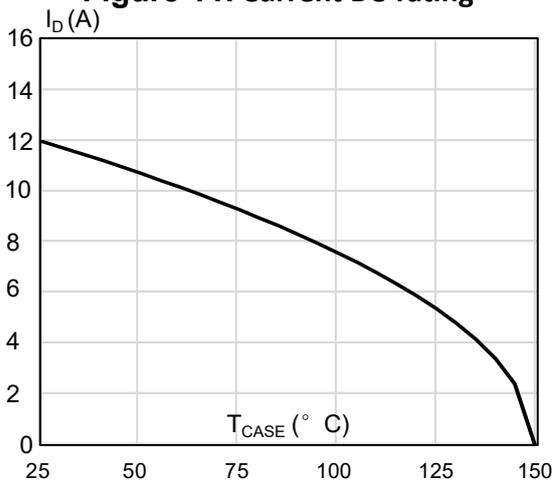
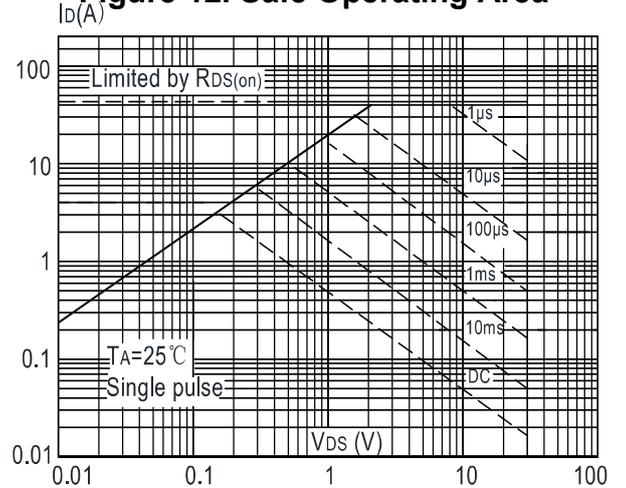
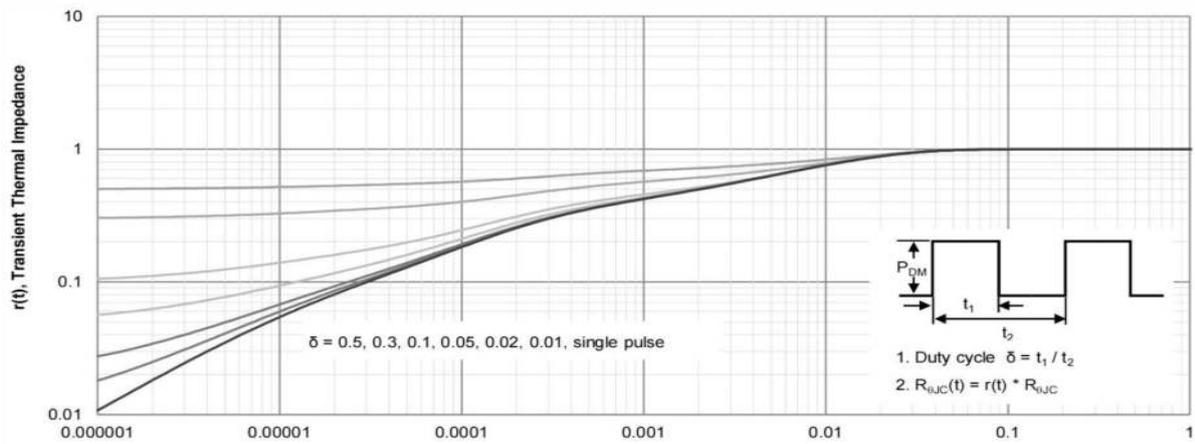


Figure 12. Safe Operating Area

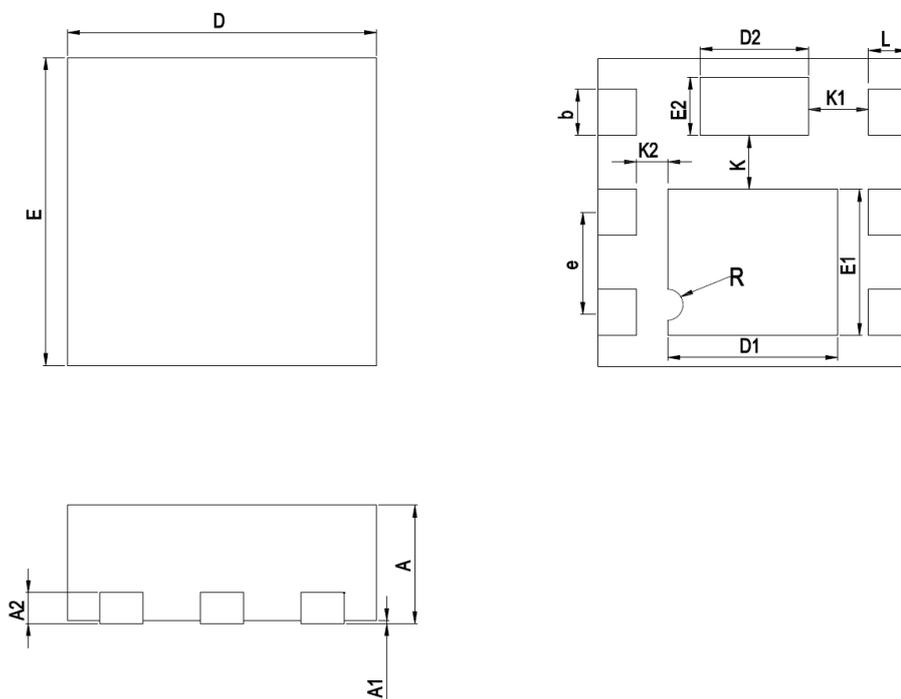


RATING AND CHARACTERISTICS CURVES (RM12N30ED2V)

Figure 13. Normalized Maximum Transient Thermal Impedance



PQFN2x2 Package Information



| SYMBOL | MILLIMETER | | |
|--------|------------|------|------|
| | MIN | NOM | MAX |
| A | 0.70 | 0.75 | 0.80 |
| A1 | 0.00 | 0.02 | 0.05 |
| b | 0.25 | 0.30 | 0.35 |
| A2 | 0.203 BSC | | |
| D | 1.90 | 2.00 | 2.10 |
| E | 1.90 | 2.00 | 2.10 |
| E1 | 0.90 | 0.95 | 1.00 |
| E2 | 0.33 | 0.38 | 0.43 |
| D1 | 1.10 | 1.15 | 1.20 |
| D2 | 0.65 | 0.70 | 0.75 |
| e | 0.65 REF | | |
| L | 0.22 | 0.25 | 0.27 |
| K | 0.30 | 0.35 | 0.40 |
| K1 | 0.35 | 0.40 | 0.45 |
| K2 | 0.18 | 0.20 | 0.22 |

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