

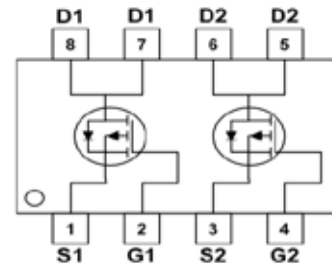
P-Channel Enhancement Mode Power MOSFET

Description

The RM6A5P30S8 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a load switch or in PWM applications.

General Features

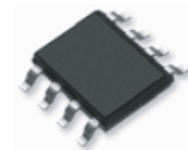
- $V_{DS} = -30V, I_D = -6.5A$
 $R_{DS(ON)} < 42m\Omega @ V_{GS} = -4.5V$
 $R_{DS(ON)} < 25m\Omega @ V_{GS} = -10V$
- High Power and current handing capability
- Lead free product is acquired
- Surface mount package



Schematic diagram and pin assignment

Application

- PWM applications
- Load switch
- Power management
- Halogen-free
- P/N suffix V means AEC-Q101 qualified, e.g:RM6A5P30S8V



SOP-8 top view

Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|------------|----------------|-----------|------------|------------|
| 6A5P30 | RM6A5P30S8 | SOP-8 | Ø330mm | 12mm | 4000 units |

Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|--|----------------|------------|------------|
| Drain-Source Voltage | V_{DS} | -30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous | I_D | -6.5 | A |
| Drain Current-Pulsed ^(Note 1) | I_{DM} | -26 | A |
| Maximum Power Dissipation | P_D | 1.5 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 150 | $^\circ C$ |

Thermal Characteristic

| | | | |
|---|-----------------|----|--------------|
| Thermal Resistance, Junction-to-Ambient ^(Note 2) | $R_{\theta JA}$ | 85 | $^\circ C/W$ |
|---|-----------------|----|--------------|

Electrical Characteristics ($T_A = 25^\circ C$ unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|----------------------------|--------|-----------|-----|-----|-----|------|
| Off Characteristics | | | | | | |

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|--|--------------|---|-----|------|-----------|------------|
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=-250\mu A$ | -30 | - | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=-24V, V_{GS}=0V$ | - | - | -1 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| On Characteristics ^(Note 3) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -1 | - | -2.5 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=-10V, I_D=-6A$ | - | - | 25 | m Ω |
| | | $V_{GS}=-4.5V, I_D=-4A$ | - | - | 42 | m Ω |
| Forward Transconductance | g_{FS} | $V_{DS}=-10V, I_D=-6A$ | 17 | - | - | S |
| Dynamic Characteristics ^(Note 4) | | | | | | |
| Input Capacitance | C_{ISS} | $V_{DS}=-15V, V_{GS}=0V,$ $F=1.0MHz$ | - | 1345 | - | PF |
| Output Capacitance | C_{OSS} | | - | 194 | - | PF |
| Reverse Transfer Capacitance | C_{RSS} | | - | 158 | - | PF |
| Switching Characteristics ^(Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=-15V, I_D=-6A,$ $V_{GS}=-10V, R_{GEN}=3.3\Omega$ | - | 4.6 | - | nS |
| Turn-on Rise Time | t_r | | - | 14.8 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 41 | - | nS |
| Turn-Off Fall Time | t_f | | - | 19.6 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=-15V, I_D=-6A, V_{GS}=-4.5V$ | - | 12.6 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 4.8 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 4.8 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage ^(Note 3) | V_{SD} | $V_{GS}=0V, I_S=-1A$ | - | - | -1.2 | V |

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

RATING AND CHARACTERISTICS CURVES (RM6A5P30S8)

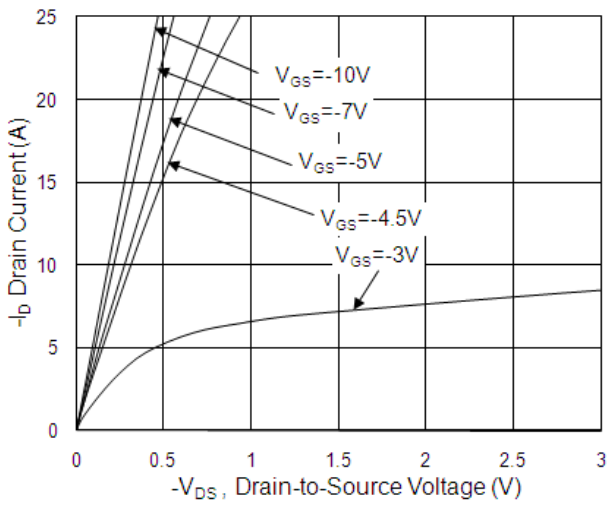


Fig.1 Typical Output Characteristics

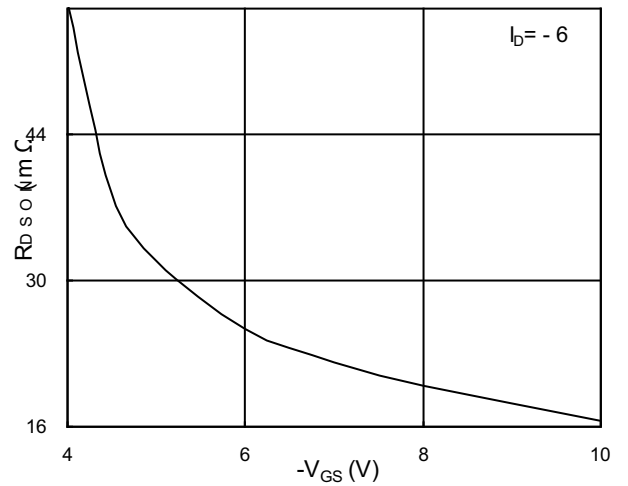


Fig.2 On-Resistance v.s Gate-Source

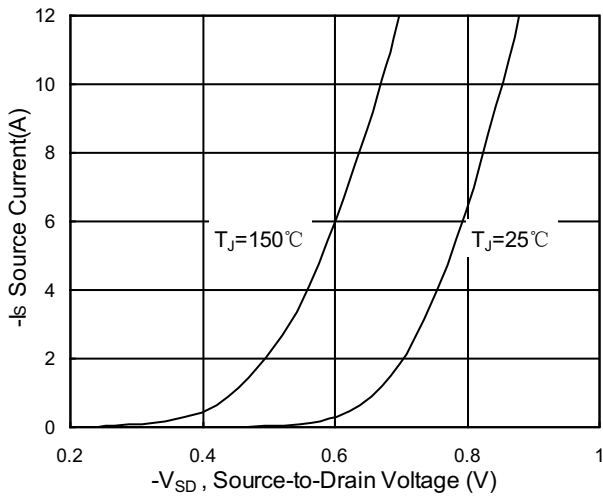


Fig.3 Forward Characteristics of Reverse

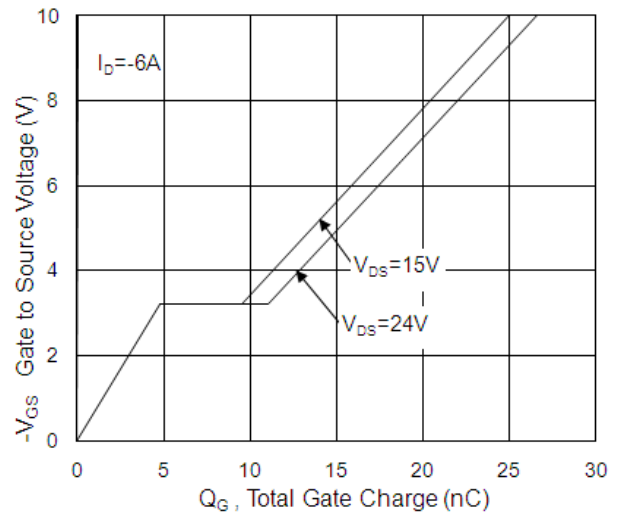


Fig.4 Gate-Charge Characteristics

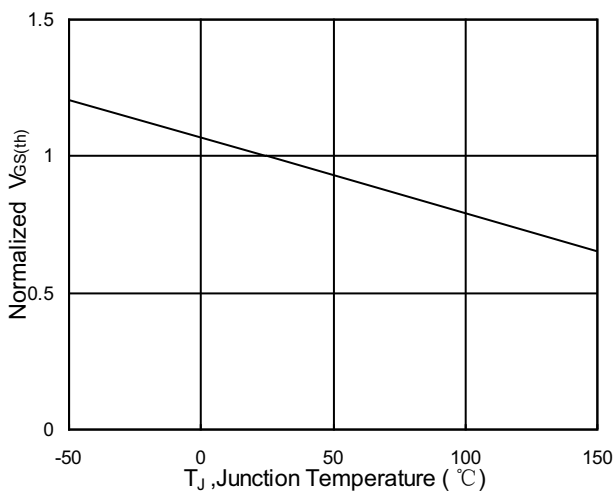


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

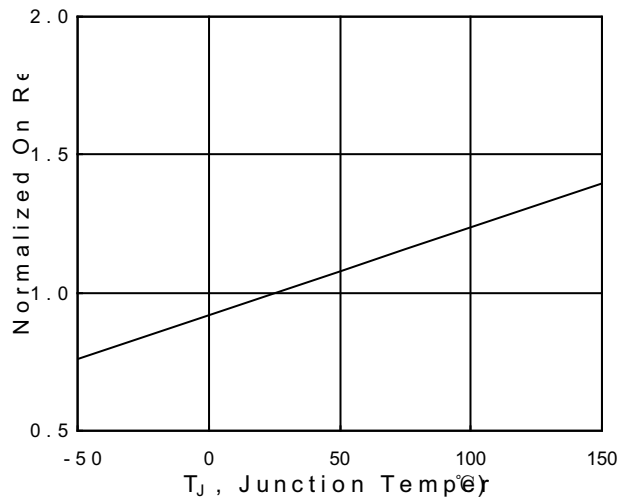


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

RATING AND CHARACTERISTICS CURVES (RM6A5P30S8)

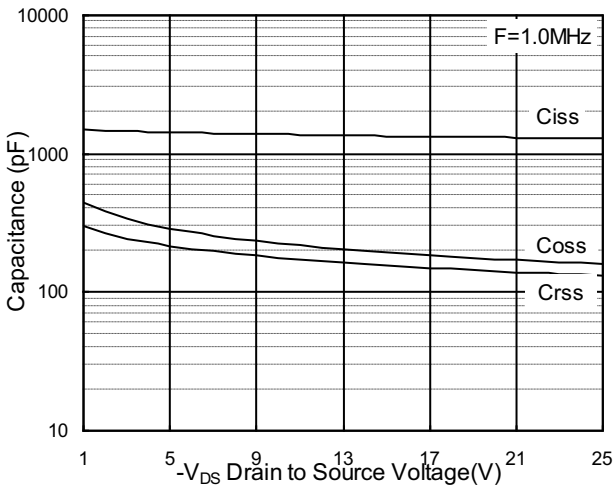


Fig.7 Capacitance

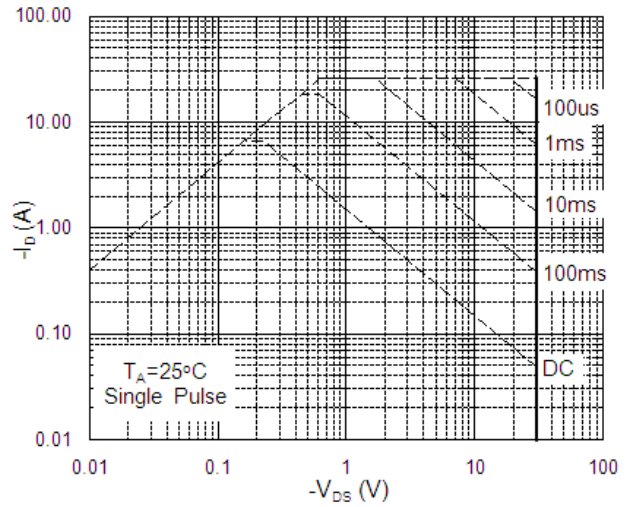


Fig.8 Safe Operating Area

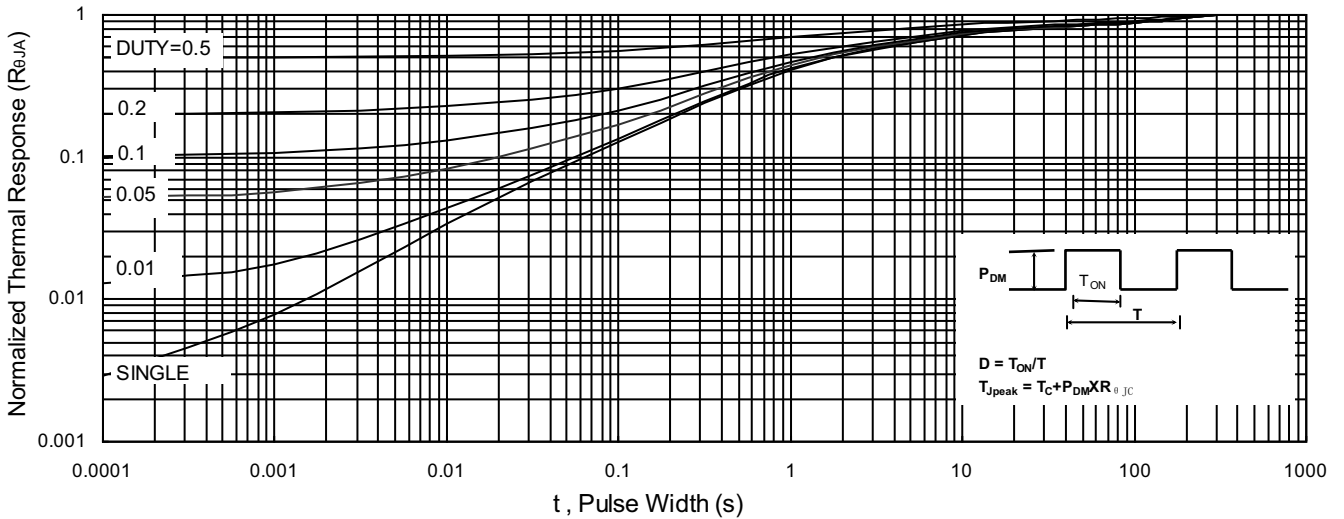


Fig.9 Normalized Maximum Transient Thermal Impedance

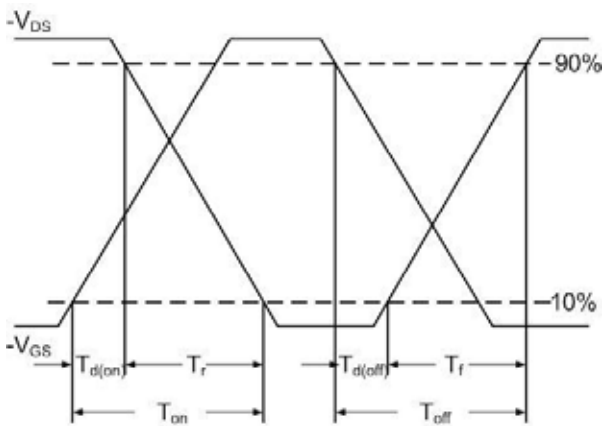


Fig.10 Switching Time Waveform

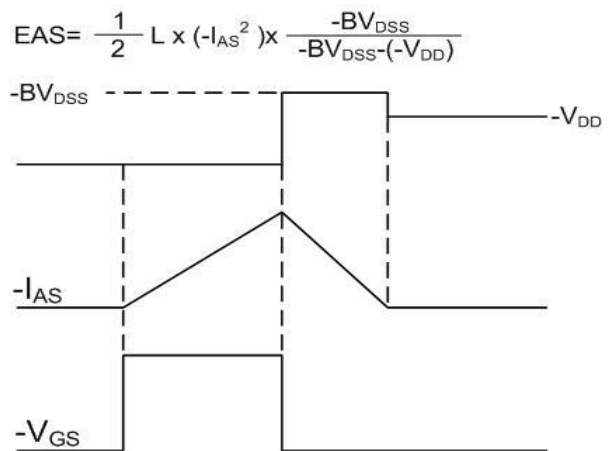
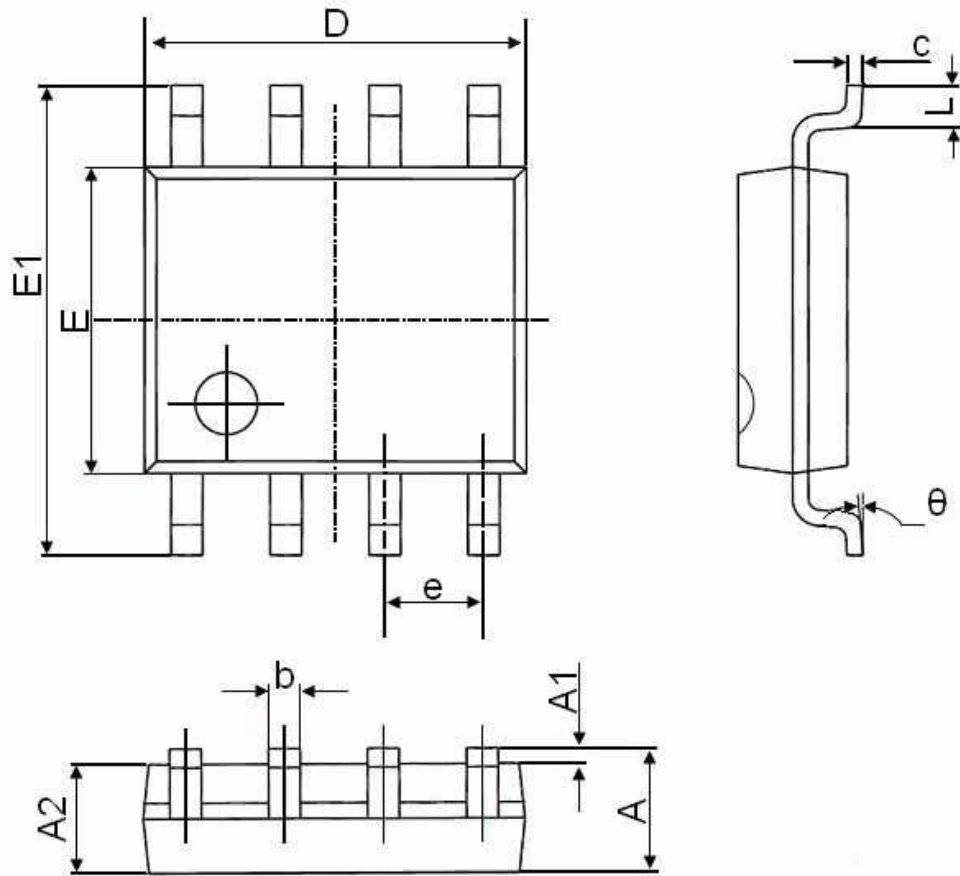


Fig.11 Unclamped Inductive Switching Waveform

SOP-8 Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 1.350 | 1.750 | 0.053 | 0.069 |
| A1 | 0.100 | 0.250 | 0.004 | 0.010 |
| A2 | 1.350 | 1.550 | 0.053 | 0.061 |
| b | 0.330 | 0.510 | 0.013 | 0.020 |
| c | 0.170 | 0.250 | 0.006 | 0.010 |
| D | 4.700 | 5.100 | 0.185 | 0.200 |
| E | 3.800 | 4.000 | 0.150 | 0.157 |
| E1 | 5.800 | 6.200 | 0.228 | 0.244 |
| e | 1.270(BSC) | | 0.050(BSC) | |
| L | 0.400 | 1.270 | 0.016 | 0.050 |
| theta | 0° | 8° | 0° | 8° |

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