

### • General Description

The ZM270P03U combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ . This device is ideal for load switch and battery protection applications.

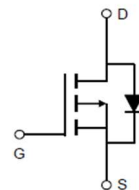
### • Features

- Advance high cell density Trench technology
- Low  $R_{DS(ON)}$  to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance

### • Application

- Load Switch
- PWM Application

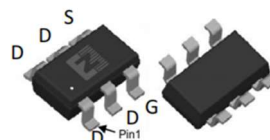
### • Product Summary



$$V_{DS} = -30V$$

$$R_{DS(ON)} = 27m\Omega$$

$$I_D = -7A$$



SOT-23-6

### • Ordering Information:

|                           |           |
|---------------------------|-----------|
| Part NO.                  | ZM270P03U |
| Marking                   | 270P03    |
| Packing Information       | REEL TAPE |
| Basic ordering unit (pcs) | 3000      |

### • Absolute Maximum Ratings ( $T_C = 25^\circ C$ )

| Parameter                                   | Symbol                 | Rating     | Unit       |
|---------------------------------------------|------------------------|------------|------------|
| Drain-Source Voltage                        | $V_{DS}$               | -30        | V          |
| Gate-Source Voltage                         | $V_{GS}$               | $\pm 20$   | V          |
| Continuous Drain Current                    | $I_{D@TC=25^\circ C}$  | -7         | A          |
|                                             | $I_{D@TC=75^\circ C}$  | -5.3       | A          |
|                                             | $I_{D@TC=100^\circ C}$ | -4.4       | A          |
| Pulsed Drain Current <sup>①</sup>           | $I_{DM}$               | -25        | A          |
| Total Power Dissipation <sup>②</sup>        | $P_D$                  | 12         | W          |
| Total Power Dissipation( $T_A=25^\circ C$ ) | $P_{D@TA=25^\circ C}$  | 0.75       | W          |
| Operating Junction Temperature              | $T_J$                  | -55 to 150 | $^\circ C$ |
| Storage Temperature                         | $T_{STG}$              | -55 to 150 | $^\circ C$ |

**•Thermal resistance**

| Parameter                                        | Symbol     | Min. | Typ. | Max. | Unit  |
|--------------------------------------------------|------------|------|------|------|-------|
| Thermal resistance, junction - case <sup>②</sup> | $R_{thJC}$ | -    | -    | 10   | ° C/W |
| Thermal resistance, junction - ambient           | $R_{thJA}$ | -    | -    | 170  | ° C/W |
| Soldering temperature, wavesoldering for 10s     | $T_{sold}$ | -    | -    | 265  | ° C   |

**•Electronic Characteristics**

| Parameter                         | Symbol       | Condition                          | Min. | Typ | Max.      | Unit       |
|-----------------------------------|--------------|------------------------------------|------|-----|-----------|------------|
| Drain-Source Breakdown Voltage    | $BV_{DSS}$   | $V_{GS} = 0V, I_D = -250\mu A$     | -30  |     |           | V          |
| Gate Threshold Voltage            | $V_{GS(TH)}$ | $V_{GS} = V_{DS}, I_D = -250\mu A$ | -1   |     | -2.5      | V          |
| Drain-Source Leakage Current      | $I_{DSS}$    | $V_{DS} = -30V, V_{GS} = 0V$       |      |     | 1.0       | $\mu A$    |
| Gate- Source Leakage Current      | $I_{GSS}$    | $V_{GS} = \pm 20V, V_{DS} = 0V$    |      |     | $\pm 100$ | nA         |
| Static Drain-source On Resistance | $R_{DS(ON)}$ | $V_{GS} = -10V, I_D = -7A$         |      | 27  | 34        | m $\Omega$ |
|                                   |              | $V_{GS} = -4.5V, I_D = -5A$        |      | 40  | 48        | m $\Omega$ |
| Forward Transconductance          | $g_{FS}$     | $V_{DS} = -10V, I_D = -1A$         |      | 10  |           | s          |
| Source-drain voltage              | $V_{SD}$     | $I_S = -7A$                        |      |     | 1.28      | V          |

**•Electronic Characteristics**

| Parameter                    | Symbol    | Condition                     | Min. | Typ | Max. | Unit |
|------------------------------|-----------|-------------------------------|------|-----|------|------|
| Input capacitance            | $C_{iss}$ | $V_{DS} = -25V$<br>$f = 1MHz$ | -    | 895 | -    | pF   |
| Output capacitance           | $C_{oss}$ |                               | -    | 160 | -    |      |
| Reverse transfer capacitance | $C_{rss}$ |                               | -    | 125 | -    |      |

**•Gate Charge characteristics( $T_a = 25^\circ C$ )**

| Parameter            | Symbol   | Condition                                         | Min. | Typ | Max. | Unit |
|----------------------|----------|---------------------------------------------------|------|-----|------|------|
| Total gate charge    | $Q_g$    | $V_{DD} = -15V$<br>$I_D = -7A$<br>$V_{GS} = -10V$ | -    | 14  |      | nC   |
| Gate - Source charge | $Q_{gs}$ |                                                   | -    | 6   | -    |      |
| Gate - Drain charge  | $Q_{gd}$ |                                                   | -    | 5   | -    |      |

Note: ① Pulse Test : Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$  ;

② Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate;

Fig.1 Power Dissipation Derating Curve

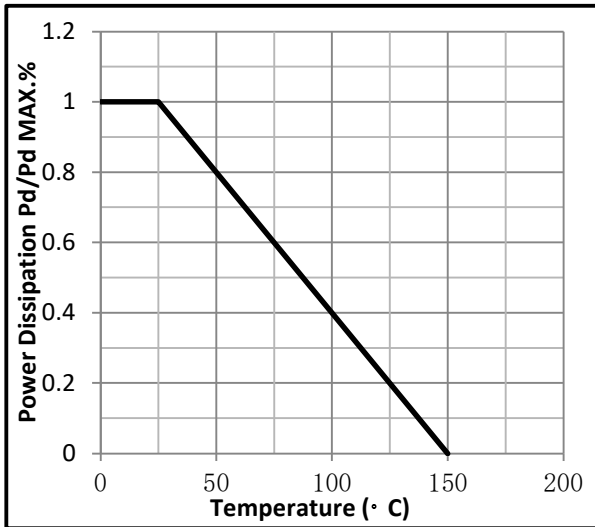


Fig.2 Typical output Characteristics

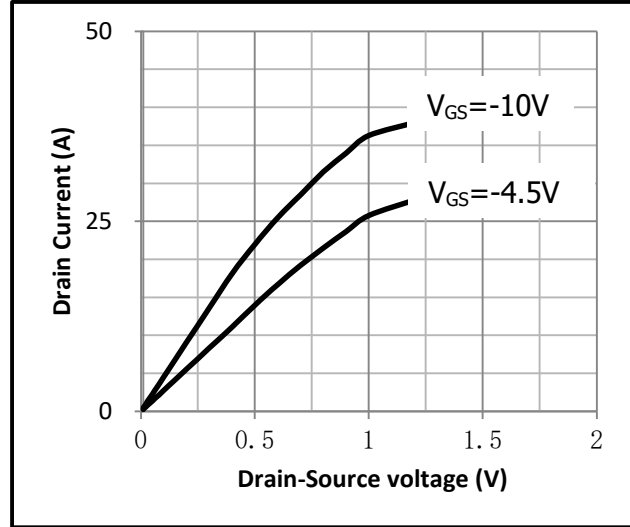


Fig.3 Threshold Voltage V.S Junction Temperature

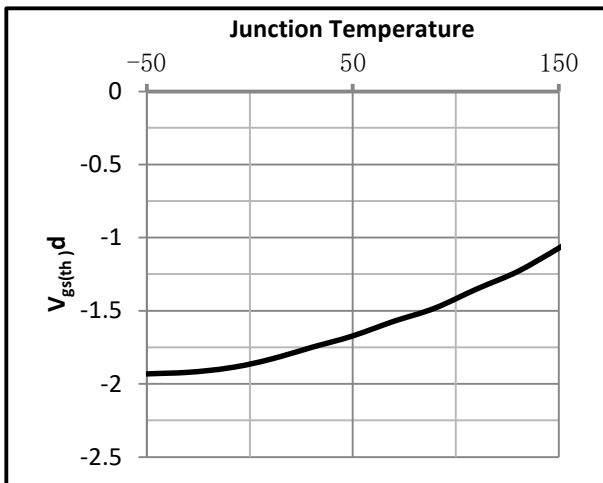


Fig.4 Resistance V.S Drain Current

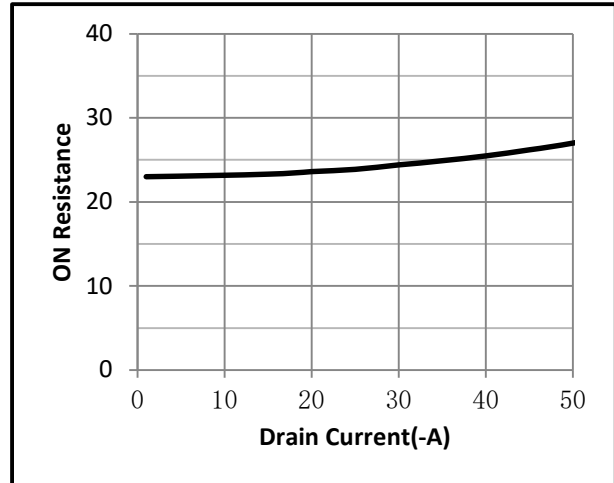


Fig.5 On-Resistance VS Gate Source Voltage

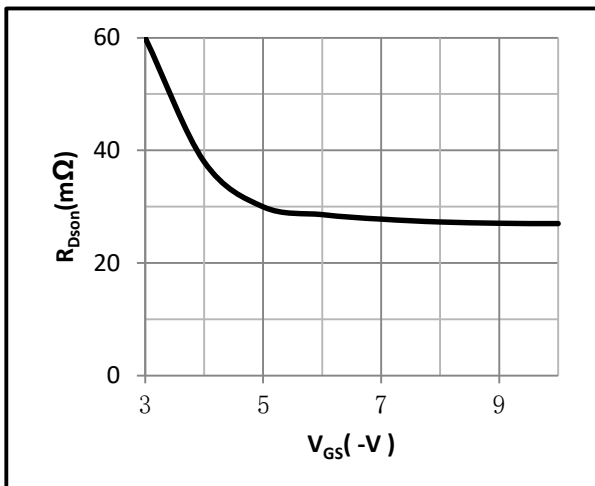


Fig.6 On-Resistance V.S Junction Temperature

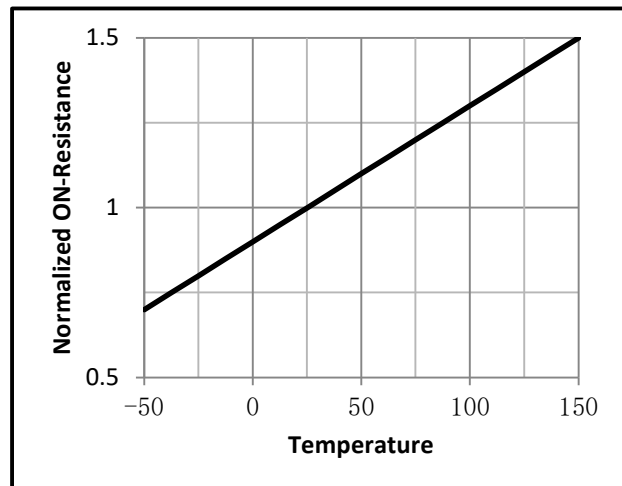


Fig.7 Gate Charge Measurement Circuit

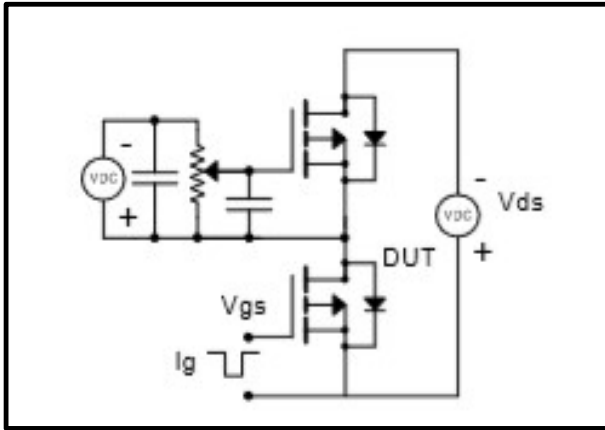


Fig.8 Gate Charge Waveform

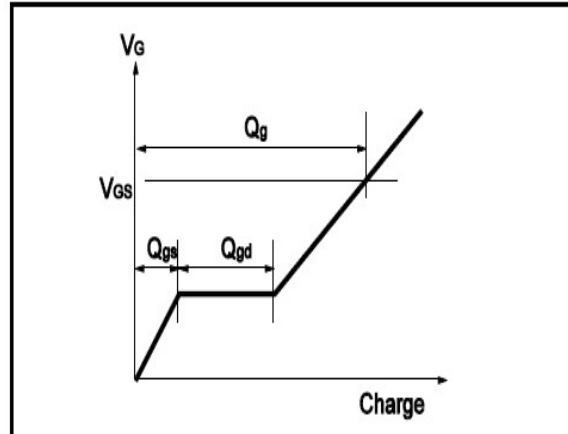


Fig.9 Switching Time Measurement Circuit

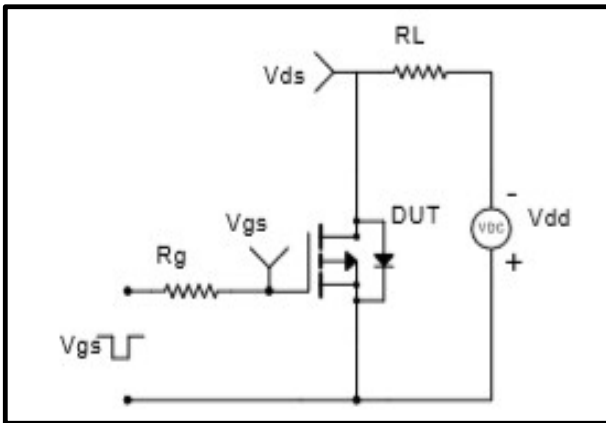


Fig.10 Switching Time Waveform

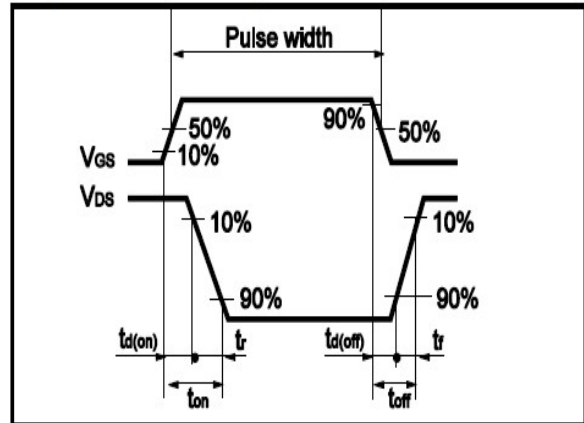


Fig.11 Avalanche Measurement Circuit

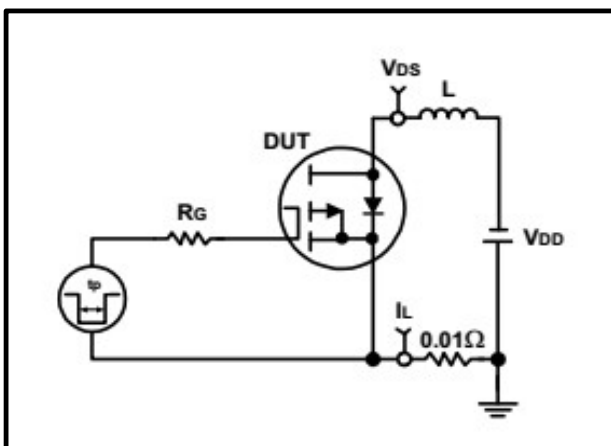
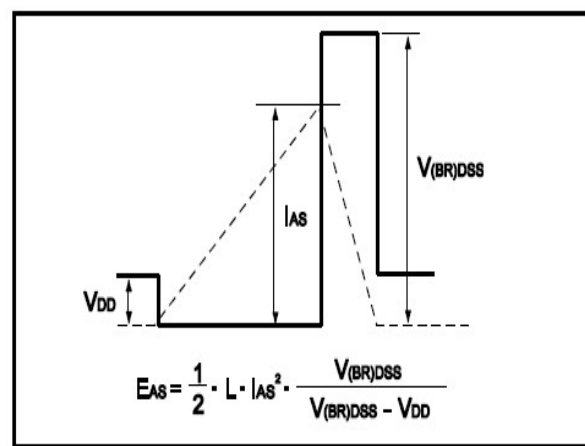


Fig.12 Avalanche Waveform



•Dimensions(SOT23-6)

Unit: mm

