



SamHop Microelectronics Corp.

Jan.7, 2008 ver1.0

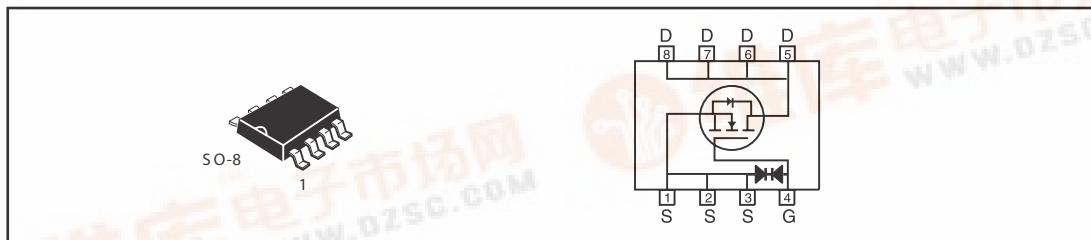
# STM4472

## N-Channel Enhancement Mode Field Effect Transistor

| PRODUCT SUMMARY |                |   |
|-----------------|----------------|---|
| V <sub>DS</sub> | I <sub>D</sub> | R <sub>DS(ON)</sub> (mΩ) Max                              |
| 40V             | 7 A            | 24 @ V <sub>GS</sub> = 10V<br>30 @ V <sub>GS</sub> = 4.5V |

### FEATURES

- Super high dense cell design for low R<sub>DS(ON)</sub>.
- Rugged and reliable.
- Surface Mount Package.
- ESD Protected.



### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C unless otherwise noted)

| Parameter  | Symbol                            | Limit                | Unit |   |
|--|-----------------------------------|----------------------|------|---|
| Drain-Source Voltage                                   | V <sub>DS</sub>                   | 40                   | V    |   |
| Gate-Source Voltage                                    | V <sub>GS</sub>                   | ±20                  | V    |   |
| Drain Current-Continuous <sup>a</sup> @ T <sub>a</sub> | I <sub>D</sub>                    | 25°C                 | 7    | A |
|  |                                   | 70°C                 | 5.9  | A |
| -Pulsed <sup>b</sup>                                   | I <sub>DM</sub>                   | 28                   | A    |   |
| Drain-Source Diode Forward Current <sup>a</sup>        | I <sub>S</sub>                    | 1.7                  | A    |   |
| Maximum Power Dissipation <sup>a</sup>                 | P <sub>D</sub>                    | T <sub>a</sub> =25°C | 3    | W |
|  |                                   | T <sub>a</sub> =70°C | 2.1  |   |
| Operating Junction and Storage Temperature Range       | T <sub>J</sub> , T <sub>STG</sub> | -55 to 150           | °C   |   |

### THERMAL CHARACTERISTICS

|  |                  |    |      |
|--|------------------|----|------|
| Thermal Resistance, Junction-to-Ambient <sup>a</sup> | R <sub>θJA</sub> | 40 | °C/W |
|--|------------------|----|------|

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N-Channel ELECTRICAL CHARACTERISTICS (TA = 25 °C unless otherwise noted)

| Parameter                                    | Symbol              | Condition  | Min | Typ <sup>c</sup> | Max | Unit  |
|--|---------------------|--|-----|------------------|-----|-------|
| <b>OFF CHARACTERISTICS</b>                   |                     |  |     |                  |     |       |
| Drain-Source Breakdown Voltage               | BV <sub>DSS</sub>   | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250uA   | 40  |                  |     | V     |
| Zero Gate Voltage Drain Current              | I <sub>DSS</sub>    | V <sub>DS</sub> = 32V, V <sub>GS</sub> = 0V  |     |                  | 1   | uA    |
| Gate-Body Leakage                            | I <sub>GSS</sub>    | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V   |     |                  | ±10 | uA    |
| <b>ON CHARACTERISTICS<sup>b</sup></b>        |                     |  |     |                  |     |       |
| Gate Threshold Voltage                       | V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250uA   | 1   | 1.8              | 3   | V     |
| Drain-Source On-State Resistance             | R <sub>DS(ON)</sub> | V <sub>GS</sub> = 10V, I <sub>D</sub> = 7A   |     | 18               | 24  | m ohm |
|  |                     | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 5A  |     | 23               | 30  | m ohm |
| On-State Drain Current                       | I <sub>D(ON)</sub>  | V <sub>DS</sub> = 5V, V <sub>GS</sub> = 10V  | 15  |                  |     | A     |
| Forward Transconductance                     | g <sub>FS</sub>     | V <sub>DS</sub> = 5V, I <sub>D</sub> = 7A  |     | 12.5             |     | S     |
| <b>DYNAMIC CHARACTERISTICS<sup>c</sup></b>   |                     |  |     |                  |     |       |
| Input Capacitance                            | C <sub>ISS</sub>    | V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V<br>f = 1.0MHz  |     | 700              |     | pF    |
| Output Capacitance                           | C <sub>OSS</sub>    |  |     | 140              |     | pF    |
| Reverse Transfer Capacitance                 | C <sub>RSS</sub>    |  |     | 80               |     | pF    |
| <b>SWITCHING CHARACTERISTICS<sup>c</sup></b> |                     |  |     |                  |     |       |
| Turn-On Delay Time                           | t <sub>D(ON)</sub>  | V <sub>DD</sub> = 20V<br>I <sub>D</sub> = 1 A<br>V <sub>GS</sub> = 10V<br>R <sub>GEN</sub> = 3.3 ohm |     | 13.4             |     | ns    |
| Rise Time                                    | t <sub>r</sub>      |  |     | 12.5             |     | ns    |
| Turn-Off Delay Time                          | t <sub>D(OFF)</sub> |  |     | 43.3             |     | ns    |
| Fall Time                                    | t <sub>f</sub>      |  |     | 8.5              |     | ns    |
| Total Gate Charge                            | Q <sub>g</sub>      | V <sub>DS</sub> = 20V, I <sub>D</sub> = 7A, V <sub>GS</sub> = 10V                                    |     | 13.5             |     | nC    |
|  |                     | V <sub>DS</sub> = 20V, I <sub>D</sub> = 7A, V <sub>GS</sub> = 4.5V                                   |     | 6.7              |     | nC    |
| Gate-Source Charge                           | Q <sub>gs</sub>     | V <sub>DS</sub> = 20V, I <sub>D</sub> = 7 A<br>V <sub>GS</sub> = 4.5V                                |     | 1.8              |     | nC    |
| Gate-Drain Charge                            | Q <sub>gd</sub>     |  |     | 2.4              |     | nC    |

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

| Parameter                                       | Symbol   | Condition                 | Min | Typ <sup>c</sup> | Max | Unit |
|---|----------|---------------------------|-----|------------------|-----|------|
| DRAIN-SOURCE DIODE CHARACTERISTICS <sup>b</sup> |          |                           |     |                  |     |      |
| Diode Forward Voltage                           | $V_{SD}$ | $V_{GS} = 0V, I_S = 1.7A$ |     | 0.78             | 1.2 | V    |

### Notes

- Surface Mounted on FR4 Board,  $t \leq 10\text{sec}$ .
- Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.

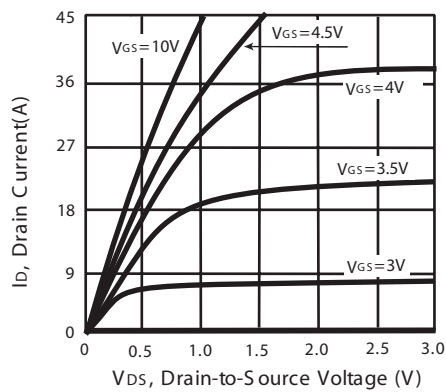


Figure 1. Output Characteristics

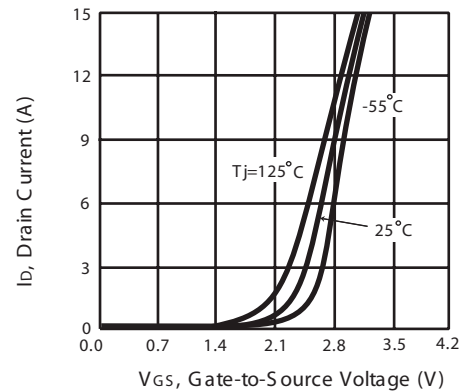


Figure 2. Transfer Characteristics

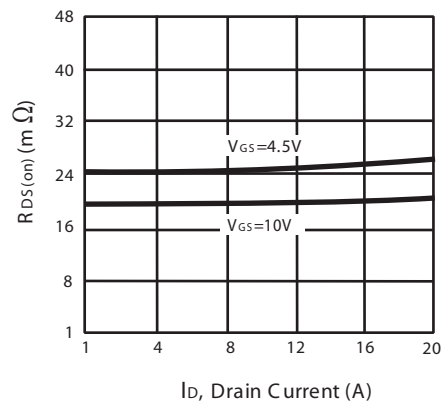


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

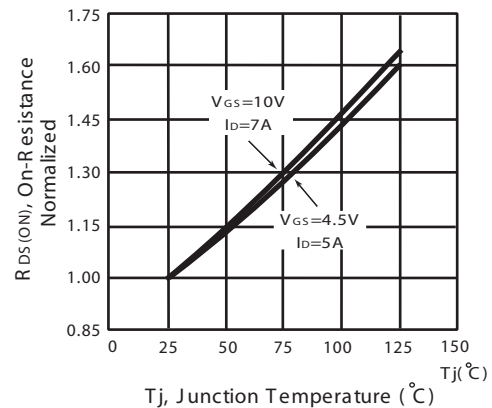


Figure 4. On-Resistance Variation with Drain Current and Temperature

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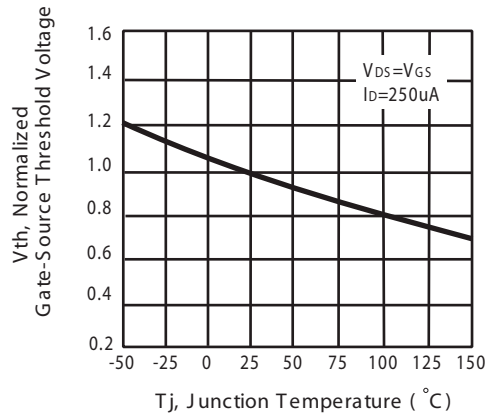


Figure 5. Gate Threshold Variation with Temperature

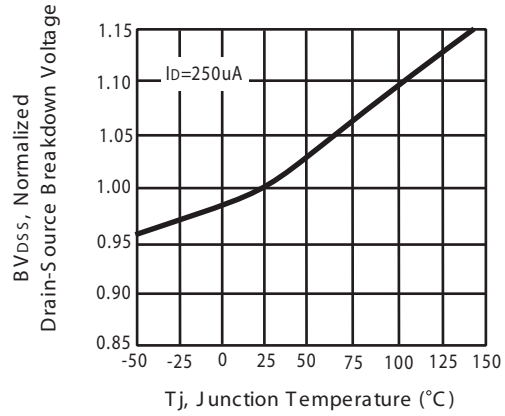


Figure 6. Breakdown Voltage Variation with Temperature

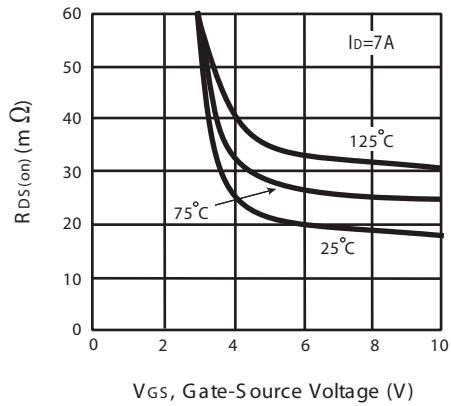


Figure 7. On-Resistance vs. Gate-Source Voltage

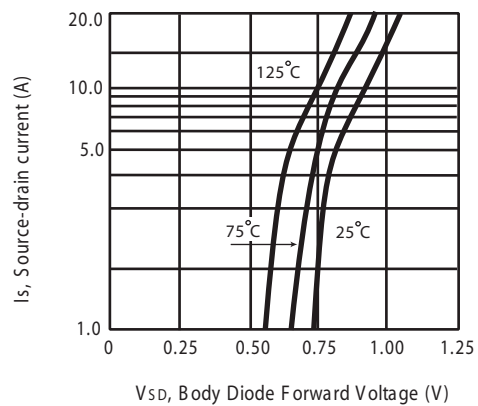
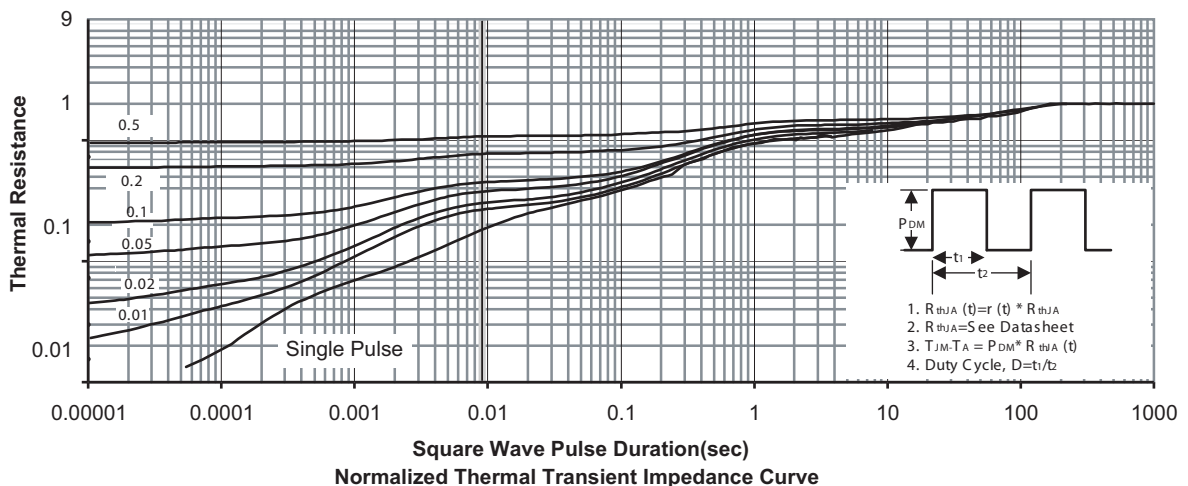
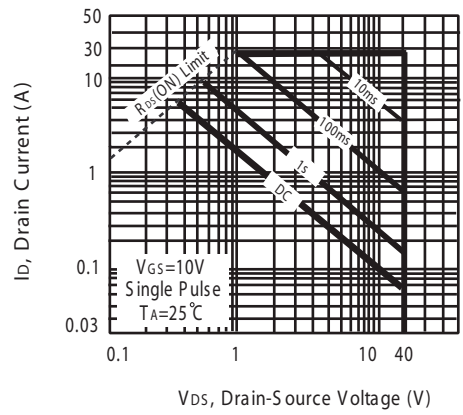
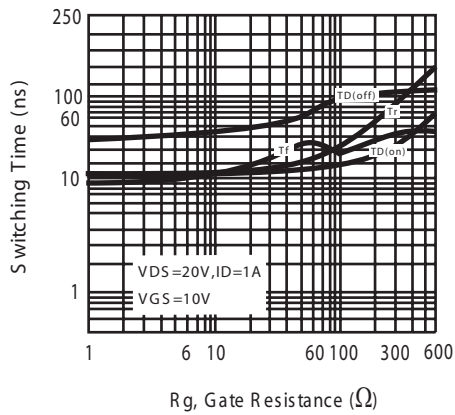
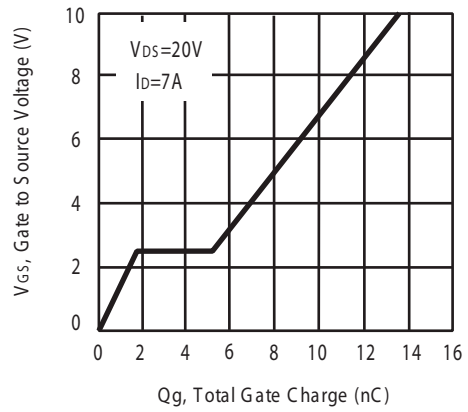
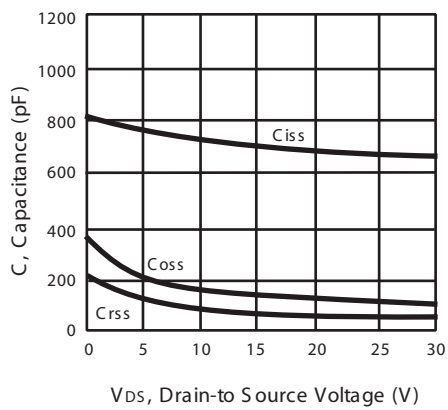


Figure 8. Body Diode Forward Voltage Variation with Source Current

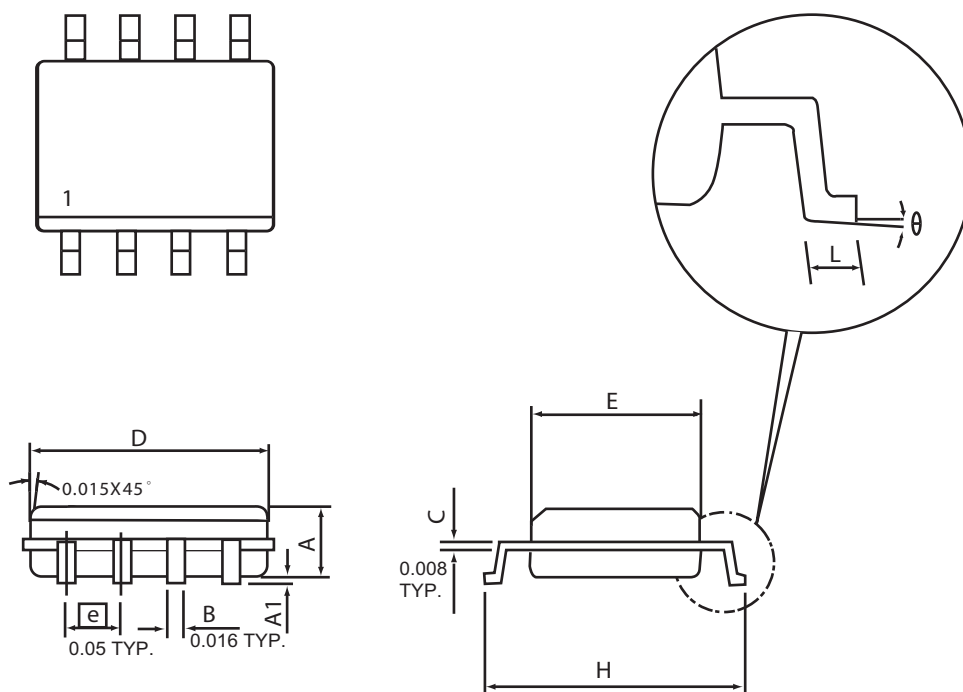
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## PACKAGE OUTLINE DIMENSIONS

SO-8

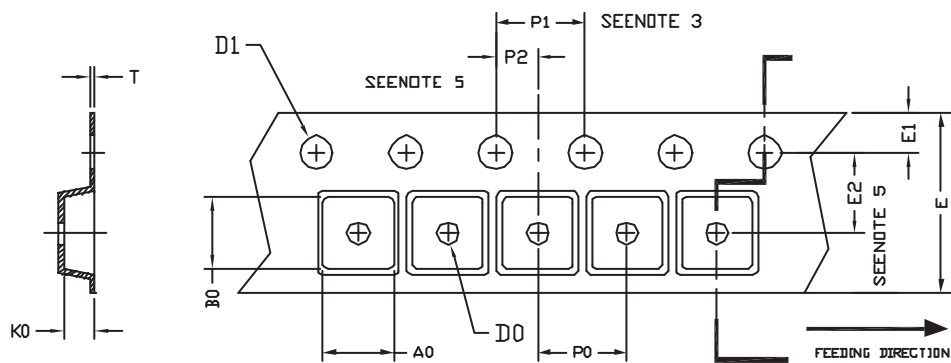


| SYMBOLS | MILLIMETERS |      | INCHES |       |
|---------|-------------|------|--------|-------|
|         | MIN         | MAX  | MIN    | MAX   |
| A       | 1.35        | 1.75 | 0.053  | 0.069 |
| A1      | 0.10        | 0.25 | 0.004  | 0.010 |
| D       | 4.80        | 4.98 | 0.189  | 0.196 |
| E       | 3.81        | 3.99 | 0.150  | 0.157 |
| H       | 5.79        | 6.20 | 0.228  | 0.244 |
| L       | 0.41        | 1.27 | 0.016  | 0.050 |
| θ       | 0°          | 8°   | 0°     | 8°    |

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## SO-8 Tape and Reel Data

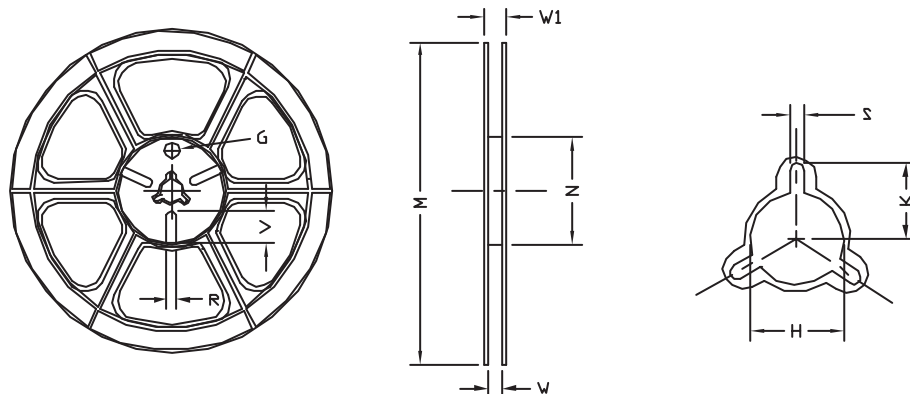
### SO-8 Carrier Tape



unit:mm

| PACKAGE          | A0   | B0   | K0   | D0                  | D1                           | E                 | E1   | E2                | P0  | P1  | P2                | T                 |
|------------------|------|------|------|---------------------|------------------------------|-------------------|------|-------------------|-----|-----|-------------------|-------------------|
| SOP 8N<br>150mil | 6.40 | 5.20 | 2.10 | $\phi 1.5$<br>(MIN) | $\phi 1.5$<br>+ 0.1<br>- 0.0 | 12.0<br>$\pm 0.3$ | 1.75 | 5.5<br>$\pm 0.05$ | 8.0 | 4.0 | 2.0<br>$\pm 0.05$ | 0.3<br>$\pm 0.05$ |

### SO-8 Reel



UNIT:mm

| TAPE SIZE | REEL SIZE  | M              | N               | W             | W1            | H                      | K   | S                 | G   | R   | V   |
|-----------|------------|----------------|-----------------|---------------|---------------|------------------------|-----|-------------------|-----|-----|-----|
| 12 mm     | $\phi 330$ | 330<br>$\pm 1$ | 62<br>$\pm 1.5$ | 12.4<br>+ 0.2 | 16.8<br>- 0.4 | $\phi 12.75$<br>+ 0.15 | --- | 2.0<br>$\pm 0.15$ | --- | --- | --- |