

# ZXMN3B14F

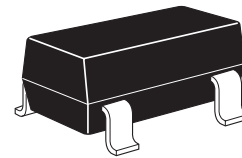
## 30V N-CHANNEL ENHANCEMENT MODE MOSFET 2.5V GATE DRIVE

### SUMMARY

$V_{(BR)DSS}=30V$  ;  $R_{DS(on)}=0.08\Omega$ ;  $I_D=3.5A$

### DESCRIPTION

This new generation of Trench MOSFETs from Zetex utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, power management applications.



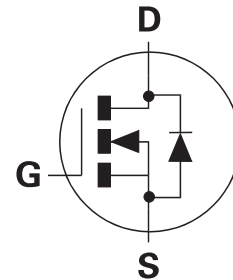
### PACKAGE

### FEATURES

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- SOT23 package

### APPLICATIONS

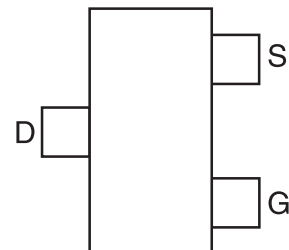
- DC-DC converters
- Power management functions
- Disconnect switches
- Motor control



### ORDERING INFORMATION

| DEVICE      | REEL SIZE | TAPE WIDTH | QUANTITY PER REEL |
|-------------|-----------|------------|-------------------|
| ZXMN3B14FTA | 7"        | 8mm        | 3,000 units       |
| ZXMN3B14FTC | 13"       | 8mm        | 10,000 units      |

### PINOUT



### DEVICE MARKING

- 3B4

# ZXMN3B14F

## ABSOLUTE MAXIMUM RATINGS

| PARAMETER                                                                                                                                                                                        | SYMBOL         | LIMIT             | UNIT           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------------|----------------|
| Drain-Source Voltage                                                                                                                                                                             | $V_{DSS}$      | 30                | V              |
| Gate-Source Voltage                                                                                                                                                                              | $V_{GS}$       | $\pm 12$          | V              |
| Continuous Drain Current @ $V_{GS} = 4.5V$ ; $T_A = 25^\circ C$ <sup>(b)</sup><br>@ $V_{GS} = 4.5V$ ; $T_A = 70^\circ C$ <sup>(b)</sup><br>@ $V_{GS} = 4.5V$ ; $T_A = 25^\circ C$ <sup>(a)</sup> | $I_D$          | 3.5<br>2.9<br>2.9 | A<br>A<br>A    |
| Pulsed Drain Current <sup>(c)</sup>                                                                                                                                                              | $I_{DM}$       | 16                | A              |
| Continuous Source Current (Body Diode) <sup>(b)</sup>                                                                                                                                            | $I_S$          | 2.4               | A              |
| Pulsed Source Current (Body Diode) <sup>(c)</sup>                                                                                                                                                | $I_{SM}$       | 16                | A              |
| Power Dissipation at $T_A = 25^\circ C$ <sup>(a)</sup>                                                                                                                                           | $P_D$          | 1                 | W              |
| Linear Derating Factor                                                                                                                                                                           |                | 8                 | mW/ $^\circ C$ |
| Power Dissipation at $T_A = 25^\circ C$ <sup>(b)</sup>                                                                                                                                           | $P_D$          | 1.5               | W              |
| Linear Derating Factor                                                                                                                                                                           |                | 12                | mW/ $^\circ C$ |
| Operating and Storage Temperature Range                                                                                                                                                          | $T_j, T_{stg}$ | -55 to +150       | $^\circ C$     |

## THERMAL RESISTANCE

| PARAMETER                          | SYMBOL          | VALUE | UNIT         |
|------------------------------------|-----------------|-------|--------------|
| Junction to Ambient <sup>(a)</sup> | $R_{\theta JA}$ | 125   | $^\circ C/W$ |
| Junction to Ambient <sup>(b)</sup> | $R_{\theta JA}$ | 83    | $^\circ C/W$ |

### NOTES

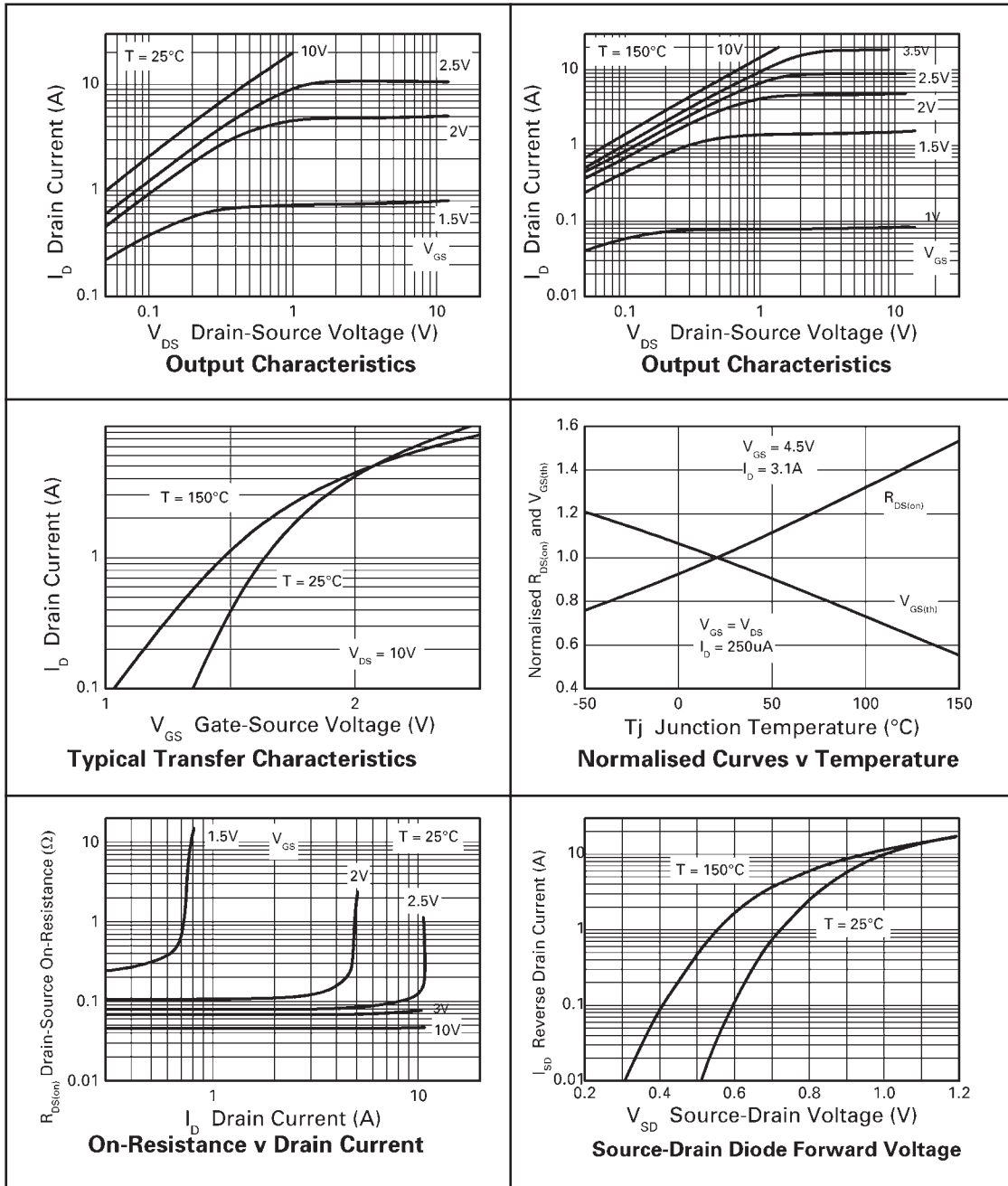
(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(b) For a device surface mounted on FR4 PCB measured at  $t \leq 5$  sec.

(c) Repetitive rating - 25mm x 25mm FR4 PCB,  $D=0.02$ , pulse width 300 $\mu s$  - pulse width limited by maximum junction temperature.

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## TYPICAL CHARACTERISTICS



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## ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

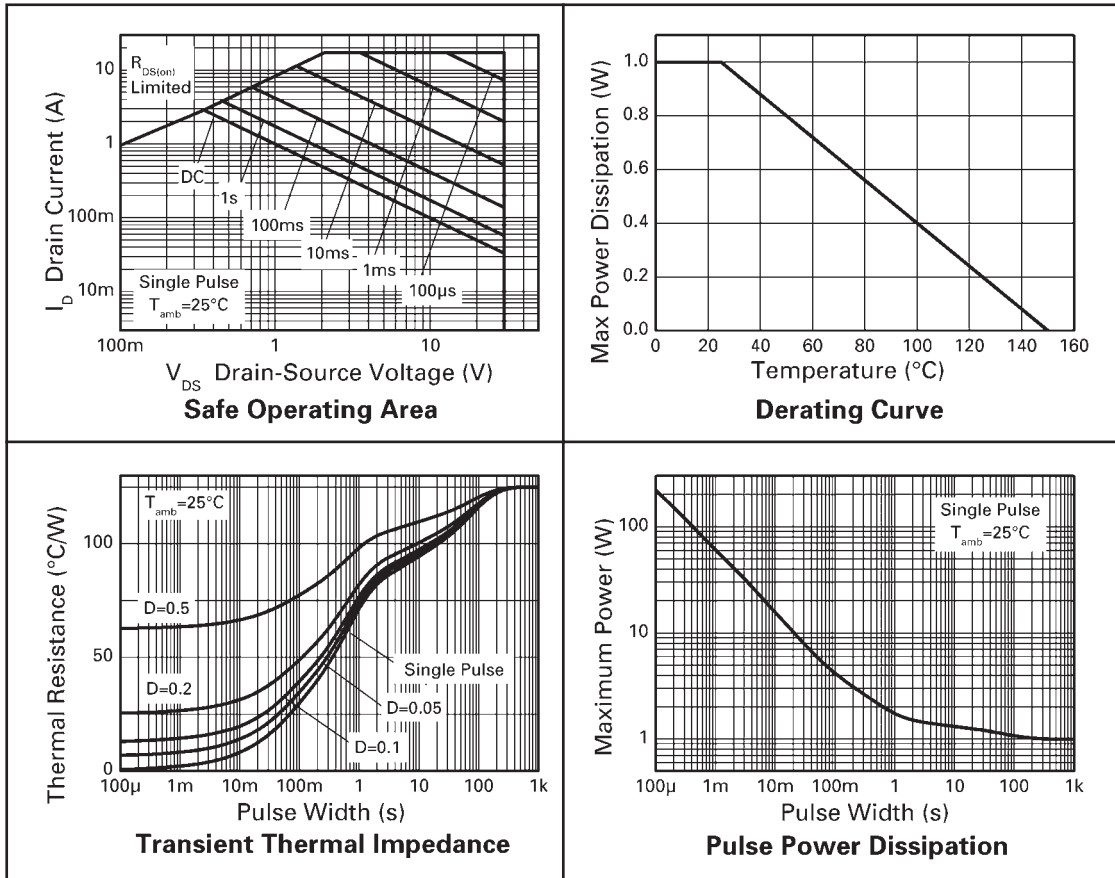
| PARAMETER                                              | SYMBOL               | MIN. | TYP. | MAX.  | UNIT | CONDITIONS                                                                                    |
|--------------------------------------------------------|----------------------|------|------|-------|------|-----------------------------------------------------------------------------------------------|
| STATIC                                                 |                      |      |      |       |      |                                                                                               |
| Drain-Source Breakdown Voltage                         | V <sub>(BR)DSS</sub> | 30   |      |       | V    | I <sub>D</sub> = 250μA, V <sub>GS</sub> =0V                                                   |
| Zero Gate Voltage Drain Current                        | I <sub>DSS</sub>     |      |      | 1     | μA   | V <sub>DS</sub> = 30V, V <sub>GS</sub> =0V                                                    |
| Gate-Body Leakage                                      | I <sub>GSS</sub>     |      |      | 100   | nA   | V <sub>GS</sub> =± 12V, V <sub>DS</sub> =0V                                                   |
| Gate-Source Threshold Voltage                          | V <sub>GS(th)</sub>  | 0.7  |      |       | V    | I <sub>D</sub> = 250μA, V <sub>DS</sub> =V <sub>GS</sub>                                      |
| Static Drain-Source On-State Resistance <sup>(1)</sup> | R <sub>DS(on)</sub>  |      |      | 0.080 | Ω    | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 3.1A                                                 |
|                                                        |                      |      |      | 0.140 | Ω    | V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 2.2A                                                 |
| Forward Transconductance <sup>(1) (3)</sup>            | g <sub>fs</sub>      |      | 8.5  |       | S    | V <sub>DS</sub> = 15V, I <sub>D</sub> = 3.1A                                                  |
| DYNAMIC <sup>(3)</sup>                                 |                      |      |      |       |      |                                                                                               |
| Input Capacitance                                      | C <sub>iss</sub>     |      | 568  |       | pF   | V <sub>DS</sub> = 15V, V <sub>GS</sub> =0V<br>f=1MHz                                          |
| Output Capacitance                                     | C <sub>oss</sub>     |      | 101  |       | pF   |                                                                                               |
| Reverse Transfer Capacitance                           | C <sub>rss</sub>     |      | 66   |       | pF   |                                                                                               |
| SWITCHING <sup>(2) (3)</sup>                           |                      |      |      |       |      |                                                                                               |
| Turn-On-Delay Time                                     | t <sub>d(on)</sub>   |      | 3.6  |       | ns   | V <sub>DD</sub> = 15V, V <sub>GS</sub> = 4.5V<br>I <sub>D</sub> = 1A<br>R <sub>G</sub> ≅ 6.0Ω |
| Rise Time                                              | t <sub>r</sub>       |      | 4.9  |       | ns   |                                                                                               |
| Turn-Off Delay Time                                    | t <sub>d(off)</sub>  |      | 17.3 |       | ns   |                                                                                               |
| Fall Time                                              | t <sub>f</sub>       |      | 9.8  |       | ns   |                                                                                               |
| Total Gate Charge                                      | Q <sub>g</sub>       |      | 6.7  |       | nC   | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 4.5V<br>I <sub>D</sub> = 3.1A                        |
| Gate-Source Charge                                     | Q <sub>gs</sub>      |      | 1.4  |       | nC   |                                                                                               |
| Gate Drain Charge                                      | Q <sub>gd</sub>      |      | 1.8  |       | nC   |                                                                                               |
| SOURCE-DRAIN DIODE                                     |                      |      |      |       |      |                                                                                               |
| Diode Forward Voltage <sup>(1)</sup>                   | V <sub>SD</sub>      |      | 0.82 | 0.95  | V    | T <sub>j</sub> =25°C, I <sub>S</sub> = 3.1A,<br>V <sub>GS</sub> =0V                           |
| Reverse Recovery Time <sup>(3)</sup>                   | t <sub>rr</sub>      |      | 10.8 |       | ns   | T <sub>j</sub> =25°C, I <sub>F</sub> = 1.6A,                                                  |
| Reverse Recovery Charge <sup>(3)</sup>                 | Q <sub>rr</sub>      |      | 4.54 |       | nC   | di/dt=100A/μs                                                                                 |

### NOTES

- (1) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .  
(2) Switching characteristics are independent of operating junction temperature.  
(3) For design aid only, not subject to production testing.

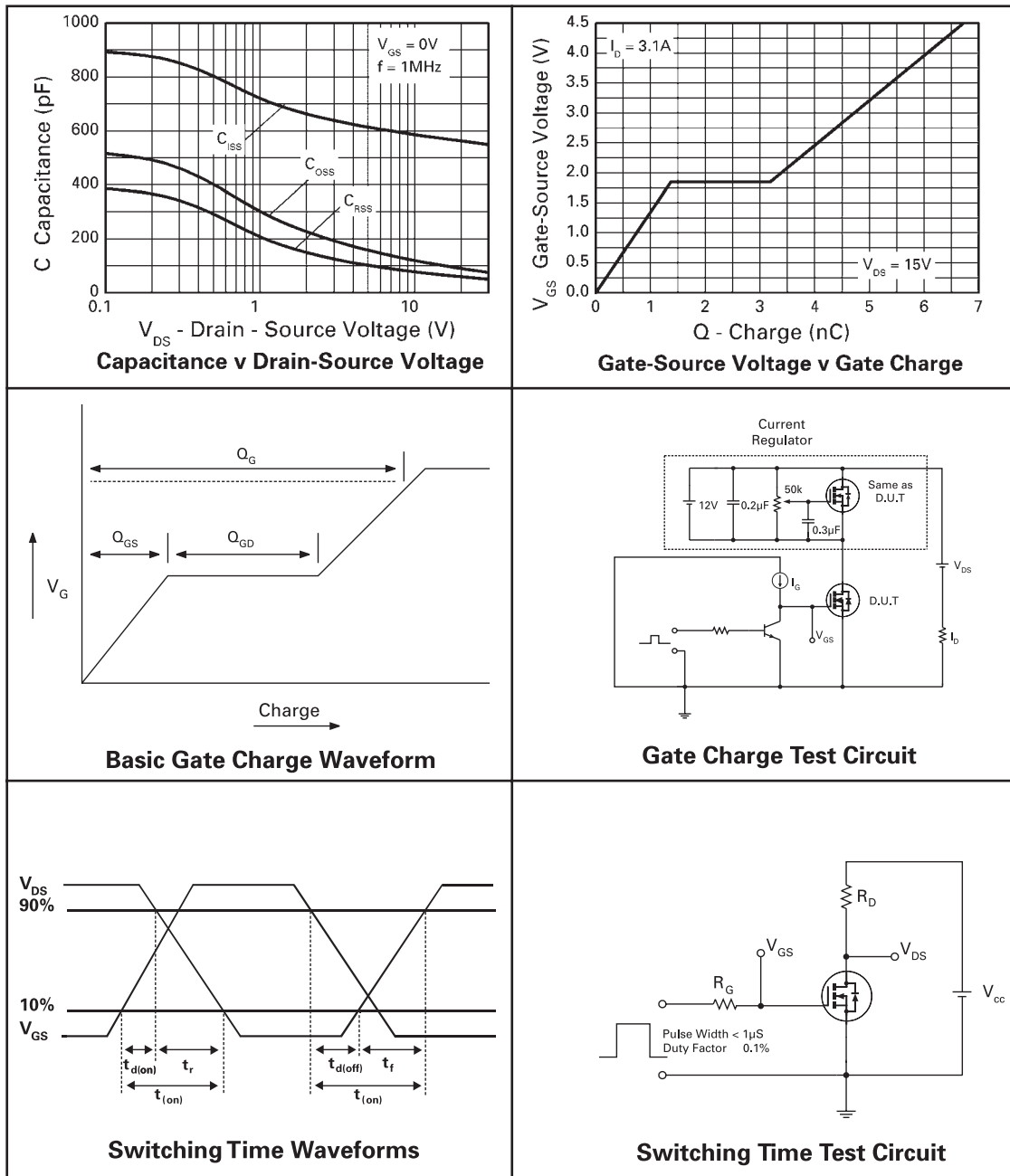
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## N-CHANNEL TYPICAL CHARACTERISTICS



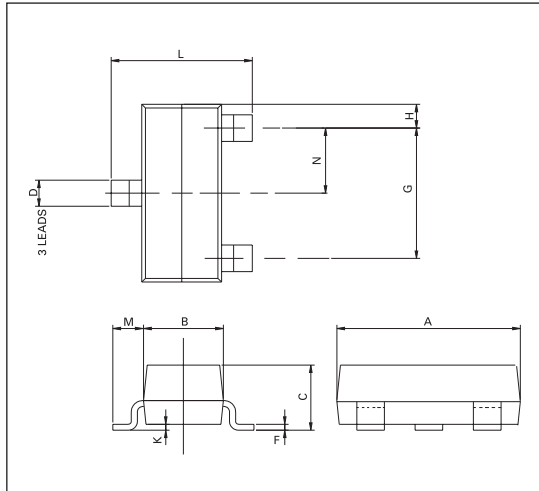
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## N-CHANNEL TYPICAL CHARACTERISTICS

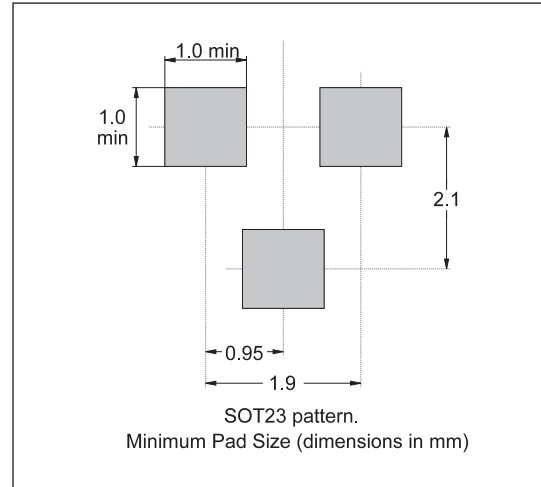


# ZXMN3B14F

## PACKAGE OUTLINE



## PAD LAYOUT



Controlling dimensions are in millimetres. Approximate conversions are given in inches

## PACKAGE DIMENSIONS

| DIM | MILLIMETRES |      | INCHES    |        | DIM | MILLIMETRES |      | INCHES     |        |
|-----|-------------|------|-----------|--------|-----|-------------|------|------------|--------|
|     | MIN         | MAX  | MIN       | MAX    |     | MIN         | MAX  | MIN        | MAX    |
| A   | 2.67        | 3.05 | 0.105     | 0.120  | H   | 0.33        | 0.51 | 0.013      | 0.020  |
| B   | 1.20        | 1.40 | 0.047     | 0.055  | K   | 0.01        | 0.10 | 0.0004     | 0.004  |
| C   | —           | 1.10 | —         | 0.043  | L   | 2.10        | 2.50 | 0.083      | 0.0985 |
| D   | 0.37        | 0.53 | 0.015     | 0.021  | M   | 0.45        | 0.64 | 0.018      | 0.025  |
| F   | 0.085       | 0.15 | 0.0034    | 0.0059 | N   | 0.95 NOM    |      | 0.0375 NOM |        |
| G   | 1.90 NOM    |      | 0.075 NOM |        | Θ   | 10° TYP     |      | 10° TYP    |        |

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