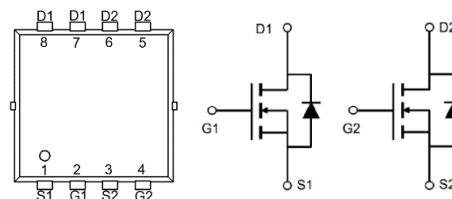
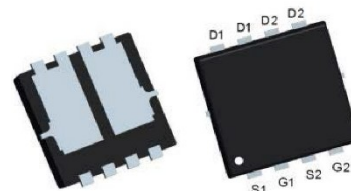


## 60V<sub>DS</sub>/±20V<sub>GS</sub> N-Channel Mode MOSFET

### Features

- $V_{DS}=60V, I_D=25A$
- $R_{DS(ON)}=18m\Omega$  (TYP.)  $V_{GS}=10V$
- $R_{DS(ON)}=25m\Omega$  (TYP.)  $V_{GS}=4.5V$
- Reliable and Rugged
- Low Gate Charge and On-Resistance
- High Current Capability

### PDFN3030



### Applications

- DC/DC Converters in Computing, Servers, and POL
- Isolated DC/DC Converters in Telecom and Industrial

### Ordering Information

| Temperature Range | Package          | Orderable Device | Package Qty. |
|-------------------|------------------|------------------|--------------|
| -55°C~+125°C      | PDFN3030 Pb-Free | BUK7K17-60E      | 5000pcs/Reel |

### Absolute Maximum Ratings (T<sub>C</sub>=25°C, unless otherwise noted)

| Parameter                                         | Symbol                            | Value   | Unit |
|---------------------------------------------------|-----------------------------------|---------|------|
| Drain-Source Voltage (V <sub>GS</sub> =0V)        | V <sub>DS</sub>                   | 60      | V    |
| Gate-Source Voltage (V <sub>GS</sub> =0V, static) | V <sub>GS</sub>                   | ±20     | V    |
| Continuous Drain Current (T <sub>C</sub> =25°C)   | I <sub>D</sub>                    | 25      | A    |
| Continuous Drain Current (T <sub>C</sub> =100°C)  |                                   | 17      | A    |
| Pulsed Drain Current                              | I <sub>DM</sub>                   | 100     | A    |
| Continuous Drain Current (T <sub>A</sub> =25°C)   | I <sub>DSM</sub>                  | 12      | A    |
| Continuous Drain Current (T <sub>A</sub> =70°C)   |                                   | 9       | A    |
| Avalanche Current                                 | I <sub>AS</sub>                   | 19      | A    |
| Single Pulsed Avalanche Energy                    | E <sub>AS</sub>                   | 10      | mJ   |
| Maximum Power Dissipation (T <sub>C</sub> =25°C)  | P <sub>D</sub>                    | 22      | W    |
| Maximum Power Dissipation (T <sub>C</sub> =100°C) |                                   | 10      | W    |
| Maximum Power Dissipation (T <sub>A</sub> =25°C)  | P <sub>DSM</sub>                  | 3.1     | W    |
| Maximum Power Dissipation (T <sub>A</sub> =70°C)  |                                   | 1.5     | W    |
| Operating, Storage Temperature Range              | T <sub>J</sub> , T <sub>STG</sub> | -55~150 | °C   |

## Thermal Characteristics

| Parameter                              | Symbol          | Min. | Typ. | Max. | Unit                        |
|----------------------------------------|-----------------|------|------|------|-----------------------------|
| Thermal Resistance,Junction-to-Case    | $R_{\theta JC}$ | -    | 5    | -    | $^{\circ}\text{C}/\text{W}$ |
| Thermal Resistance,Junction-to-Ambient | $R_{\theta JA}$ | -    | 62   | -    | $^{\circ}\text{C}/\text{W}$ |

## Electrical Characteristics

| Parameter                        | Symbol       | Test Conditions               | Min. | Typ. | Max.      | Unit       |
|----------------------------------|--------------|-------------------------------|------|------|-----------|------------|
| Drain-Source Breakdown Voltage   | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$     | 60   | -    | -         | V          |
| Zero Gate Voltage Drain Current  | $I_{DSS}$    | $V_{DS}=30V, V_{GS}=0V$       | -    | -    | 1         | $\mu A$    |
| Gate -Source Leakage Current     | $I_{GSS}$    | $V_{GS}=\pm 20V, V_{DS}=0V$   | -    | -    | $\pm 100$ | nA         |
| Gate Threshold Voltage           | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1.3  | 1.8  | 2.3       | V          |
| Drain-Source On-stage Resistance | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=12A$         | -    | 18   | 20        | m $\Omega$ |
|                                  |              | $V_{GS}=4.5V, I_D=10A$        | -    | 25   | 28        |            |

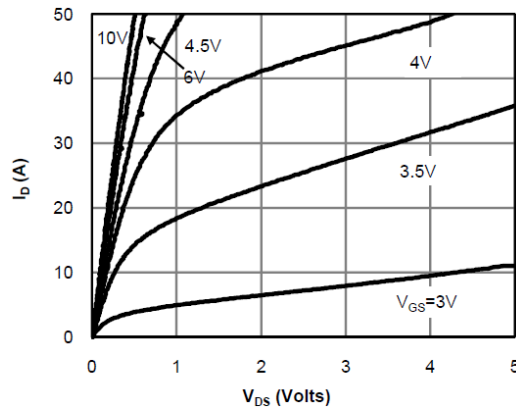
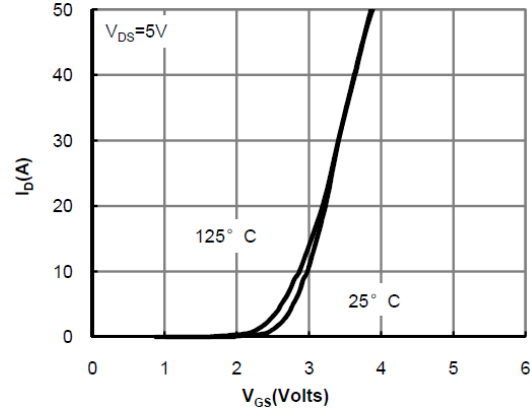
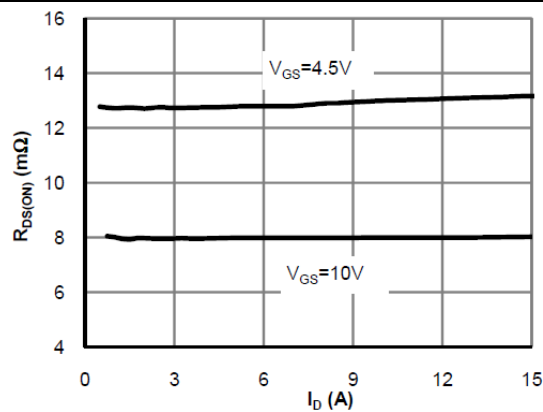
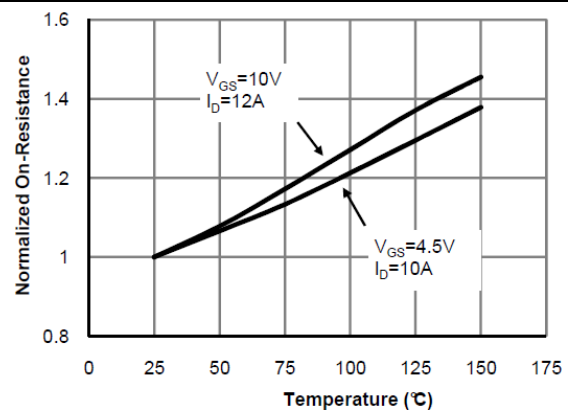
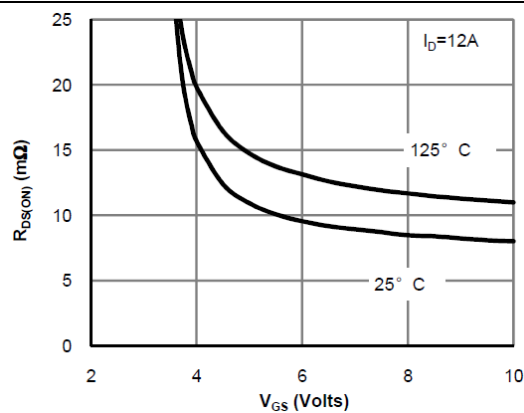
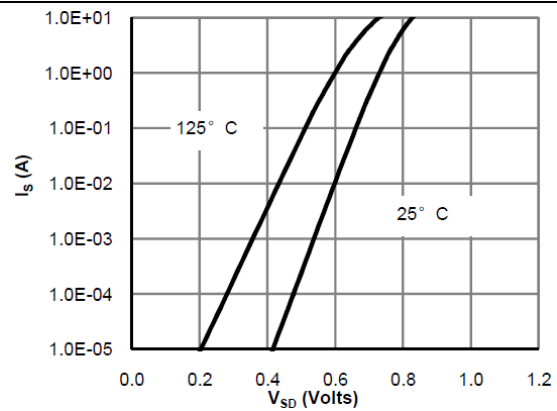
## Dynamic Characteristics

| Parameter                    | Symbol       | Test Conditions                                                   | Min. | Typ. | Max. | Unit     |
|------------------------------|--------------|-------------------------------------------------------------------|------|------|------|----------|
| Input capacitance            | $C_{iss}$    | $V_{DS}=15V$<br>$V_{GS}=0V$<br>$f=1\text{MHz}$                    | -    | 550  | -    | pF       |
| Output capacitance           | $C_{oss}$    |                                                                   | -    | 238  | -    |          |
| Reverse transfer capacitance | $C_{rss}$    |                                                                   | -    | 33   | -    |          |
| Gate Resistance              | $R_g$        | $f=1\text{MHz}$                                                   | -    | 1.9  | -    | $\Omega$ |
| Total Gate Charge            | $Q_g$        | $V_{DS}=15V$<br>$V_{GS}=10V$<br>$I_D=12A$                         | -    | 9.2  | -    | nC       |
| Gate Source Charge           | $Q_{gs}$     |                                                                   | -    | 2.3  | -    |          |
| Gate Drain Charge            | $Q_{gd}$     |                                                                   | -    | 1.8  | -    |          |
| Turn-on delay Time           | $t_{d(on)}$  | $V_{GS}=10V$<br>$V_{DS}=15V$<br>$R_L=0.75\Omega$<br>$R_G=3\Omega$ | -    | 4.2  | -    | ns       |
| Rise time                    | $t_r$        |                                                                   | -    | 3.6  | -    |          |
| Turn-off delay Time          | $t_{d(off)}$ |                                                                   | -    | 18.3 | -    |          |
| Fall time                    | $t_f$        |                                                                   | -    | 3.3  | -    |          |

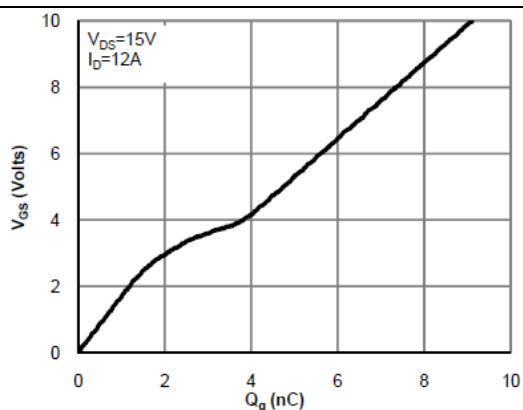
## Reverse Diode Characteristics

| Parameter                  | Symbol   | Test Conditions                               | Min. | Typ. | Max. | Unit |
|----------------------------|----------|-----------------------------------------------|------|------|------|------|
| Body Diode Forward Voltage | $V_{SD}$ | $V_{GS}=0V, I_{SD}=1A$                        | -    | 0.7  | 1    | V    |
| Reverse Recovery Time      | $t_{rr}$ | $V_{GS}=0V, I_{SD}=12A$<br>$dI/dt=500A/\mu s$ | -    | 10.2 | -    | ns   |
| Reverse Recovery Charge    | $Q_{rr}$ |                                               | -    | 11.5 | -    | nC   |

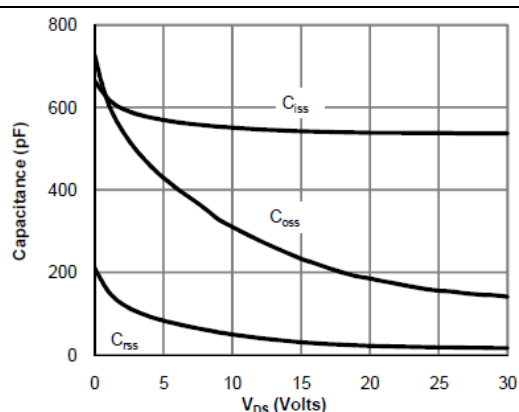
## Electrical Characteristics Diagrames

**Figure 1. On-Regin Characteristics**

**Figure 2. Transfer Characteristics**

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

**Figure 4. On-Resistance vs. Junction Temperature**

**Figure 5. On-Resistance vs. Gate-Source Voltage**

**Figure 6. Body-Diode Characteristics**


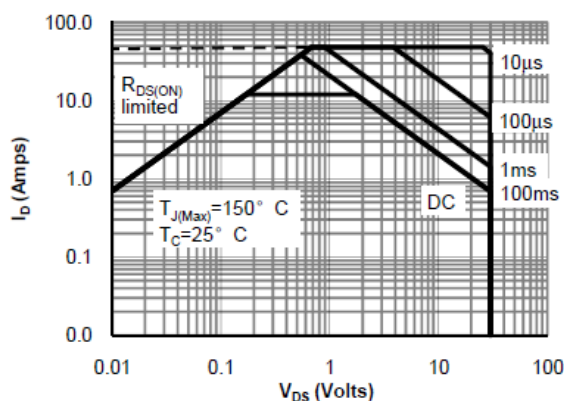
**Figure 7. Gate-Charge Characteristics**



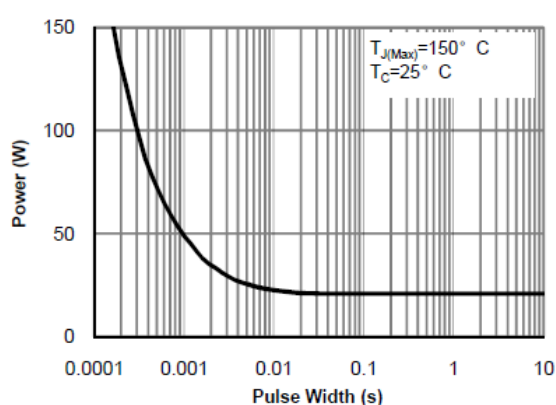
**Figure 8. Capacitance Characteristics**



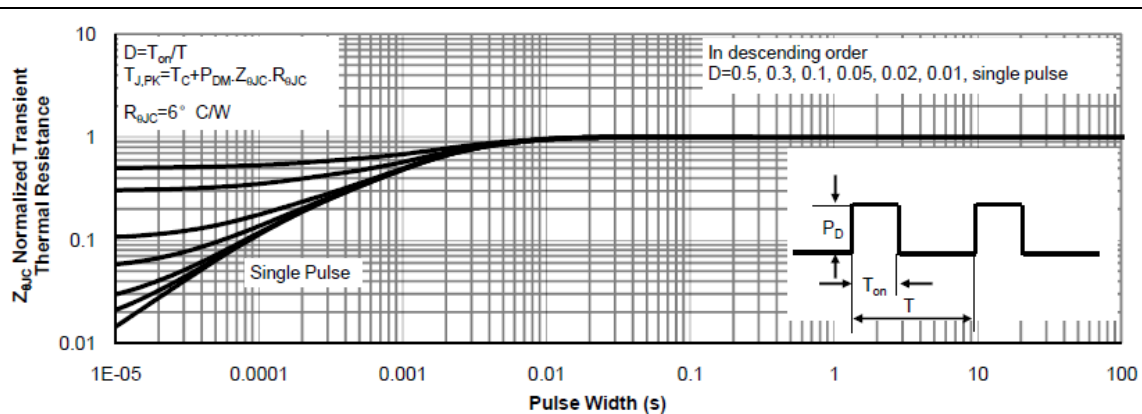
**Figure 9. Maximum Forward Biased Safe Operating Area**



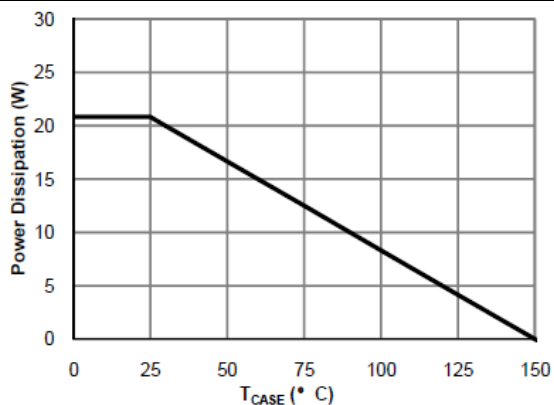
**Figure 10. Single Pulse Power Rating Junction-to-Case**



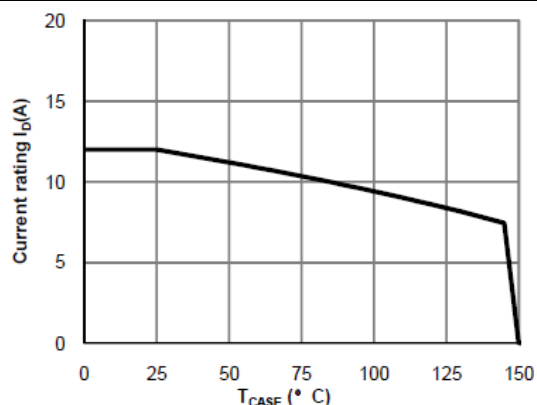
**Figure 11. Normalized Maximum Transient Thermal Impedance**



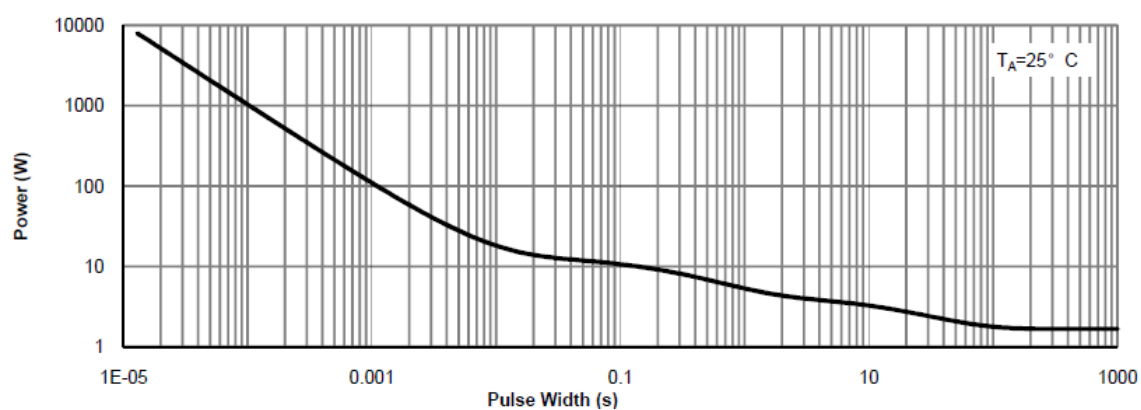
**Figure 12. Power De-rating**



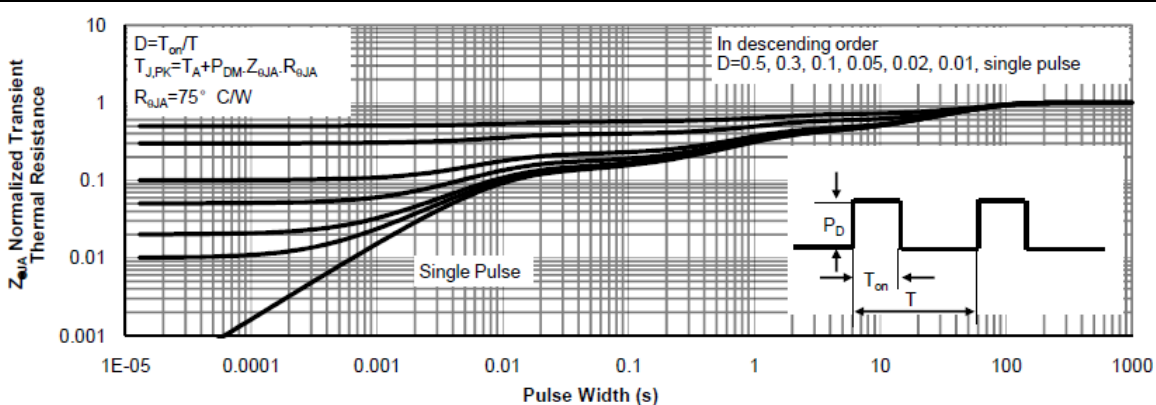
**Figure 13. Current De-rating**



**Figure 14. Single Pulse Power Rating Junction-to-Ambient**

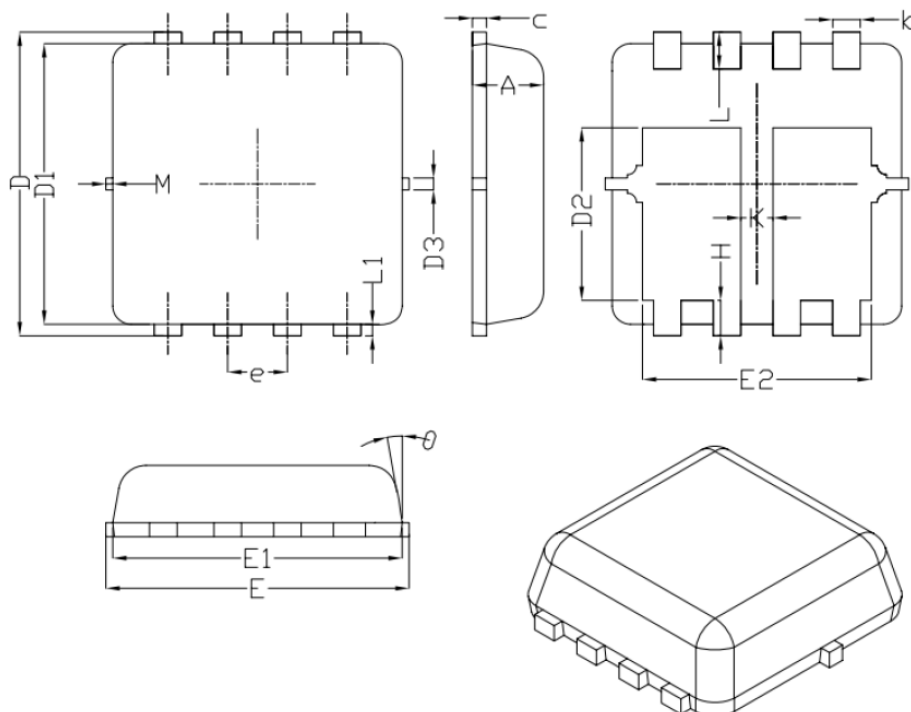


**Figure 15. Normalized Maximum Transient Thermal Impedance**



## Physical Dimensions

### PDFN3030



| 符号        | 尺寸          |             |             | 符号                     | 尺寸              |             |             |
|-----------|-------------|-------------|-------------|------------------------|-----------------|-------------|-------------|
|           | 最小值         | 典型值         | 最大值         |                        | 最小值             | 典型值         | 最大值         |
| <b>A</b>  | <b>0.70</b> | <b>0.75</b> | <b>0.80</b> | <b>E2</b>              | <b>2.39</b>     | <b>2.49</b> | <b>2.59</b> |
| <b>b</b>  | <b>0.25</b> | <b>0.30</b> | <b>0.35</b> | <b>e</b>               | <b>0.65 BSC</b> |             |             |
| <b>c</b>  | <b>0.10</b> | <b>0.15</b> | <b>0.25</b> | <b>H</b>               | <b>0.30</b>     | <b>0.39</b> | <b>0.50</b> |
| <b>D</b>  | <b>3.25</b> | <b>3.35</b> | <b>3.45</b> | <b>L</b>               | <b>0.30</b>     | <b>0.40</b> | <b>0.50</b> |
| <b>D1</b> | <b>3.00</b> | <b>3.10</b> | <b>3.20</b> | <b>L1</b>              | --              | <b>0.13</b> | --          |
| <b>D2</b> | <b>1.78</b> | <b>1.88</b> | <b>1.98</b> | <b>K</b>               | <b>0.30</b>     | --          | --          |
| <b>D3</b> | --          | <b>0.13</b> | --          | <b>θ</b>               | --              | <b>10°</b>  | <b>12°</b>  |
| <b>E</b>  | <b>3.20</b> | <b>3.30</b> | <b>3.40</b> | <b>M</b>               | *               | *           | <b>0.15</b> |
| <b>E1</b> | <b>3.00</b> | <b>3.15</b> | <b>3.20</b> | <b>* Not Specified</b> |                 |             |             |

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