

# N-Channel Enhancement Mode MOSFET

## 1. Product Information

### 1.1 Features

- ☒ Surface-mounted package
- ☒ Low Thermal Resistance

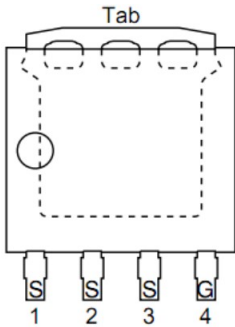
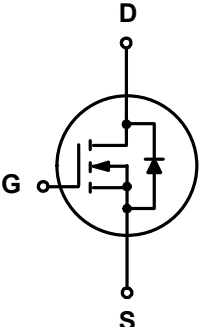
### 1.2 Applications

- ☒ Motor drivers
- ☒ DC - DC Converter

### 1.3 Quick reference

- ☒  $BV \geq 100 \text{ V}$
- ☒  $P_{tot} \leq 375 \text{ W}$
- ☒  $I_D \leq 133 \text{ A}$
- ☒  $R_{DS(ON)} \leq 7.0 \text{ m}\Omega @ V_{GS} = 10 \text{ V}$
- ☒  $R_{DS(ON)} \leq 8.5 \text{ m}\Omega @ V_{GS} = 6 \text{ V}$

## 2. Pin Description

| Pin   | Description | Simplified Outline                                                                                            | Symbol                                                                                |
|-------|-------------|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1,2,3 | Source      |  <p>Top View<br/>LFPAK</p> |  |
| 4     | Gate        |                                                                                                               |                                                                                       |
| Tab   | Drain       |                                                                                                               |                                                                                       |

### 3. Limiting Values

| Symbol               | Parameter                               | Conditions                                      | Min  | Max  | Unit   |
|----------------------|-----------------------------------------|-------------------------------------------------|------|------|--------|
| V <sub>DS</sub>      | Drain-Source Voltage                    | T <sub>C</sub> = 25 °C                          | -    | 100  | V      |
| V <sub>GS</sub>      | Gate-Source Voltage                     | T <sub>C</sub> = 25 °C                          | -    | ± 20 | V      |
| I <sub>D</sub> *     | Drain Current                           | T <sub>C</sub> = 25 °C, V <sub>GS</sub> = 10 V  | -    | 133  | A      |
|                      |                                         | T <sub>C</sub> = 100 °C, V <sub>GS</sub> = 10 V | -    | 94   | A      |
| I <sub>DM</sub> *,** | Pulsed Source Current                   | T <sub>C</sub> = 25 °C, V <sub>GS</sub> = 10 V  | -    | 280  | A      |
| P <sub>tot</sub> *   | Total Power Dissipation                 | T <sub>C</sub> = 25 °C                          | -    | 375  | W      |
| T <sub>stg</sub>     | Storage Temperature                     |                                                 | - 55 | 175  | °C     |
| T <sub>J</sub>       | Junction Temperature                    |                                                 | -    | 175  | °C     |
| I <sub>S</sub>       | Diode Forward Current                   | T <sub>C</sub> = 25 °C                          | -    | 133  | A      |
| E <sub>AS</sub> *    | Single Pulsed Avalanche Energy          | V <sub>DD</sub> = 50 V , L = 1 mH               | -    | 722  | mJ     |
| R <sub>θJA</sub> *   | Thermal Resistance- Junction to Ambient |                                                 | -    | 60   | °C / W |
| R <sub>θJC</sub> *   | Thermal Resistance- Junction to Case    |                                                 | -    | 0.4  |        |

Notes :

- \* Surface Mounted on 1 in<sup>2</sup> pad area, t ≤ 10 sec
- \*\* Pulse width ≤ 300 μs, duty cycle ≤ 2 %
- \*\*\* Limited by bonding wire

### 4. Marking Information

| Product Name | Marking                                                                                                                                                                        |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UK6R5N10LF   | <div style="display: inline-block; background-color: black; color: white; padding: 2px;"> <b>6R5N10</b><br/> <b>YWW01</b><br/> <b>AAAAAA</b> </div> <b>YWW01:</b><br>Date Code |

### 5. Ordering Code

| Product Name | Package  | Reel Size | Tape width | Quantity | Note |
|--------------|----------|-----------|------------|----------|------|
| UK6R5N10LF   | LFPAK5*6 |           |            | 5000     |      |

## 6. Electrical Characteristics (T<sub>A</sub> = 25 °C Unless Otherwise Noted)

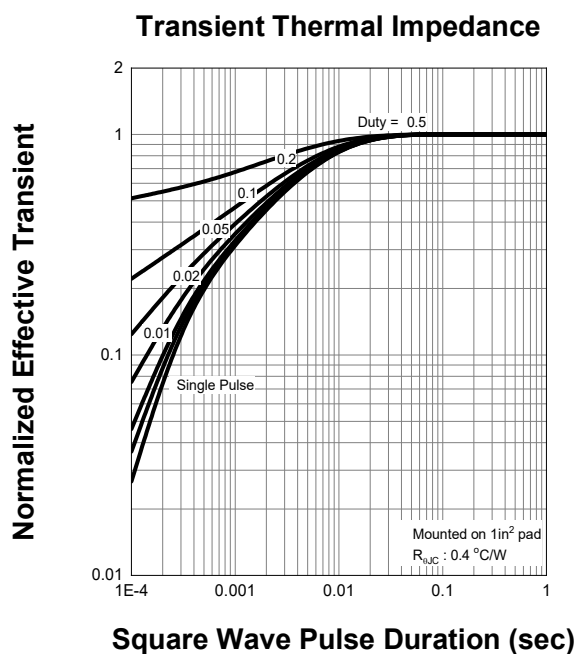
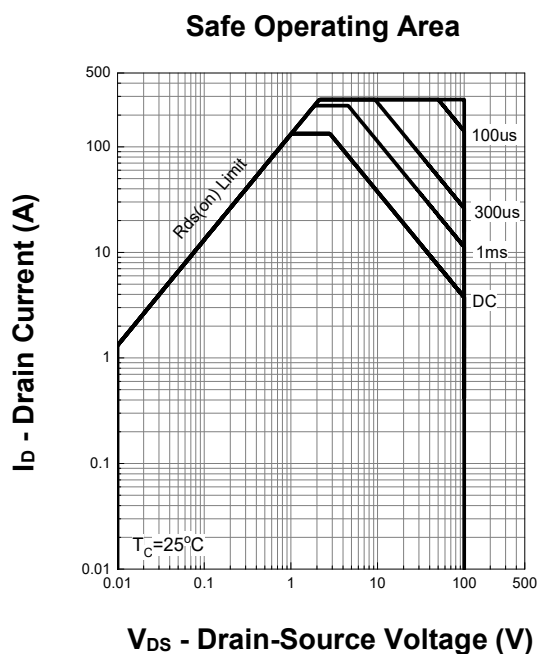
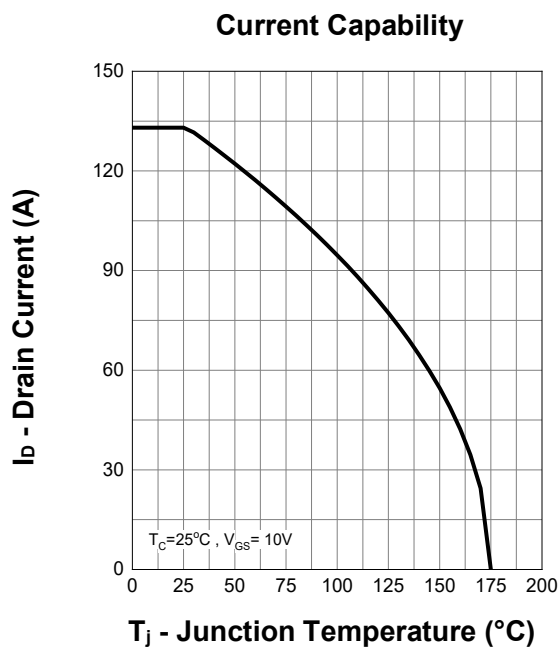
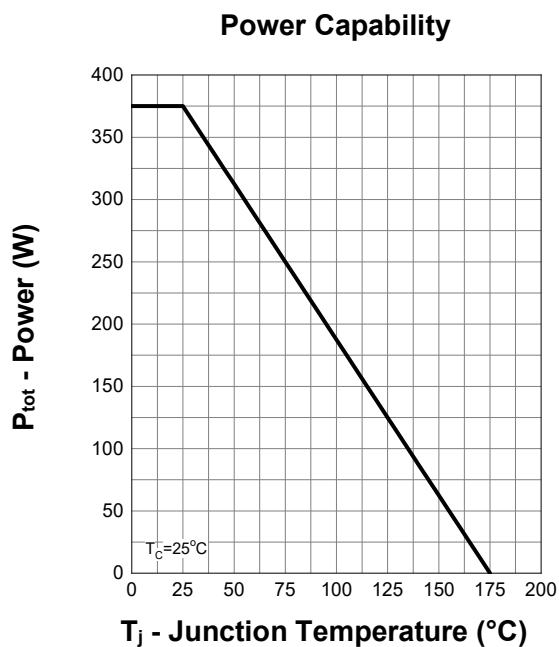
| Symbol                                   | Parameter                      | Conditions                                                                                                                    | Min | Typ   | Max  | Unit |
|------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----|-------|------|------|
| Static Characteristics                   |                                |                                                                                                                               |     |       |      |      |
| BV <sub>DSS</sub>                        | Drain-Source Breakdown Voltage | V <sub>GS</sub> = 0 V, I <sub>DS</sub> = 250 μA                                                                               | 100 | -     | -    | V    |
| V <sub>GS(th)</sub>                      | Gate Threshold Voltage         | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>DS</sub> = 250 μA                                                                  | 2   | -     | 4    | V    |
| I <sub>DSS</sub>                         | Drain Leakage Current          | V <sub>DS</sub> = 80 V, V <sub>GS</sub> = 0 V                                                                                 | -   | -     | 1    | μA   |
| I <sub>GSS</sub>                         | Gate Leakage Current           | V <sub>GS</sub> = 0 V, V <sub>GS</sub> = ± 20 V                                                                               | -   | -     | ±100 | nA   |
| R <sub>DS(ON)</sub> <sup>a</sup>         | On-State Resistance            | V <sub>GS</sub> = 10 V, I <sub>DS</sub> = 30 A                                                                                | -   | 6.3   | 7.0  | mΩ   |
|                                          |                                | V <sub>GS</sub> = 6 V, I <sub>DS</sub> = 20 A                                                                                 | -   | 7.5   | 8.5  |      |
|                                          |                                |                                                                                                                               |     |       |      |      |
| Diode Characteristics                    |                                |                                                                                                                               |     |       |      |      |
| V <sub>SD</sub> <sup>a</sup>             | Diode Forward Voltage          | I <sub>SD</sub> = 30 A, V <sub>GS</sub> = 0 V                                                                                 | -   | -     | 1.3  | V    |
| t <sub>rr</sub>                          | Reverse Recovery Time          | I <sub>DS</sub> = 30 A, V <sub>GS</sub> = 0 V<br>dI <sub>SD</sub> /dt = 100 A/μs                                              | -   | 45    | -    | nS   |
| Q <sub>rr</sub>                          | Reverse Recovery Charge        |                                                                                                                               | -   | 106   | -    | nC   |
| Dynamic Characteristics <sup>b</sup>     |                                |                                                                                                                               |     |       |      |      |
| C <sub>iSS</sub>                         | Input Capacitance              | V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 50 V<br>Frequency = 1 MHz                                                            | -   | 13874 | -    | pF   |
| C <sub>oSS</sub>                         | Output Capacitance             |                                                                                                                               | -   | 287   | -    |      |
| C <sub>rSS</sub>                         | Reverse Transfer Capacitance   |                                                                                                                               | -   | 43    | -    |      |
| t <sub>d(on)</sub>                       | Turn-on Delay Time             | V <sub>DS</sub> = 50 V, V <sub>GEN</sub> = 10 V,<br>R <sub>G</sub> = 3.9 Ω, R <sub>L</sub> = 1.6 Ω,<br>I <sub>DS</sub> = 30 A | -   | 43    | -    | nS   |
| t <sub>r</sub>                           | Turn-on Rise Time              |                                                                                                                               | -   | 54    | -    |      |
| t <sub>d(off)</sub>                      | Turn-off Delay Time            |                                                                                                                               | -   | 105   | -    |      |
| t <sub>f</sub>                           | Turn-off Fall Time             |                                                                                                                               | -   | 30    | -    |      |
| Gate Charge Characteristics <sup>b</sup> |                                |                                                                                                                               |     |       |      |      |
| Q <sub>g</sub>                           | Total Gate Charge              | V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 10 V,<br>I <sub>DS</sub> = 30 A                                                     | -   | 199   | -    | nC   |
| Q <sub>gs</sub>                          | Gate-Source Charge             |                                                                                                                               | -   | 80    | -    |      |
| Q <sub>gd</sub>                          | Gate-Drain Charge              |                                                                                                                               | -   | 25    | -    |      |

Notes :

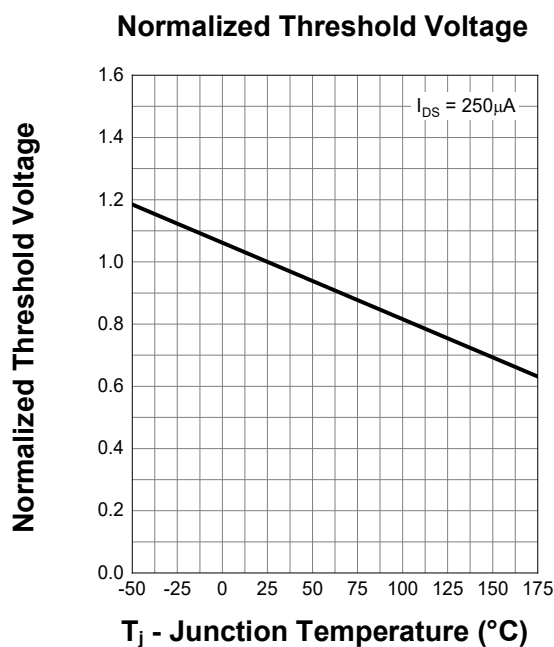
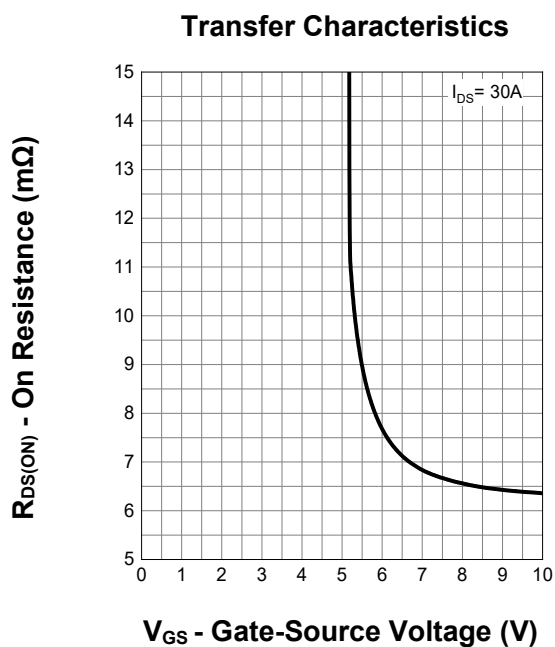
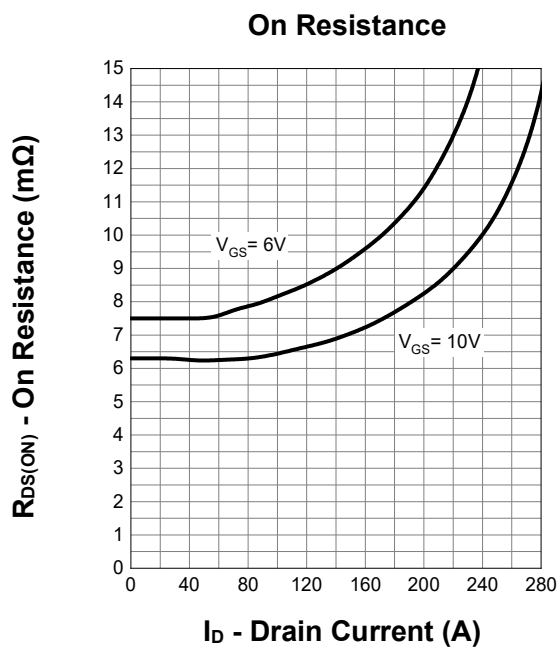
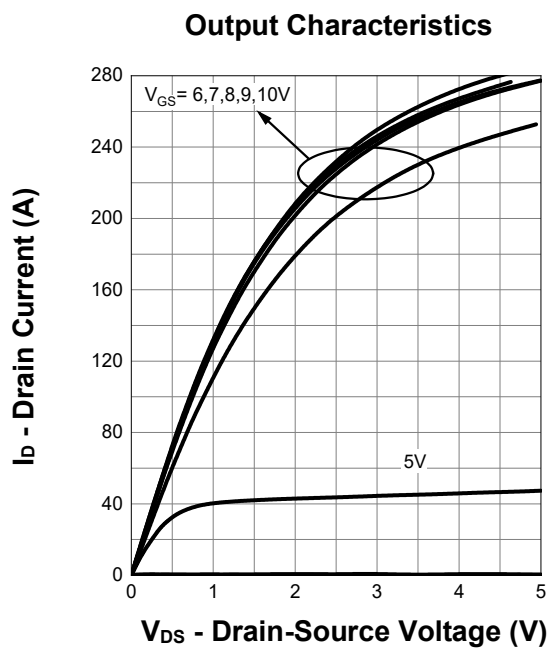
a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2%

b : Guaranteed by design, not subject to production testing

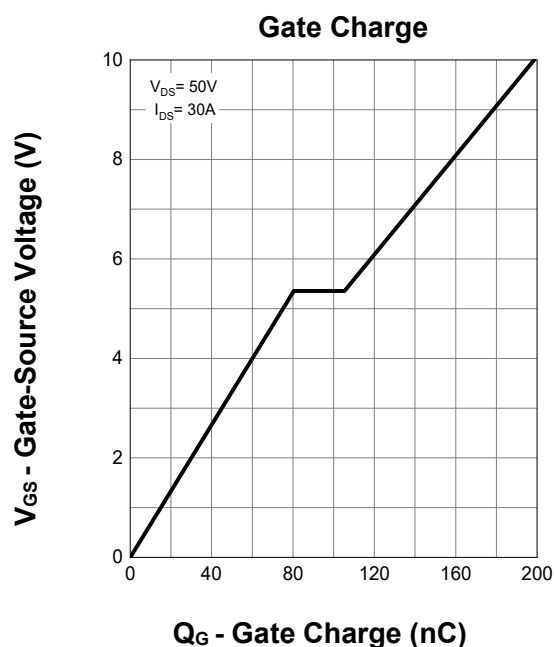
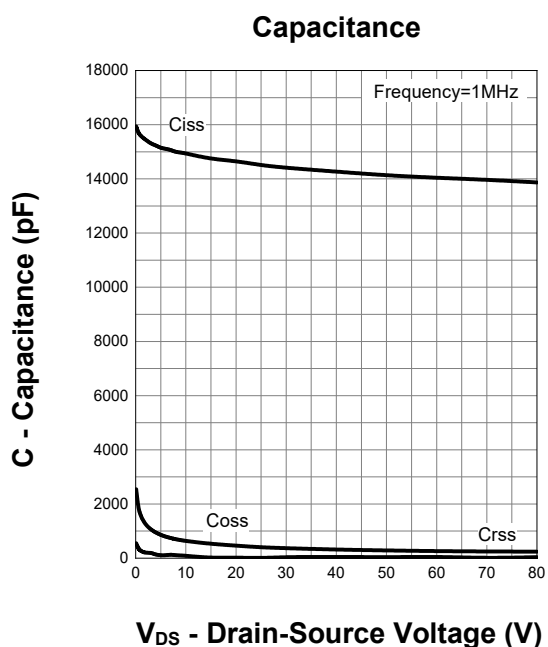
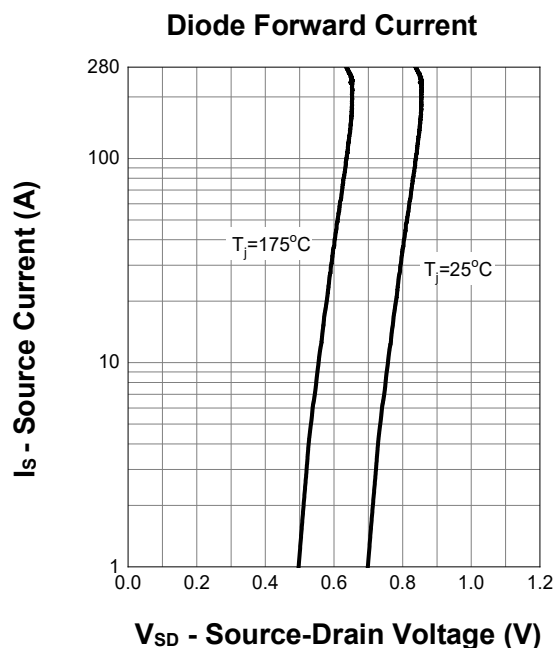
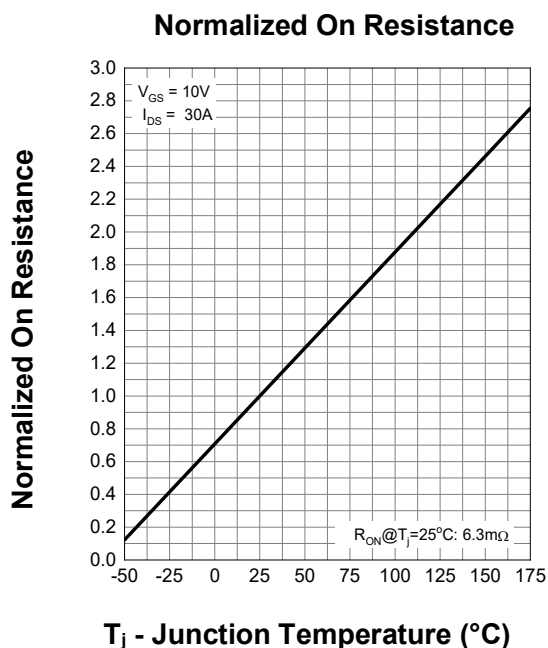
## 7. Typical Characteristics



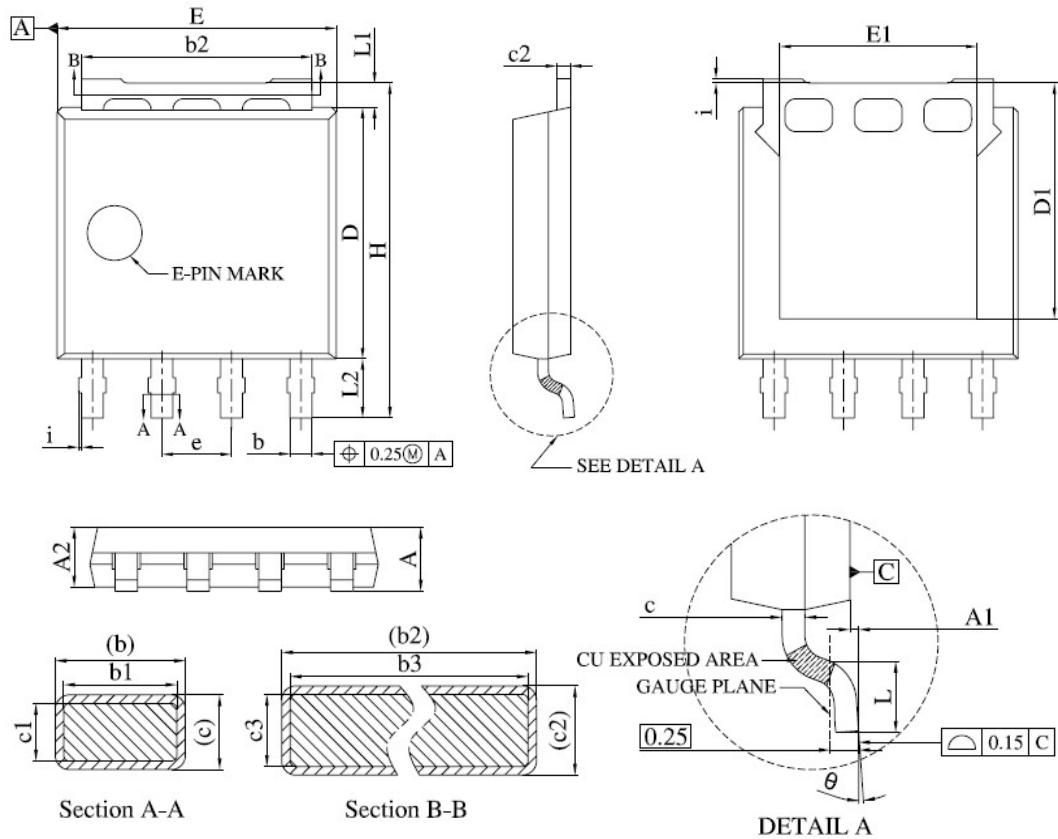
## 7. Typical Characteristics (cont.)



## 7. Typical Characteristics (cont.)



## 8. Package Dimensions LFPAK5\*6 Package



| Symbol | Dimensions In Millimeters |      |
|--------|---------------------------|------|
|        | MIN.                      | MAX. |
| A      | 1.00                      | 1.30 |
| A1     | 0.00                      | 0.15 |
| A2     | 0.98                      | 1.12 |
| b      | 0.35                      | 0.50 |
| b1     | 0.32                      | 0.46 |
| b2     | 4.02                      | 4.41 |
| b3     | 4.00                      | 4.37 |
| c      | 0.19                      | 0.25 |
| c1     | 0.17                      | 0.23 |
| c2     | 0.24                      | 0.30 |
| c3     | 0.22                      | 0.28 |
| D      | 4.45                      | 4.70 |
| D1     | -                         | 4.45 |
| E      | 4.95                      | 5.30 |
| E1     | 3.50                      | 3.70 |
| e      | 1.27 BSC.                 |      |

| Symbol | Dimensions In Millimeters |      |
|--------|---------------------------|------|
|        | MIN.                      | MAX. |
| H      | 5.95                      | 6.25 |
| i      | -                         | 0.25 |
| L      | 0.40                      | 0.85 |
| L1     | 0.27                      | 0.57 |
| L2     | 0.80                      | 1.30 |
| θ      | 0°                        | 8°   |