

# N-Channel Enhancement Mode MOSFET

## 1. Product Information

### 1.1 Features

- ☒ Surface-mounted package
- ☒ Advanced trench cell design

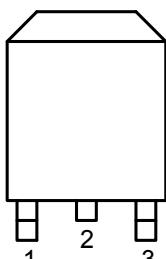
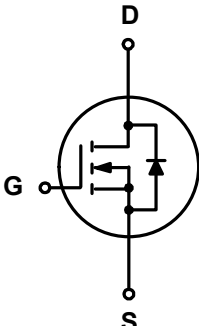
### 1.2 Applications

- ☒ LCD TV appliances
- ☒ LCDM appliances
- ☒ High power inverter system

### 1.3 Quick reference

- ☒  $BV \geq 65\text{ V}$
- ☒  $P_{\text{tot}} \leq 50\text{ W}$
- ☒  $I_D \leq 60\text{ A}$
- ☒  $R_{\text{DS(ON)}} \leq 8.5\text{ m}\Omega @ V_{\text{GS}} = 10\text{ V}$

## 2. Pin Description

| Pin | Description | Simplified Outline                                                                                             | Symbol                                                                                |
|-----|-------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1   | Gate(G)     |  <p>Top View<br/>TO-252</p> |  |
| 2   | Drain(D)    |                                                                                                                |                                                                                       |
| 3   | Source(S)   |                                                                                                                |                                                                                       |

### 3. Limiting Values

| Symbol               | Parameter                               | Conditions                                                | Min | Max      | Unit                 |
|----------------------|-----------------------------------------|-----------------------------------------------------------|-----|----------|----------------------|
| $V_{DS}$             | Drain-Source Voltage                    | $T_C = 25\text{ }^{\circ}\text{C}$                        | 65  | -        | V                    |
| $V_{GS}$             | Gate-Source Voltage                     | $T_C = 25\text{ }^{\circ}\text{C}$                        | -   | $\pm 20$ | V                    |
| $I_D^{***}$          | Drain Current ( DC )                    | $T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$  | -   | 60       | A                    |
|                      |                                         | $T_C = 100\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$ | -   | 36.8     | A                    |
| $I_{DM}^{*:**}$      | Drain Current ( Pulsed )                | $T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$  | -   | 96       | A                    |
| $P_{tot}$            | Drain power dissipation                 | $T_C = 25\text{ }^{\circ}\text{C}$                        | -   | 50       | W                    |
| $T_{stg}$            | Storage Temperature                     |                                                           | -55 | 150      | $^{\circ}\text{C}$   |
| $T_J$                | Junction Temperature                    |                                                           | -   | 150      | $^{\circ}\text{C}$   |
| $I_S$                | Continuous-Source Current               | $T_C = 25\text{ }^{\circ}\text{C}$                        | -   | 60       | A                    |
| $R_{\theta JA}^{**}$ | Thermal Resistance- Junction to Ambient |                                                           | -   | 37       | $^{\circ}\text{C/W}$ |
| $R_{\theta JC}^{**}$ | Thermal Resistance- Junction to Case    |                                                           | -   | 1.2      |                      |

Notes :

\* Pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$

\*\* Mounted on Large Heat Sink

\*\*\* limited by bonding wire

### 4. Marking Information

| Product Name    | Marking                                                   |
|-----------------|-----------------------------------------------------------|
| <b>UP0906KH</b> | <div>0906H<br/>YWWXXX</div> <div>YWW:<br/>Date Code</div> |

### 5. Ordering Code

| Product Name    | Package      | Reel Size | Tape width | Quantity    | Note |
|-----------------|--------------|-----------|------------|-------------|------|
| <b>UP0906KH</b> | <b>TO252</b> |           |            | <b>2500</b> |      |

Note: UOE defines “ Green ” as lead-free ( RoHS compliant ) and halogen free ( Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC / JEDEC J-STD-020C )

## 6. Electrical Characteristics ( $T_A=25^\circ$ Unless Otherwise Noted )

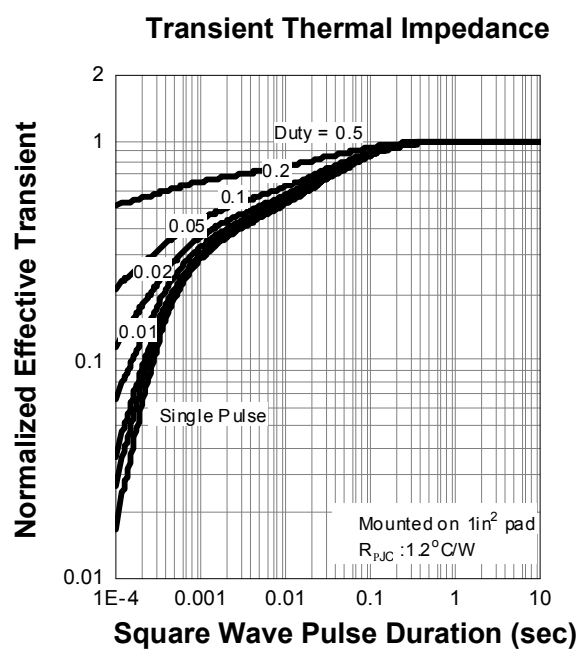
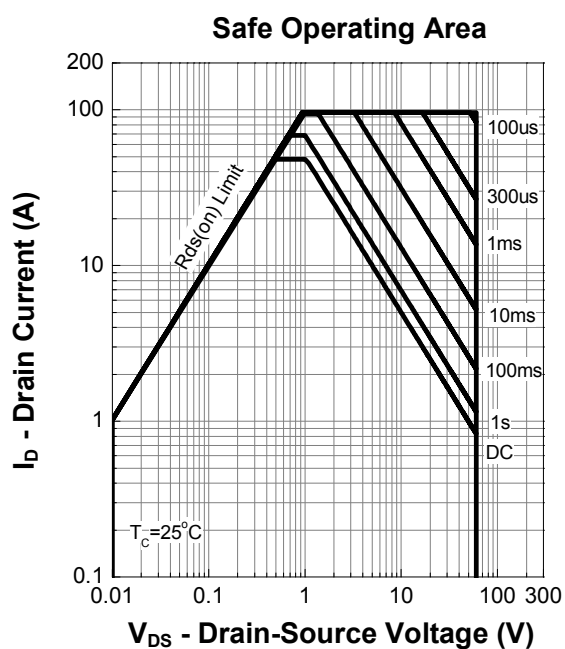
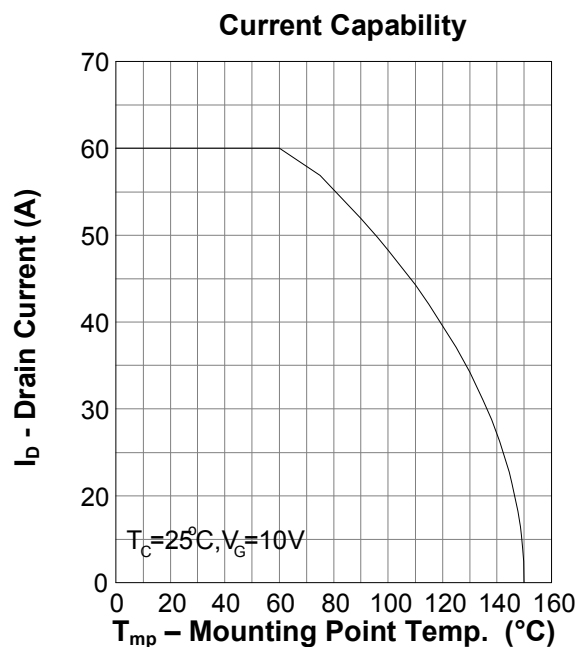
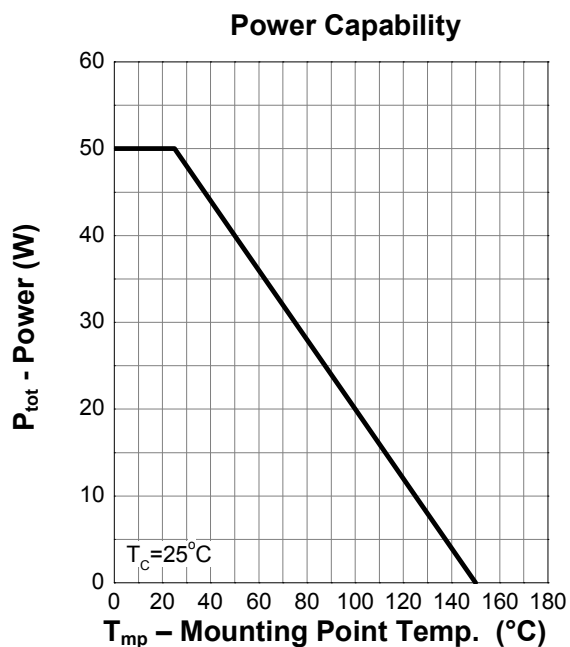
| Symbol                                   | Parameter                      | Conditions                                                                                                                    | Min | Typ  | Max | Unit |
|------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----|------|-----|------|
| Static Characteristics                   |                                |                                                                                                                               |     |      |     |      |
| BV <sub>DSS</sub>                        | Drain-Source Breakdown Voltage | V <sub>GS</sub> = 0 V, I <sub>DS</sub> = 250 μA                                                                               | 65  | -    | -   | 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> = 48 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                                                                               | -   | -    | ±10 | uA   |
| R <sub>DS(ON)</sub> <sup>a</sup>         | On-State Resistance            | V <sub>GS</sub> = 10 V, I <sub>DS</sub> = 20 A                                                                                | -   | 7.6  | 8.5 | mΩ   |
| Diode Characteristics                    |                                |                                                                                                                               |     |      |     |      |
| V <sub>SD</sub> <sup>a</sup>             | Diode Forward Voltage          | I <sub>SD</sub> = 20 A, V <sub>GS</sub> = 0 V                                                                                 | -   | -    | 1.3 | V    |
| t <sub>rr</sub>                          | Reverse Recovery Time          | I <sub>DS</sub> = 20 A, V <sub>GS</sub> = 0 V                                                                                 | -   | 44.7 | -   | nS   |
| Q <sub>rr</sub>                          | Reverse Recovery Charge        | di <sub>SD</sub> /dt = 100 A/μs                                                                                               | -   | 39.2 | -   | nC   |
| Dynamic Characteristics <sup>b</sup>     |                                |                                                                                                                               |     |      |     |      |
| C <sub>iss</sub>                         | Input Capacitance              | V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 30 V<br>Frequency = 1 MHz                                                            | -   | 1512 | -   | pF   |
| C <sub>oss</sub>                         | Output Capacitance             |                                                                                                                               | -   | 523  | -   |      |
| C <sub>rss</sub>                         | Reverse Transfer Capacitance   |                                                                                                                               | -   | 45   | -   |      |
| t <sub>d(on)</sub>                       | Turn-on Delay Time             | V <sub>DS</sub> = 30 V, V <sub>GEN</sub> = 10 V,<br>R <sub>G</sub> = 4.5 Ω, R <sub>L</sub> = 1.5 Ω,<br>I <sub>DS</sub> = 20 A | -   | 10.4 | -   | nS   |
| t <sub>r</sub>                           | Turn-on Rise Time              |                                                                                                                               | -   | 32.6 | -   |      |
| t <sub>d(off)</sub>                      | Turn-off Delay Time            |                                                                                                                               | -   | 19   | -   |      |
| t <sub>f</sub>                           | Turn-off Fall Time             |                                                                                                                               | -   | 21   | -   |      |
| Gate Charge Characteristics <sup>b</sup> |                                |                                                                                                                               |     |      |     |      |
| Q <sub>g</sub>                           | Total Gate Charge              | V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 10 V,<br>I <sub>DS</sub> = 20 A                                                     | -   | 25.5 | -   | nC   |
| Q <sub>gs</sub>                          | Gate-Source Charge             |                                                                                                                               | -   | 8.8  | -   |      |
| Q <sub>gd</sub>                          | Gate-Drain Charge              |                                                                                                                               | -   | 5.5  | -   |      |

Notes :

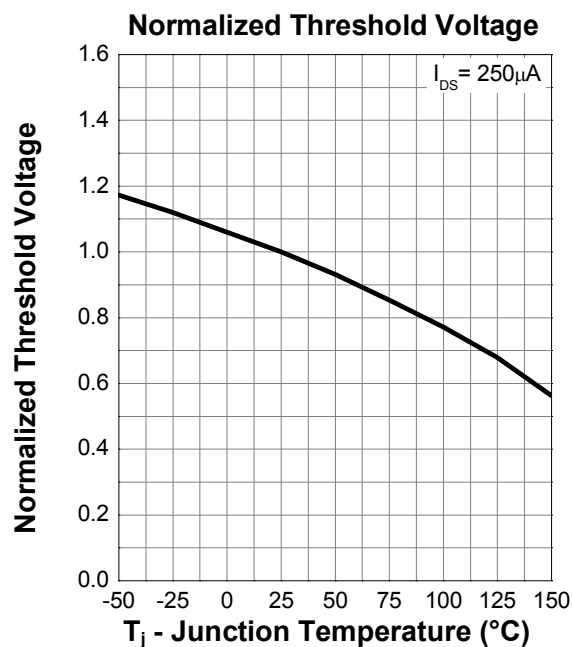
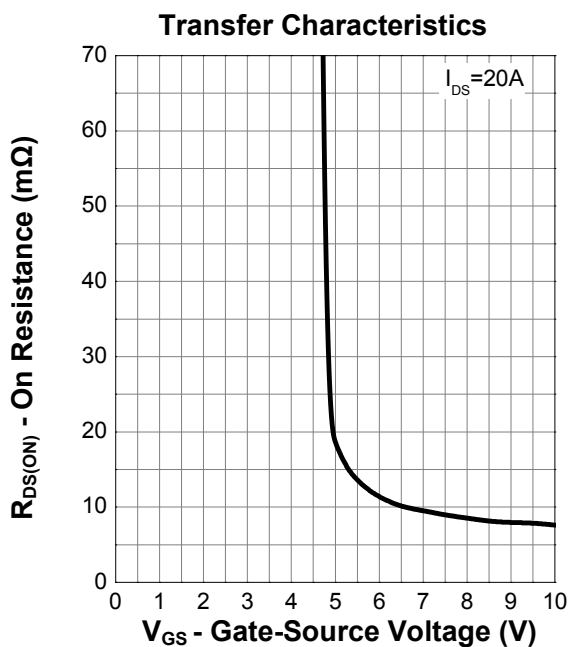
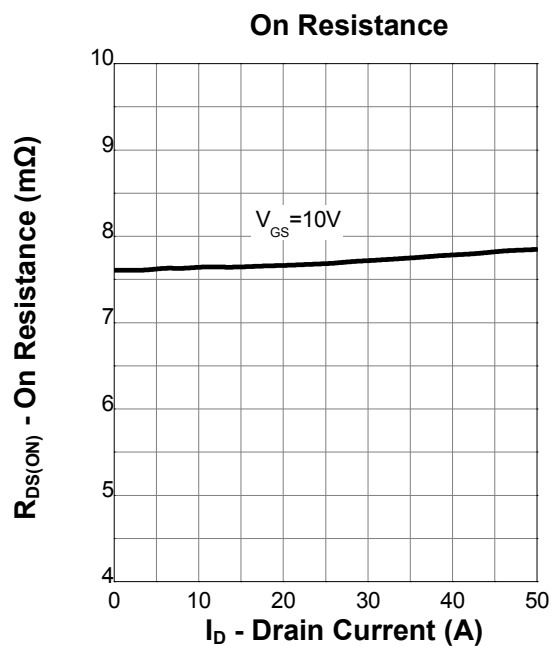
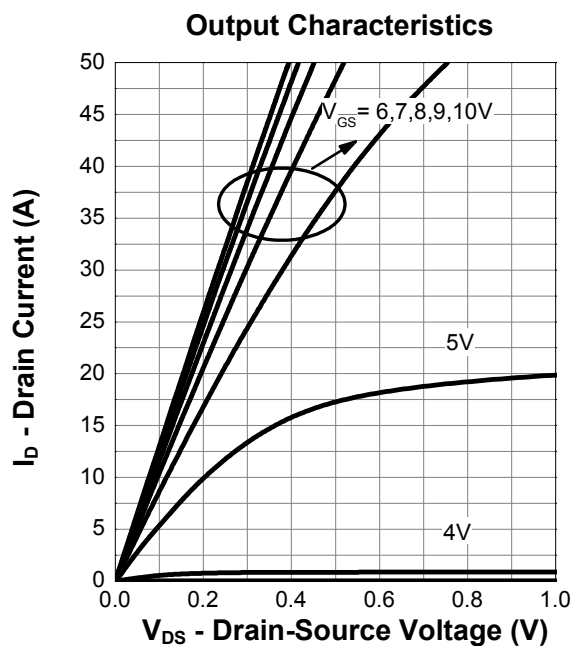
a : Pulse test ; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$

b : Guaranteed by design, not subject to production testing

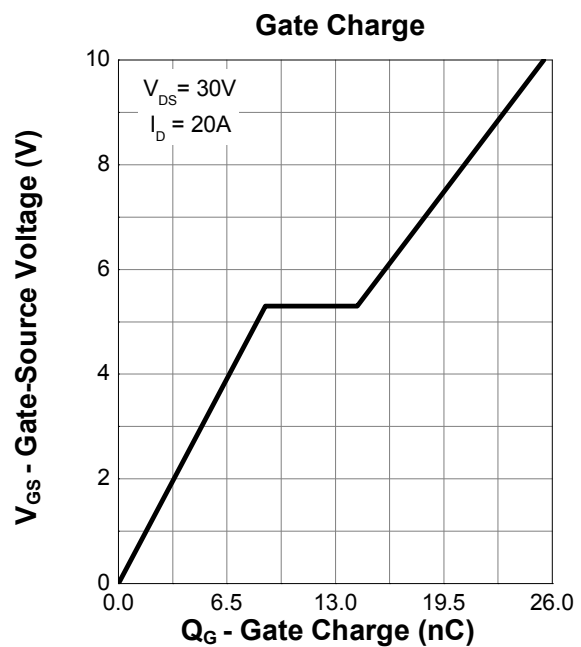
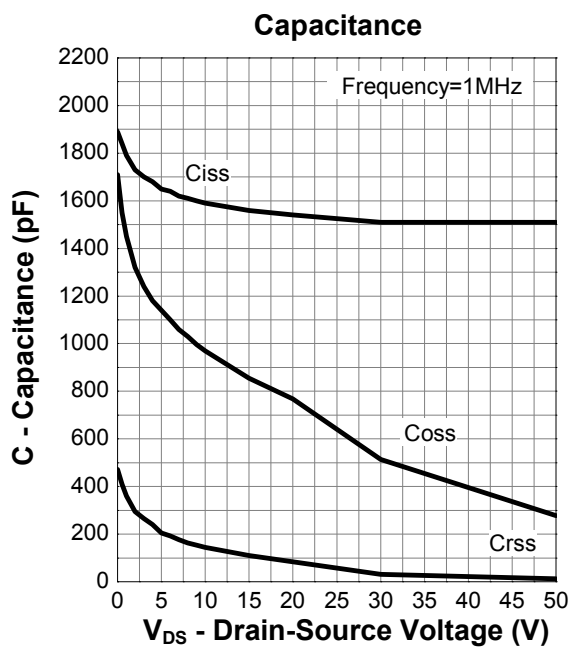
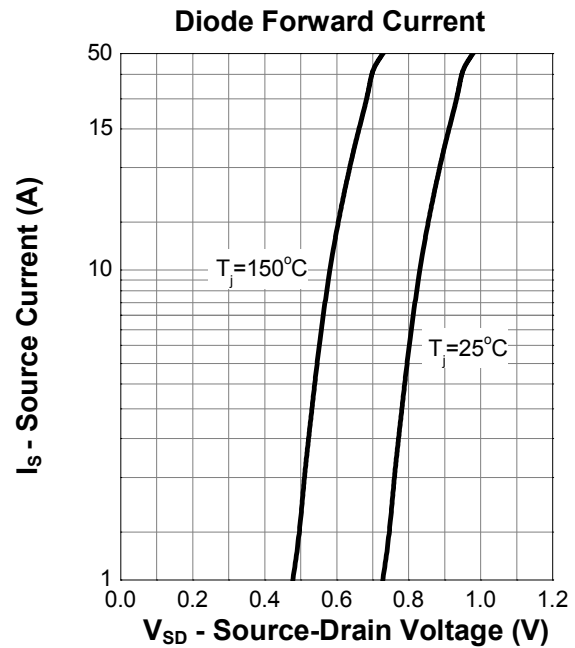
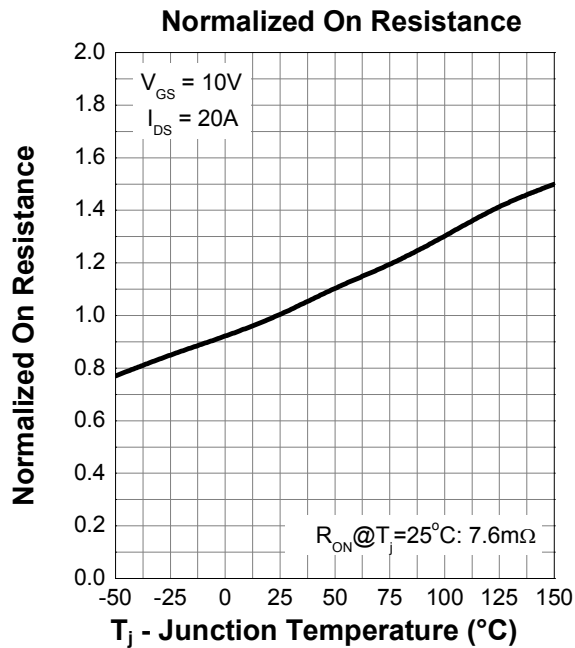
## 7. Typical Characteristics



## 7. Typical Characteristics (cont.)

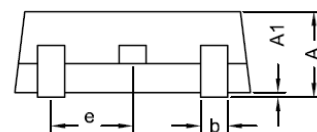
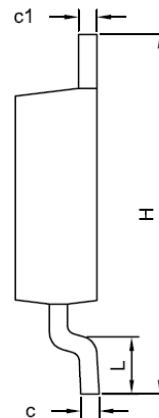
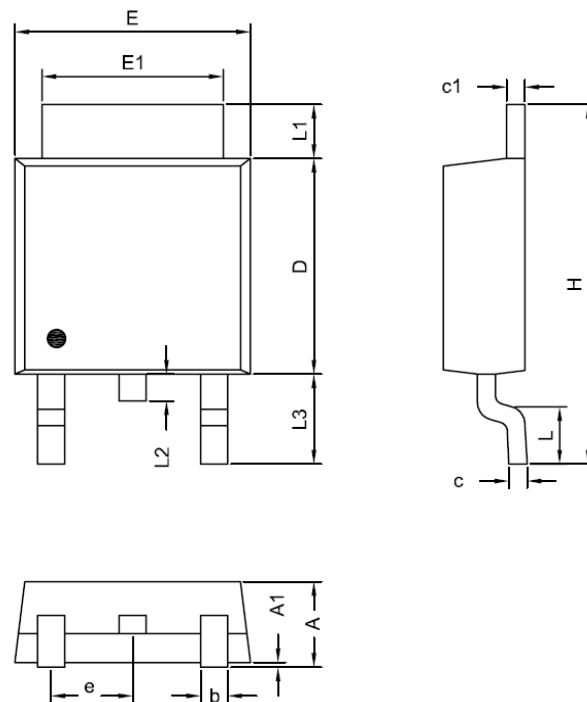


## 7. Typical Characteristics (cont.)



## 8.Package Dimensions

### TO252-3L



| Symbol | Dimensions In Millimeters |       |
|--------|---------------------------|-------|
|        | MIN.                      | MAX.  |
| A      | 2.19                      | 2.38  |
| A1     | 0.02                      | 0.13  |
| D      | 5.30                      | 6.40  |
| E      | 6.35                      | 6.80  |
| E1     | 5.20                      | 5.50  |
| c      | 0.40                      | 0.60  |
| c1     | 0.40                      | 0.60  |
| b      | 0.55                      | 0.85  |
| e      | 2.30 BCS                  |       |
| L      | 1.00                      | 1.80  |
| L1     | 0.70                      | 1.80  |
| L2     | 0.70 BCS                  |       |
| L3     | 2.40                      | 2.80  |
| H      | 9.20                      | 10.40 |