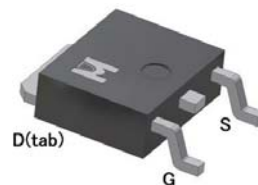


N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

|                     |               |
|---------------------|---------------|
| $BV_{DSS}$          | 150V          |
| $R_{DS(on)} (MAX.)$ | 500m $\Omega$ |
| $I_D$               | 3A            |



UIS, Rg 100% Tested

Pb-Free Lead Plating & Halogen Free



ABSOLUTE MAXIMUM RATINGS ( $T_C = 25\text{ }^{\circ}\text{C}$  Unless Otherwise Noted)

| PARAMETERS/TEST CONDITIONS                     |                                                             | SYMBOL           | LIMITS     | UNIT               |
|------------------------------------------------|-------------------------------------------------------------|------------------|------------|--------------------|
| Gate-Source Voltage                            |                                                             | $V_{GS}$         | $\pm 20$   | V                  |
| Continuous Drain Current                       | $T_C = 25\text{ }^{\circ}\text{C}$                          | $I_D$            | 3          | A                  |
|                                                | $T_C = 100\text{ }^{\circ}\text{C}$                         |                  | 2          |                    |
| Pulsed Drain Current <sup>1</sup>              |                                                             | $I_{DM}$         | 12         |                    |
| Avalanche Current                              |                                                             | $I_{AS}$         | 2          | mJ                 |
| Avalanche Energy                               | $L = 0.1\text{mH}, I_D = 2\text{A}, R_G = 25\text{ }\Omega$ | $E_{AS}$         | 0.2        |                    |
| Repetitive Avalanche Energy <sup>2</sup>       | $L = 0.05\text{mH}$                                         | $E_{AR}$         | 0.1        |                    |
| Power Dissipation                              | $T_C = 25\text{ }^{\circ}\text{C}$                          | $P_D$            | 25         | W                  |
|                                                | $T_C = 100\text{ }^{\circ}\text{C}$                         |                  | 10         |                    |
| Operating Junction & Storage Temperature Range |                                                             | $T_{j}, T_{stg}$ | -55 to 150 | $^{\circ}\text{C}$ |

THERMAL RESISTANCE RATINGS

| THERMAL RESISTANCE  | SYMBOL          | TYPICAL | MAXIMUM | UNIT                          |
|---------------------|-----------------|---------|---------|-------------------------------|
| Junction-to-Case    | $R_{\theta JC}$ |         | 5       | $^{\circ}\text{C} / \text{W}$ |
| Junction-to-Ambient | $R_{\theta JA}$ |         | 62.5    |                               |

<sup>1</sup>Pulse width limited by maximum junction temperature.

<sup>2</sup>Duty cycle  $\leq 1\%$

ELECTRICAL CHARACTERISTICS ( $T_c = 25^\circ\text{C}$ , Unless Otherwise Noted)

| PARAMETER                                                               | SYMBOL        | TEST CONDITIONS                                               | LIMITS |      |           | UNIT    |
|-------------------------------------------------------------------------|---------------|---------------------------------------------------------------|--------|------|-----------|---------|
|                                                                         |               |                                                               | MIN    | TYP  | MAX       |         |
| STATIC                                                                  |               |                                                               |        |      |           |         |
| Drain-Source Breakdown Voltage                                          | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$                                 | 150    |      |           | V       |
| Gate Threshold Voltage                                                  | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = 250\mu A$                             | 1.0    | 1.5  | 3.0       |         |
| Gate-Body Leakage                                                       | $I_{GSS}$     | $V_{DS} = 0V, V_{GS} = \pm 20V$                               |        |      | $\pm 100$ | nA      |
| Zero Gate Voltage Drain Current                                         | $I_{DSS}$     | $V_{DS} = 100V, V_{GS} = 0V$                                  |        |      | 1         | $\mu A$ |
|                                                                         |               | $V_{DS} = 80V, V_{GS} = 0V, T_J = 125\text{ }^{\circ}C$       |        |      | 25        |         |
| On-State Drain Current <sup>1</sup>                                     | $I_{D(ON)}$   | $V_{DS} = 10V, V_{GS} = 10V$                                  | 3      |      |           | A       |
| Drain-Source On-State Resistance <sup>1</sup>                           | $R_{DS(ON)}$  | $V_{GS} = 10V, I_D = 1.5A$                                    |        | 430  | 500       | mΩ      |
|                                                                         |               | $V_{GS} = 5V, I_D = 0.8A$                                     |        | 450  | 540       |         |
| Forward Transconductance <sup>1</sup>                                   | $g_{fs}$      | $V_{DS} = 5V, I_D = 1.5A$                                     |        | 2    |           | S       |
| DYNAMIC                                                                 |               |                                                               |        |      |           |         |
| Input Capacitance                                                       | $C_{iss}$     | $V_{GS} = 0V, V_{DS} = 25V, f = 1MHz$                         |        | 572  |           | pF      |
| Output Capacitance                                                      | $C_{oss}$     |                                                               |        | 13   |           |         |
| Reverse Transfer Capacitance                                            | $C_{rss}$     |                                                               |        | 11   |           |         |
| Gate Resistance                                                         | $R_g$         | $V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz$                        |        | 3.5  |           | Ω       |
| Total Gate Charge <sup>1,2</sup>                                        | $Q_g$         | $V_{DS} = 75V, V_{GS} = 10V,$<br>$I_D = 1.5A$                 |        | 14.1 |           | nC      |
| Gate-Source Charge <sup>1,2</sup>                                       | $Q_{gs}$      |                                                               |        | 2.8  |           |         |
| Gate-Drain Charge <sup>1,2</sup>                                        | $Q_{gd}$      |                                                               |        | 3.4  |           |         |
| Turn-On Delay Time <sup>1,2</sup>                                       | $t_{d(on)}$   | $V_{DS} = 75V,$<br>$I_D = 1A, V_{GS} = 10V, R_{GS} = 6\Omega$ |        | 12   |           | nS      |
| Rise Time <sup>1,2</sup>                                                | $t_r$         |                                                               |        | 15   |           |         |
| Turn-Off Delay Time <sup>1,2</sup>                                      | $t_{d(off)}$  |                                                               |        | 16   |           |         |
| Fall Time <sup>1,2</sup>                                                | $t_f$         |                                                               |        | 15   |           |         |
| SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T <sub>C</sub> = 25 °C) |               |                                                               |        |      |           |         |
| Continuous Current                                                      | $I_S$         |                                                               |        |      | 3         | A       |
| Pulsed Current <sup>3</sup>                                             | $I_{SM}$      |                                                               |        |      | 12        |         |
| Forward Voltage <sup>1</sup>                                            | $V_{SD}$      | $I_F = I_S, V_{GS} = 0V$                                      |        |      | 1.3       | V       |
| Reverse Recovery Time                                                   | $t_{rr}$      | $I_F = 1.5A, dI_F/dt = 100A / \mu S$                          |        | 80   |           | nS      |
| Reverse Recovery Charge                                                 | $Q_{rr}$      |                                                               |        | 120  |           | nC      |

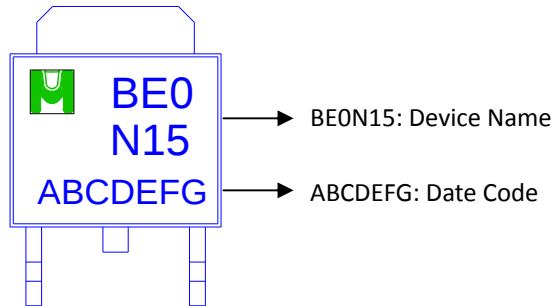
<sup>1</sup>Pulse test : Pulse Width  $\leq 300\mu\text{sec}$ , Duty Cycle  $\leq 2\%$ .

<sup>2</sup>Independent of operating temperature.

<sup>3</sup>Pulse width limited by maximum junction temperature.

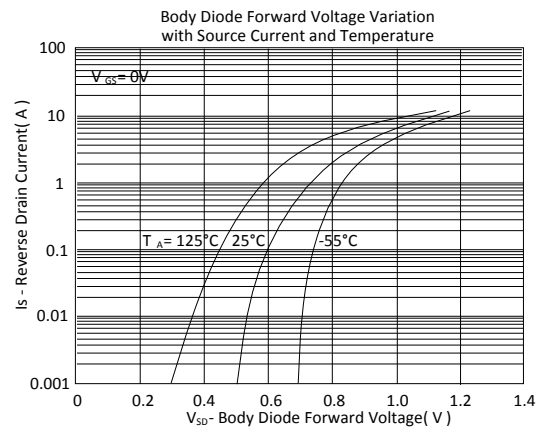
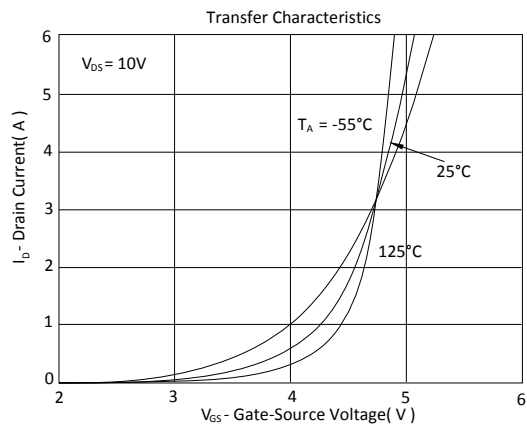
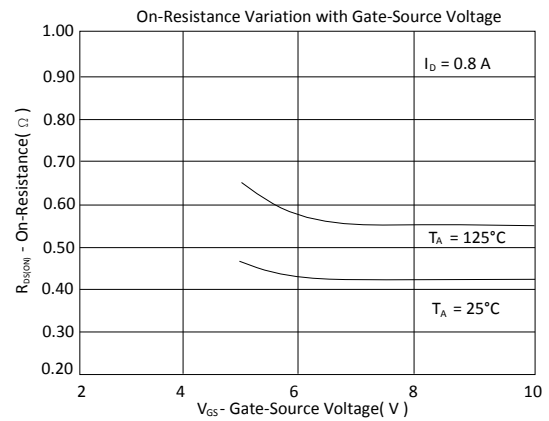
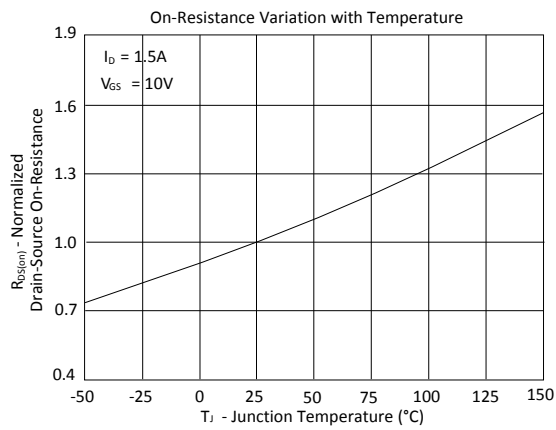
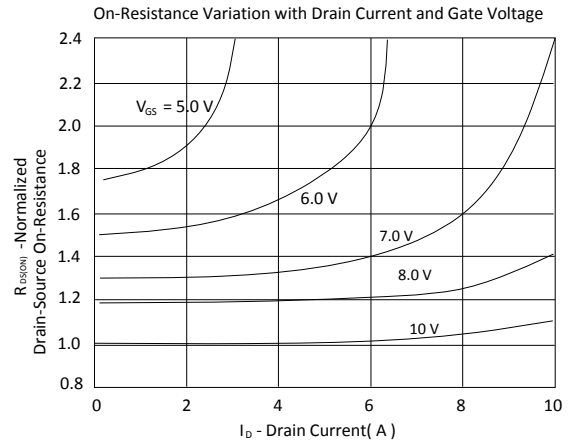
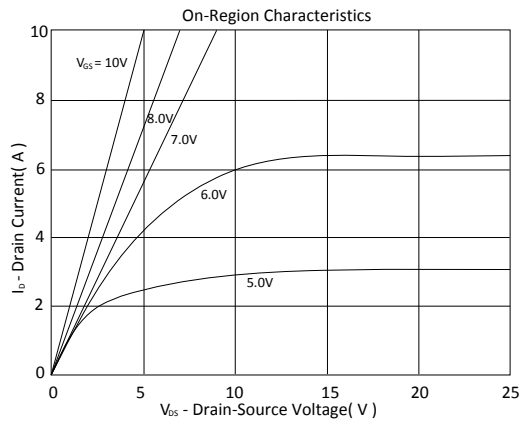
Ordering & Marking Information:

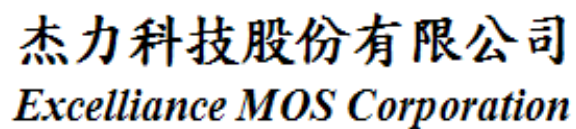
Device Name: EMBE0N15A for DPAK (TO-252)





TYPICAL CHARACTERISTICS





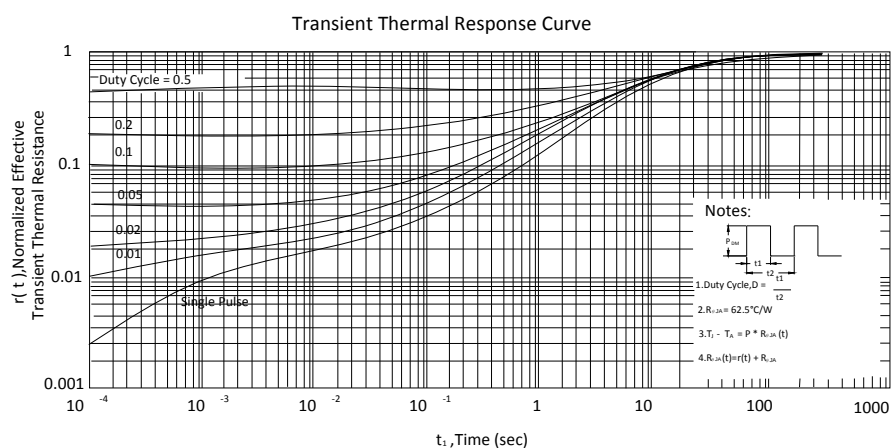
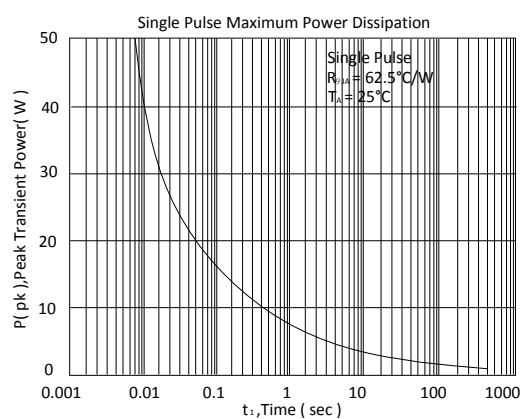
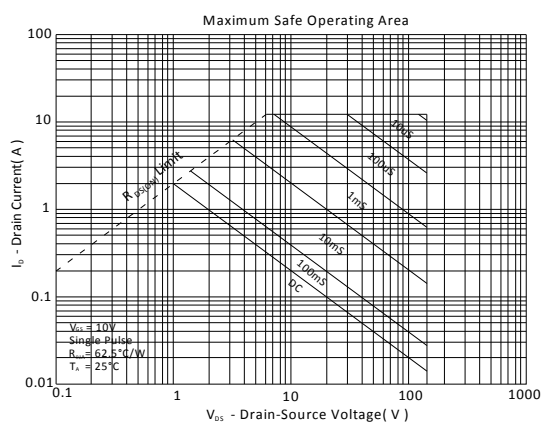
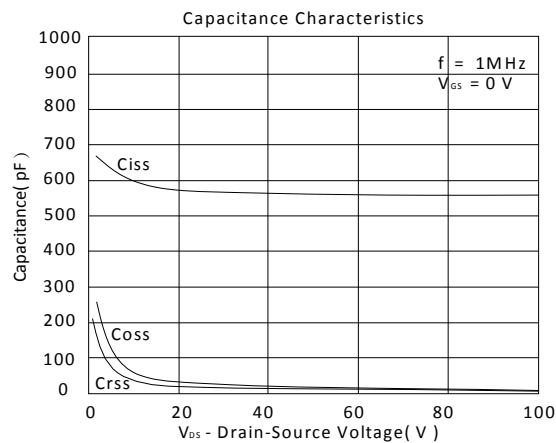
Gate Charge Characteristics

$I_D = 1.5A$

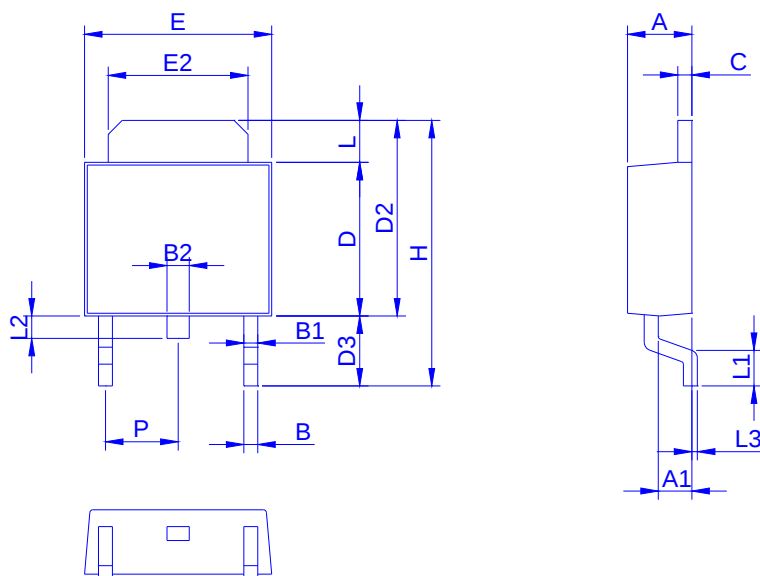
$V_{DS} = 50V$   $80V$

$V_{GS}$  - Gate Source Voltage (V)

$Q_g$  - Gate Charge (nC)



## Outline Drawing



Dimension in mm

| Dimension | A    | A1   | B    | B1   | B2   | C    | D    | D2   | D3   | E    | E2   | H     | L    | L1   | L2   | L3   | P    |
|-----------|------|------|------|------|------|------|------|------|------|------|------|-------|------|------|------|------|------|
| Min.      | 2.10 | 0.95 | 0.30 | 0.40 | 0.60 | 0.40 | 5.30 | 6.70 | 2.20 | 6.40 | 4.80 | 9.20  | 0.89 | 0.90 | 0.50 | 0.00 | 2.10 |
| Max.      | 2.50 | 1.30 | 0.85 | 0.94 | 1.00 | 0.60 | 6.20 | 7.30 | 3.00 | 6.70 | 5.45 | 10.15 | 1.70 | 1.65 | 1.10 | 0.30 | 2.50 |

## Footprint

