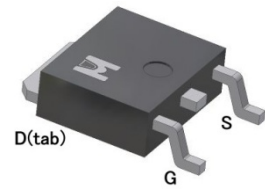
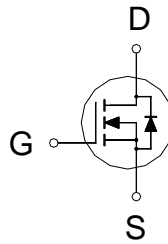


N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

| | |
|---------------------|---------------|
| BV_{DSS} | 30V |
| $R_{DS(on)}$ (MAX.) | 4.0m Ω |
| I_D | 90A |



UIS, R_g 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} | ± 20 | V |
| Continuous Drain Current | $T_C = 25\text{ }^\circ\text{C}$ | I_D | 90 | A |
| | $T_C = 100\text{ }^\circ\text{C}$ | | 55 | |
| Pulsed Drain Current ¹ | | I_{DM} | 180 | |
| Avalanche Current | | I_{AS} | 53 | |
| Avalanche Energy | $L = 0.1\text{mH}, I_D = 53\text{A}, R_G = 25\text{ }\Omega$ | E_{AS} | 140 | mJ |
| Repetitive Avalanche Energy ² | $L = 0.05\text{mH}$ | E_{AR} | 40 | |
| Power Dissipation | $T_C = 25\text{ }^\circ\text{C}$ | P_D | 69 | W |
| | $T_C = 100\text{ }^\circ\text{C}$ | | 27 | |
| Operating Junction & Storage Temperature Range | | T_{j}, T_{stg} | -55 to 150 | $^\circ\text{C}$ |

100% UIS testing in condition of $V_D = 15\text{V}, L = 0.1\text{mH}, V_G = 10\text{V}, I_L = 40\text{A}$, Rated $V_{DS} = 30\text{V}$ N-CH

THERMAL RESISTANCE RATINGS

| THERMAL RESISTANCE | SYMBOL | TYPICAL | MAXIMUM | UNIT |
|---------------------|-----------------|---------|---------|-----------------------------|
| Junction-to-Case | $R_{\theta JC}$ | | 1.8 | $^\circ\text{C} / \text{W}$ |
| Junction-to-Ambient | $R_{\theta JA}$ | | 75 | |

¹Pulse width limited by maximum junction temperature.

²Duty cycle $\leq 1\%$

³ $75\text{ }^\circ\text{C} / \text{W}$ when mounted on a 1 in² pad of 2 oz copper.



ELECTRICAL CHARACTERISTICS (T_C = 25 °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 = 250μA | 30 | | | V |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D = 250μA | 1 | 1.5 | 3 | |
| Gate-Body Leakage | I _{GSS} | V _{DS} = 0V, V _{GS} = ±20V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 24V, V _{GS} = 0V | | | 1 | μA |
| | | V _{DS} = 20V, V _{GS} = 0V, T _J = 125 °C | | | 25 | |
| On-State Drain Current ¹ | I _{D(ON)} | V _{DS} = 10V, V _{GS} = 10V | 75 | | | A |
| Drain-Source On-State Resistance ¹ | R _{DS(ON)} | V _{GS} = 10V, I _D = 30A | | 3.2 | 4.0 | mΩ |
| | | V _{GS} = 4.5V, I _D = 24A | | 4.9 | 6.6 | |
| Forward Transconductance ¹ | g _{fs} | V _{DS} = 5V, I _D = 24A | | 25 | | S |
| DYNAMIC | | | | | | |
| Input Capacitance | C _{iss} | V _{GS} = 0V, V _{DS} = 15V, f = 1MHz | | 3570 | | pF |
| Output Capacitance | C _{oss} | | | 548 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 448 | | |
| Gate Resistance | R _g | V _{GS} = 15mV, V _{DS} = 0V, f = 1MHz | | 1.2 | | Ω |
| Total Gate Charge ^{1,2} | Q _g (V _{GS} =10V) | V _{DS} = 15V, V _{GS} = 10V, I _D = 30A | | 59 | | nC |
| | Q _g (V _{GS} =4.5V) | | | 25 | | |
| Gate-Source Charge ^{1,2} | Q _{gs} | | | 7.2 | | |
| Gate-Drain Charge ^{1,2} | Q _{gd} | | | 12.7 | | |
| Turn-On Delay Time ^{1,2} | t _{d(on)} | | V _{DS} = 15V, I _D = 24A, V _{GS} = 10V, R _{GS} = 2.7Ω | | 18 | |
| Rise Time ^{1,2} | t _r | | | 12 | | |
| Turn-Off Delay Time ^{1,2} | t _{d(off)} | | | 55 | | |
| Fall Time ^{1,2} | t _f | | | 15 | | |
| SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C) | | | | | | |
| Continuous Current | I _S | | | | 90 | A |
| Pulsed Current ³ | I _{SM} | | | | 180 | |
| Forward Voltage ¹ | V _{SD} | I _F = I _S , V _{GS} = 0V | | | 1.3 | V |
| Reverse Recovery Time | t _{rr} | I _F = I _S , dI _F /dt = 100A / μS | | 30 | | nS |
| Peak Reverse Recovery Current | I _{RM(REC)} | | | 200 | | A |
| Reverse Recovery Charge | Q _{rr} | | | 10 | | nC |

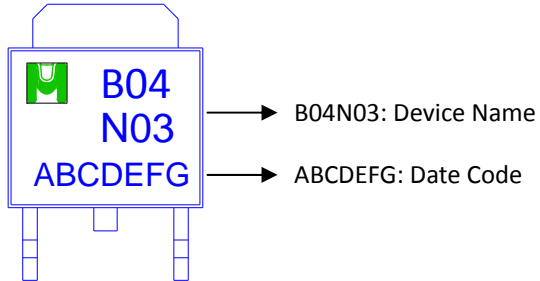
¹Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

²Independent of operating temperature.

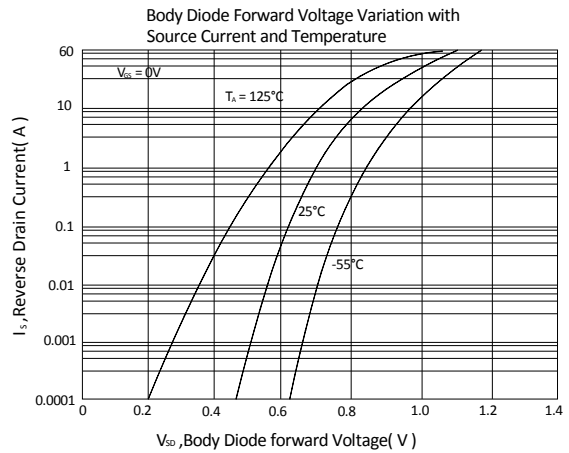
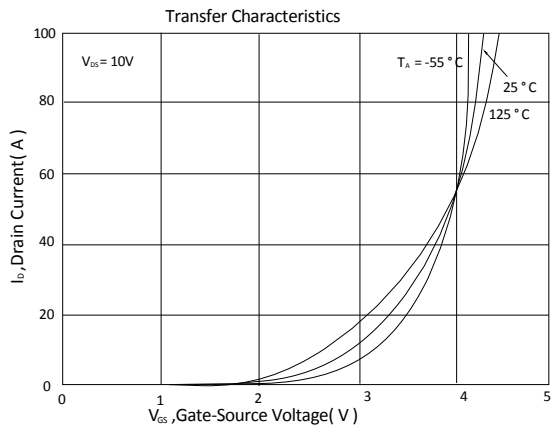
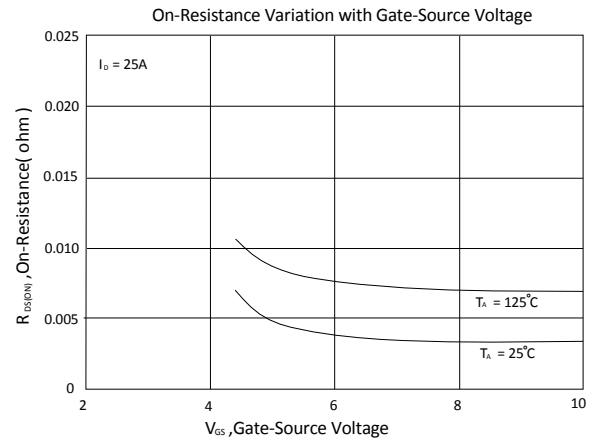
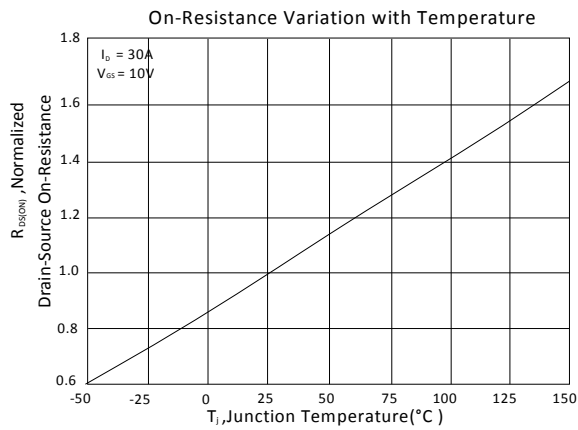
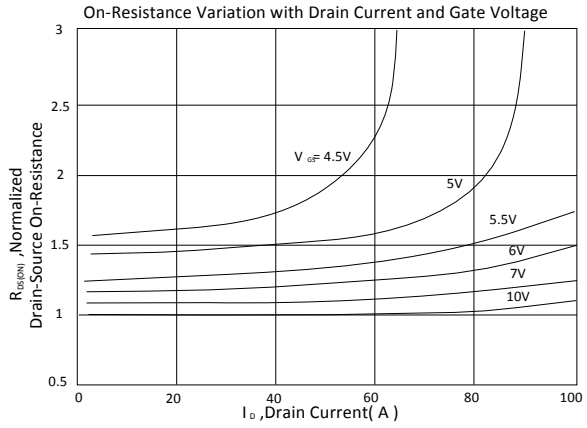
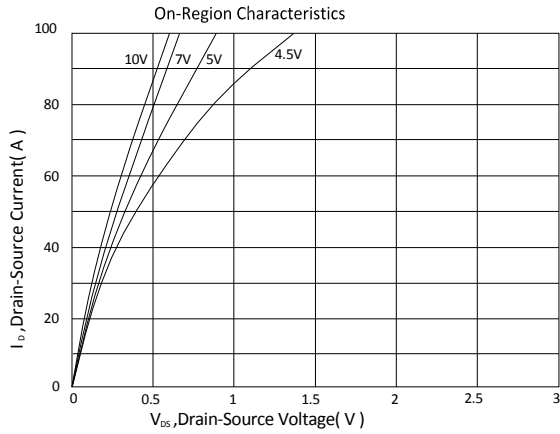
³Pulse width limited by maximum junction temperature.

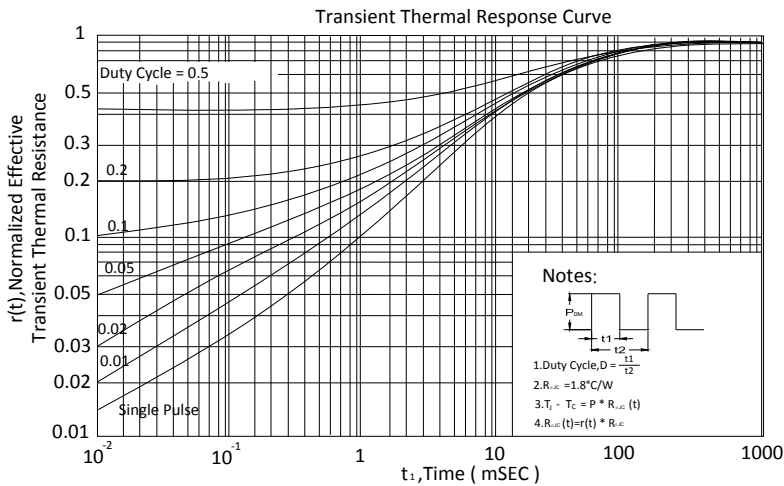
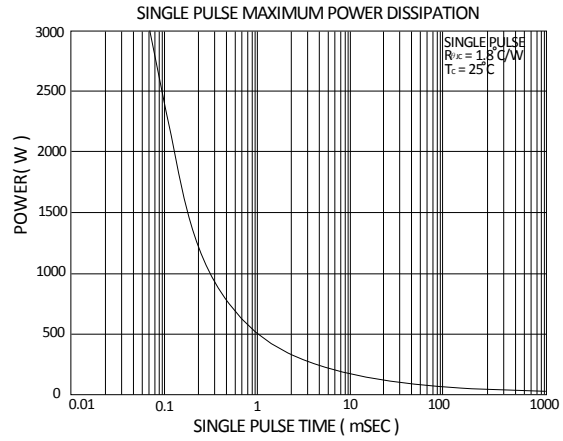
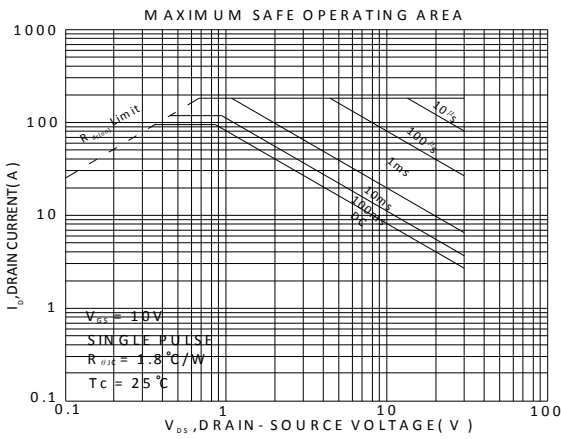
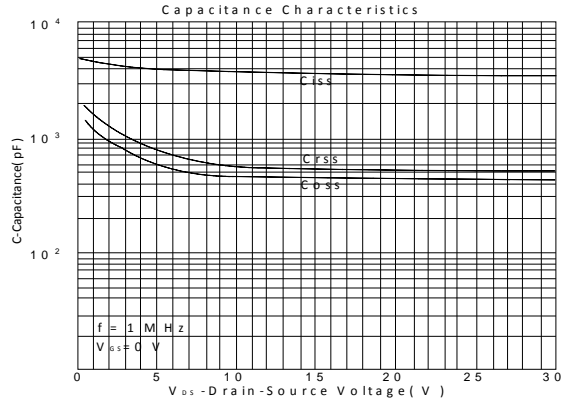
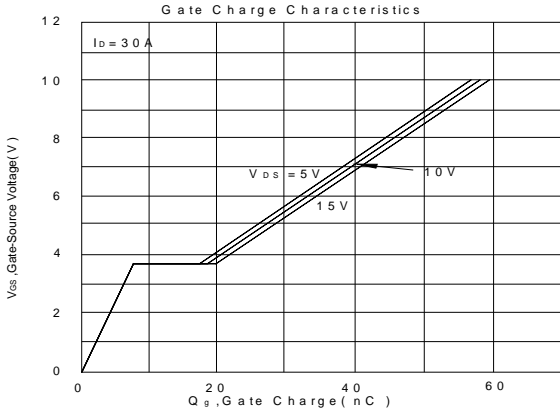
Ordering & Marking Information:

Device Name: EMB04N03A for DPAK (TO-252)



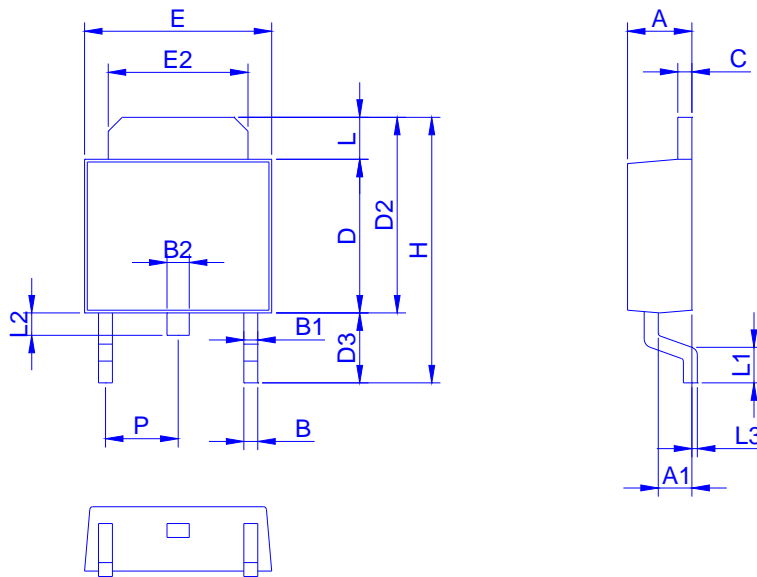
TYPICAL CHARACTERISTICS







Outline Drawing



| 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

