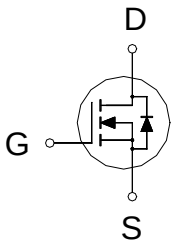
杰力科技股份有限公司
Excelliance MOS Corporation

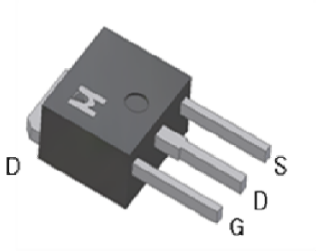
**EMBA5N10CS**

**N-Channel Logic Level Enhancement Mode Field Effect Transistor**

Product Summary:

| | |
|---|---|
| $BV_{DSS}$ | 100V |
| $R_{DSON\ (MAX.)}$ | 150mΩ |
| $I_D$ | 10A |




UIS, Rg 100% Tested

Pb-Free Lead Plating & Halogen Free

GP
GREEN PRODUCT

**ABSOLUTE MAXIMUM RATINGS ($T_C$ = 25 °C Unless Otherwise Noted)**

| PARAMETERS/TEST CONDITIONS | | SYMBOL | LIMITS | UNIT |
|---|---|---|---|---|
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | $T_C$ = 25 °C | $I_D$ | 10 | A |
| | $T_C$ = 100 °C | | 7 | |
| Pulsed Drain Current[1] | | $I_{DM}$ | 40 | |
| Avalanche Current | | $I_{AS}$ | 12 | |
| Avalanche Energy | L = 0.1mH, ID=12A, RG=25Ω | $E_{AS}$ | 7.2 | mJ |
| Repetitive Avalanche Energy[2] | L = 0.05mH | $E_{AR}$ | 3.6 | |
| Power Dissipation | $T_C$ = 25 °C | $P_D$ | 30 | W |
| | $T_C$ = 100 °C | | 13 | |
| Operating Junction & Storage Temperature Range | | $T_j$, $T_{stg}$ | -55 to 150 | °C |

**THERMAL RESISTANCE RATINGS**

| THERMAL RESISTANCE | SYMBOL | TYPICAL | MAXIMUM | UNIT |
|---|---|---|---|---|
| Junction-to-Case | $R_{\theta JC}$ | | 4.2 | °C / W |
| Junction-to-Ambient | $R_{\theta JA}$ | | 62.5 | |

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle ≤ 1%

**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 | 100 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 1.0 | 2.0 | 3.0 | |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0V, $V_{GS}$ = ±20V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 80V, $V_{GS}$ = 0V | | | 1 | μA |
| | | $V_{DS}$ = 70V, $V_{GS}$ = 0V, $T_J$ = 125 °C | | | 25 | |
| On-State Drain Current[1] | $I_{D(ON)}$ | $V_{DS}$ = 10V, $V_{GS}$ = 10V | 10 | | | A |
| Drain-Source On-State Resistance[1] | $R_{DS(ON)}$ | $V_{GS}$ = 10V, $I_D$ = 10A | | 130 | 150 | mΩ |
| | | $V_{GS}$ = 5V, $I_D$ = 10A | | 150 | 175 | |
| Forward Transconductance[1] | $g_{fs}$ | $V_{DS}$ = 5V, $I_D$ = 10A | | 8 | | S |
| **DYNAMIC** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 25V, f = 1MHz | | 1030 | | pF |
| Output Capacitance | $C_{oss}$ | | | 50 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 42 | | |
| Gate Resistance | $R_g$ | $V_{GS}$ = 15mV, $V_{DS}$ = 0V, f = 1MHz | | 1.2 | | Ω |
| Total Gate Charge[1,2] | $Q_g$ | $V_{DS}$ = 80V, $V_{GS}$ = 10V, $I_D$ = 10A | | 23 | | nC |
| Gate-Source Charge[1,2] | $Q_{gs}$ | | | 2.3 | | |
| Gate-Drain Charge[1,2] | $Q_{gd}$ | | | 6.1 | | |
| Turn-On Delay Time[1,2] | $t_{d(on)}$ | $V_{DS}$ = 50V, $I_D$ = 1A, $V_{GS}$ = 10V, $R_{GS}$ = 6Ω | | 12 | | nS |
| Rise Time[1,2] | $t_r$ | | | 20 | | |
| Turn-Off Delay Time[1,2] | $t_{d(off)}$ | | | 25 | | |
| Fall Time[1,2] | $t_f$ | | | 25 | | |
| **SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_C$ = 25 °C)** | | | | | | |
| Continuous Current | $I_S$ | | | | 10 | A |
| Pulsed Current[3] | $I_{SM}$ | | | | 40 | |
| Forward Voltage[1] | $V_{SD}$ | $I_F$ = $I_S$, $V_{GS}$ = 0V | | | 1.3 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$ = 10A, $dI_F/dt$ = 100A / μS | | 35 | | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | | 65 | | nC |

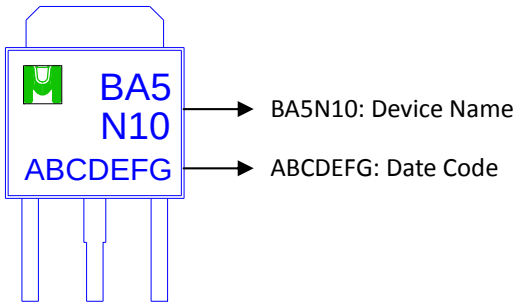
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

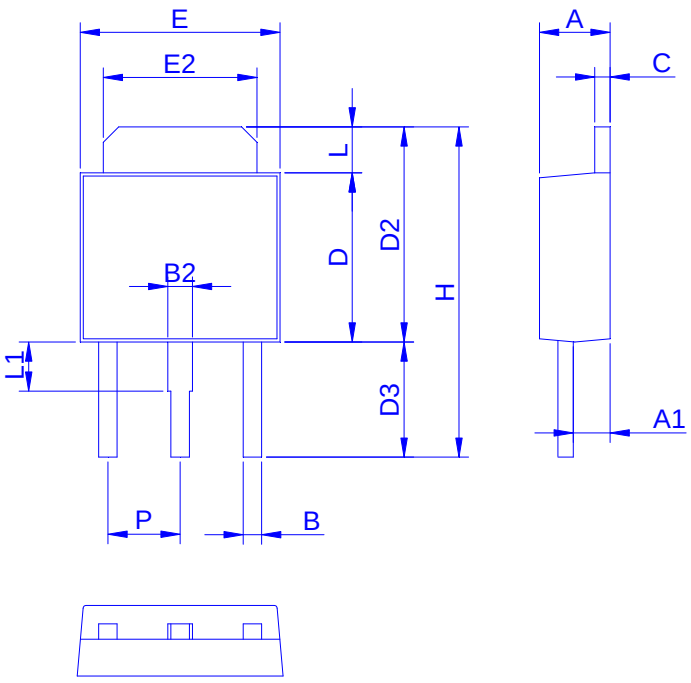
[3]Pulse width limited by maximum junction temperature.

## Ordering & Marking Information:

Device Name: EMBA5N10CS for IPAK (TO-251)



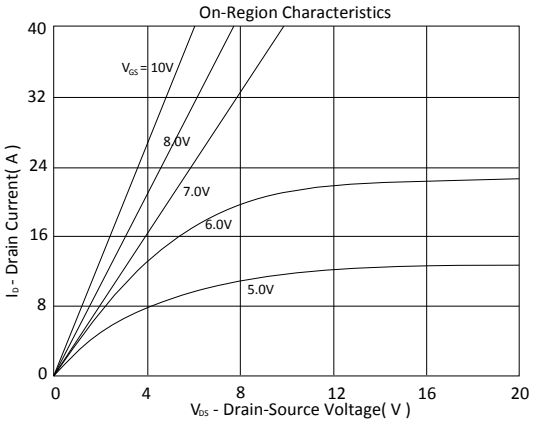

## Outline Drawing

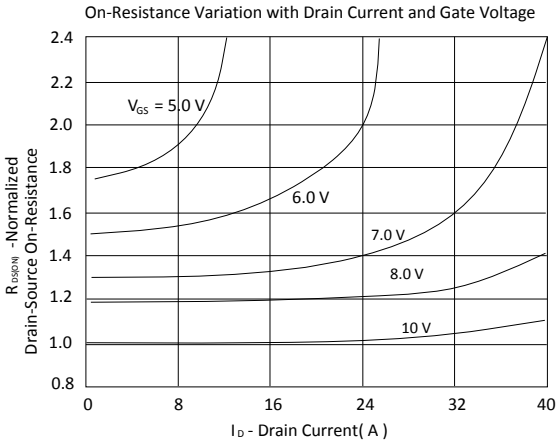


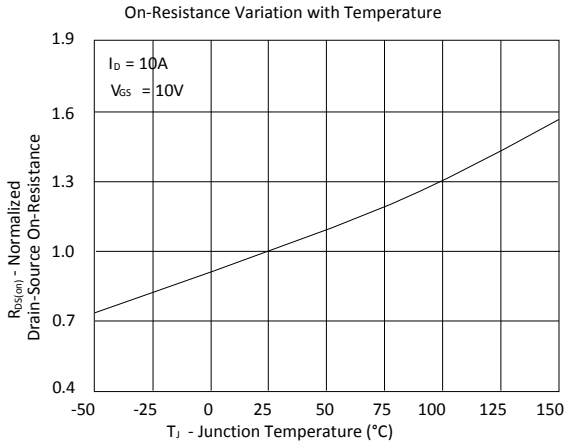

Dimension in mm

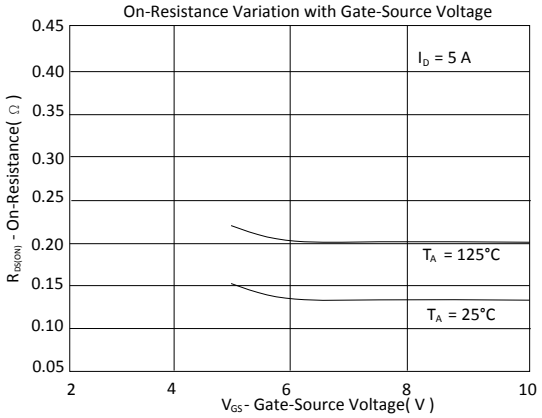
| Dimension | A | A1 | B | B2 | C | D | D2 | D3 | E | E2 | H | L | L1 | P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min. | 2.10 | 0.90 | 0.40 | 0.60 | 0.40 | 5.30 | 6.70 | 3.40 | 6.30 | 4.80 | 10.2 | 0.89 | 0.90 | 2.10 |
| Max. | 2.50 | 1.50 | 0.90 | 1.15 | 0.60 | 6.25 | 7.30 | 4.30 | 6.80 | 5.50 | 11.5 | 1.40 | 1.80 | 2.50 |

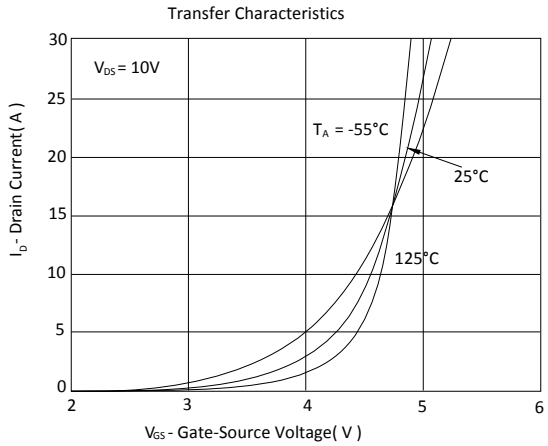
TYPICAL CHARACTERISTICS

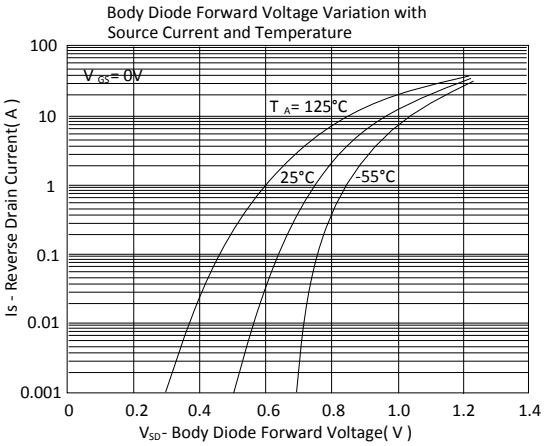


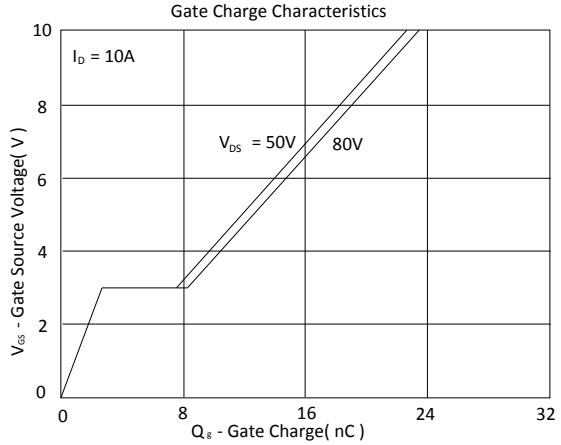



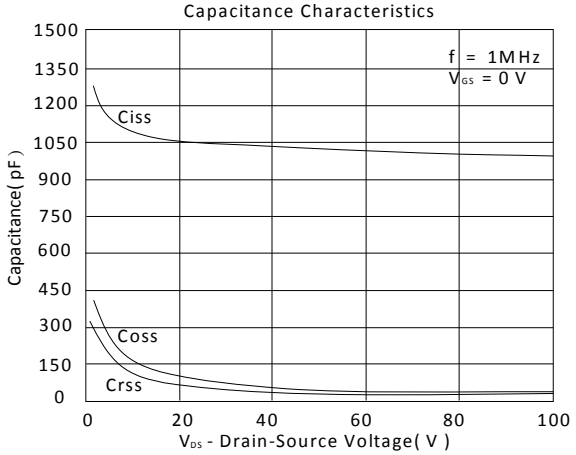



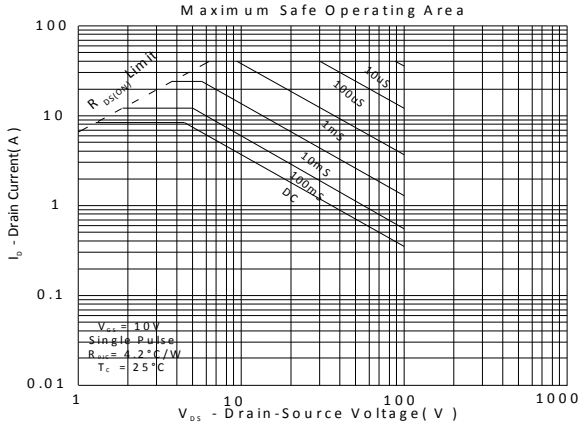
Gate Charge Characteristics



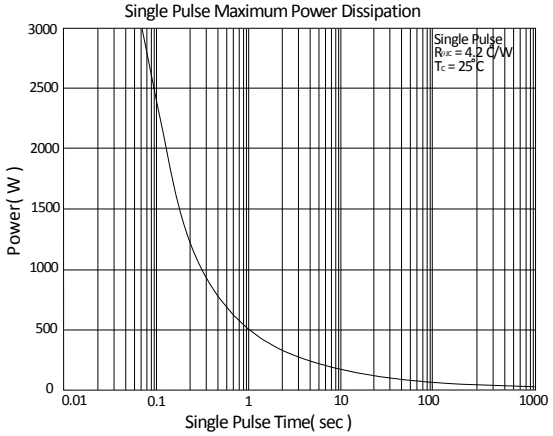

Capacitance Characteristics




Maximum Safe Operating Area




Single Pulse Maximum Power Dissipation




Transient Thermal Response Curve