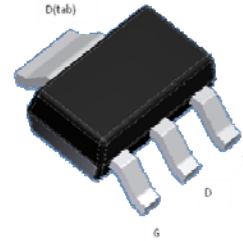


N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

| | |
|---------------------|---------------|
| BV_{DSS} | 100V |
| $R_{DS(on)}$ (MAX.) | 250m Ω |
| I_D | 3A |



UIS 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 | 3 | A |
| | $T_C = 100\text{ }^\circ\text{C}$ | | 2 | |
| Pulsed Drain Current ¹ | | I_{DM} | 12 | |
| Avalanche Current | | I_{AS} | 5 | |
| Avalanche Energy | $L = 0.1\text{mH}, I_D = 5\text{A}, R_G = 25\Omega$ | E_{AS} | 1.25 | mJ |
| Repetitive Avalanche Energy ² | $L = 0.05\text{mH}$ | E_{AR} | 0.625 | |
| Power Dissipation | $T_C = 25\text{ }^\circ\text{C}$ | P_D | 6.25 | W |
| | $T_C = 100\text{ }^\circ\text{C}$ | | 2.5 | |
| 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 | $R_{\theta JC}$ | | 20 | $^\circ\text{C} / \text{W}$ |
| Junction-to-Ambient ³ | $R_{\theta JA}$ | | 150 | |

¹Pulse width limited by maximum junction temperature.

²Duty cycle $\leq 1\%$

³150 $^\circ\text{C} / \text{W}$ when mounted on a 1 in² pad of 2 oz copper.

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

| PARAMETER | SYMBOL | TEST CONDITIONS | LIMITS | | | UNIT |
|---|---------------|---|--------|------|-----------|-----------|
| | | | MIN | TYP | MAX | |
| STATIC | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$ | 100 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 1 | 1.5 | 3 | |
| Gate-Body Leakage | I_{GSS} | $V_{DS} = 0V, V_{GS} = \pm 20V$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 80V, V_{GS} = 0V$ | | | 1 | μA |
| | | $V_{DS} = 70V, V_{GS} = 0V, T_J = 125\text{ }^\circ\text{C}$ | | | 25 | |
| On-State Drain Current ¹ | $I_{D(ON)}$ | $V_{DS} = 5V, V_{GS} = 10V$ | 2.5 | | | A |
| Drain-Source On-State Resistance ¹ | $R_{DS(ON)}$ | $V_{GS} = 10V, I_D = 2A$ | | 200 | 250 | $m\Omega$ |
| | | $V_{GS} = 4.5V, I_D = 1A$ | | 235 | 300 | |
| Forward Transconductance ¹ | g_{fs} | $V_{DS} = 5V, I_D = 2A$ | | 4 | | S |
| DYNAMIC | | | | | | |
| Input Capacitance | C_{iss} | $V_{GS} = 0V, V_{DS} = 50V, f = 1MHz$ | | 858 | | pF |
| Output Capacitance | C_{oss} | | | 38 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 27 | | |
| Total Gate Charge ^{1,2} | Q_g | $V_{DS} = 15V, V_{GS} = 10V,$ $I_D = 2A$ | | 14.3 | | nC |
| Gate-Source Charge ^{1,2} | Q_{gs} | | | 2.9 | | |
| Gate-Drain Charge ^{1,2} | Q_{gd} | | | 3.4 | | |
| Turn-On Delay Time ^{1,2} | $t_{d(on)}$ | $V_{DS} = 15V,$ $I_D = 1A, V_{GS} = 10V, R_{GS} = 6\Omega$ | | 20 | | nS |
| Rise Time ^{1,2} | t_r | | | 40 | | |
| Turn-Off Delay Time ^{1,2} | $t_{d(off)}$ | | | 36 | | |
| Fall Time ^{1,2} | t_f | | | 30 | | |
| SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_c = 25\text{ }^\circ\text{C}$) | | | | | | |
| Continuous Current | I_S | | | | 2 | A |
| Pulsed Current ³ | I_{SM} | | | | 8 | |
| Forward Voltage ¹ | V_{SD} | $I_F = I_S, V_{GS} = 0V$ | | | 1.2 | V |
| Reverse Recovery Time | t_{rr} | | | 50 | | nS |
| Reverse Recovery Charge | Q_{rr} | | | 90 | | nC |

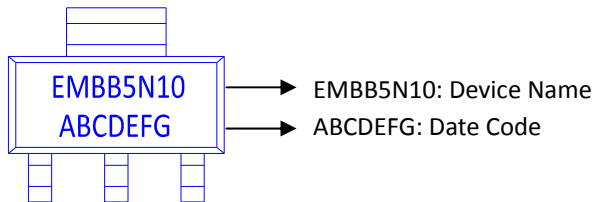
¹Pulse test : Pulse Width $\leq 300\ \mu\text{sec}$, Duty Cycle $\leq 2\%$.

²Independent of operating temperature.

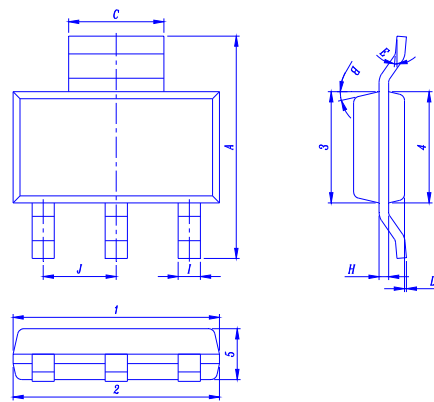
³Pulse width limited by maximum junction temperature.

Ordering & Marking Information:

Device Name: EMBB5N10Q for SOT-223



Outline Drawing



Dimension in mm

| Dimension | A | C | D | E | I | H | B | J | 1 | 2 | 3 | 4 | 5 |
|-----------|------|------|------|-----|------|------|-----|------|------|------|------|------|------|
| Min. | 6.70 | 2.90 | 0.02 | 0° | 0.60 | 0.25 | | | 6.30 | 63.0 | 3.30 | 3.30 | 1.40 |
| Typ. | | | | | | | 13° | 2.30 | | | | | |
| Max. | 7.30 | 3.10 | 0.10 | 10° | 0.80 | 0.35 | | | 6.70 | 6.70 | 3.70 | 3.70 | 1.80 |

Recommended minimum pads

