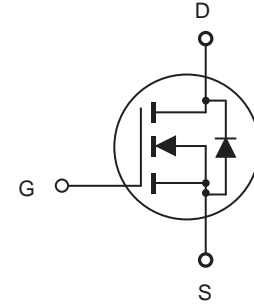


N-Channel Enhancement Mode Field Effect Transistor

FEATURES

- 30V, 40A, $R_{DS(ON)} = 15m\Omega$ @ $V_{GS} = 10V$.
 $R_{DS(ON)} = 22m\Omega$ @ $V_{GS} = 4.5V$.
- Super high dense cell design for extremely low $R_{DS(ON)}$.
- High power and current handing capability.
- Lead free product is acquired.
- TO-220 & TO-263 package.



ABSOLUTE MAXIMUM RATINGS $T_C = 25^\circ C$ unless otherwise noted

| Parameter | Symbol | Limit | Units |
|---|----------------|------------|---------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous | I_D | 40 | A |
| Drain Current-Pulsed ^a | I_{DM} | 160 | A |
| Maximum Power Dissipation @ $T_C = 25^\circ C$ - Derate above $25^\circ C$ | P_D | 43 | W |
| | | 0.29 | W/ $^\circ C$ |
| Operating and Store Temperature Range | T_J, T_{stg} | -55 to 175 | $^\circ C$ |

Thermal Characteristics

| Parameter | Symbol | Limit | Units |
|---|-----------------|-------|--------------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 3.5 | $^\circ C/W$ |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 62.5 | $^\circ C/W$ |



CEP3120/CEB3120

Electrical Characteristics $T_A = 25^\circ\text{C}$ unless otherwise noted

| Parameter | Symbol | Test Condition | Min | Typ | Max | Units |
|---|--------------|---|-----|------|------|-----------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS} = 0V, I_D = 250\mu A$ | 30 | | | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 30V, V_{GS} = 0V$ | | | 1 | μA |
| Gate Body Leakage Current, Forward | I_{GSSF} | $V_{GS} = 20V, V_{DS} = 0V$ | | | 100 | nA |
| Gate Body Leakage Current, Reverse | I_{GSSR} | $V_{GS} = -20V, V_{DS} = 0V$ | | | -100 | nA |
| On Characteristics ^c | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS} = V_{DS}, I_D = 250\mu A$ | 1 | | 3 | V |
| Static Drain-Source | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 40A$ | | 11 | 15 | $m\Omega$ |
| On-Resistance | | $V_{GS} = 4.5V, I_D = 32A$ | | 17 | 22 | $m\Omega$ |
| Dynamic Characteristics ^d | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS} = 15V, V_{GS} = 0V,$ $f = 1.0\text{ MHz}$ | | 955 | | pF |
| Output Capacitance | C_{oss} | | | 155 | | pF |
| Reverse Transfer Capacitance | C_{rss} | | | 75 | | pF |
| Switching Characteristics ^d | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD} = 15V, I_D = 10A,$ $V_{GS} = 10V, R_{GEN} = 0.3\Omega$ | | 13 | 26 | ns |
| Turn-On Rise Time | t_r | | | 3.4 | 6.8 | ns |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 30 | 60 | ns |
| Turn-Off Fall Time | t_f | | | 6.8 | 13.6 | ns |
| Total Gate Charge | Q_g | $V_{DS} = 15V, I_D = 40A,$ $V_{GS} = 10V$ | | 13.1 | 17.4 | nC |
| Gate-Source Charge | Q_{gs} | | | 2.7 | | nC |
| Gate-Drain Charge | Q_{gd} | | | 1 | | nC |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| Drain-Source Diode Forward Current ^b | I_S | | | | 40 | A |
| Drain-Source Diode Forward Voltage ^c | V_{SD} | $V_{GS} = 0V, I_S = 40A$ | | | 1.3 | V |
| Notes : a.Repetitive Rating : Pulse width limited by maximum junction temperature. b.Surface Mounted on FR4 Board, $t \leq 10\text{ sec.}$ c.Pulse Test : Pulse Width $\leq 300\mu s,$ Duty Cycle $\leq 2\%.$ d.Guaranteed by design, not subject to production testing. | | | | | | |

5



CEP3120/CEB3120

5

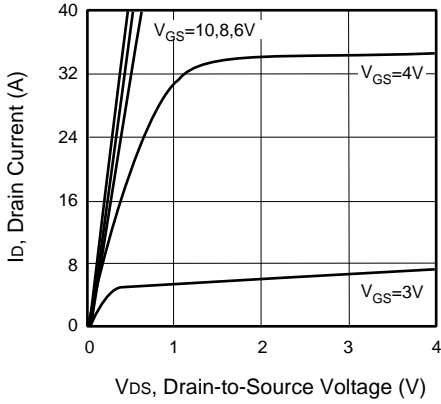


Figure 1. Output Characteristics

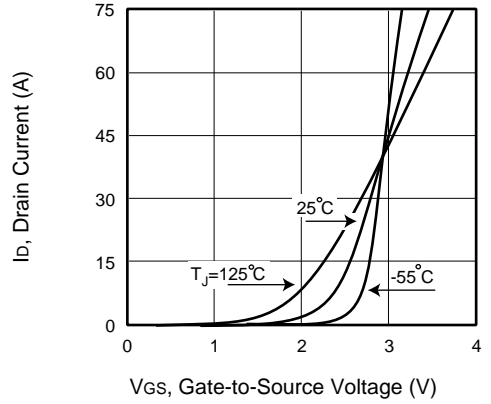


Figure 2. Transfer Characteristics

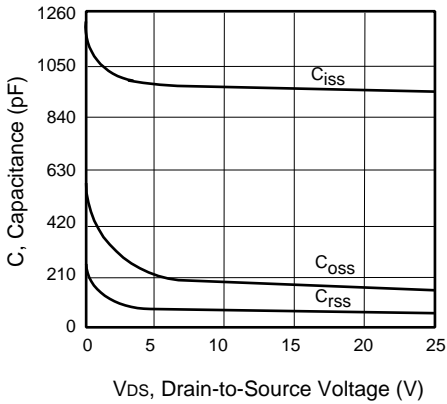


Figure 3. Capacitance

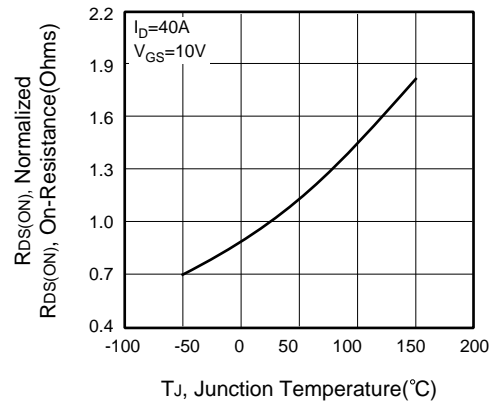


Figure 4. On-Resistance Variation with Temperature

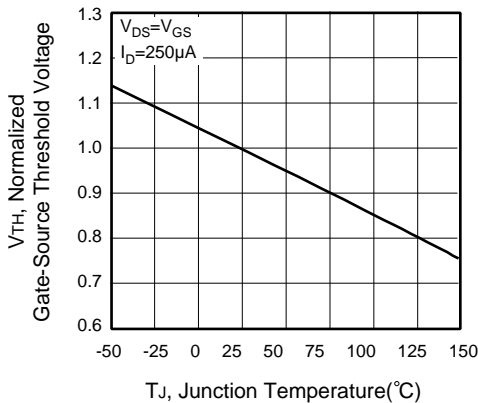


Figure 5. Gate Threshold Variation with Temperature

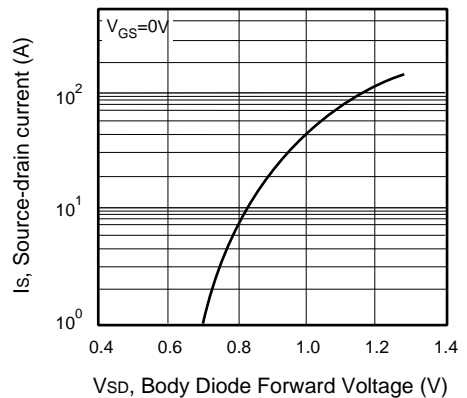


Figure 6. Body Diode Forward Voltage Variation with Source Current



CEP3120/CEB3120

6

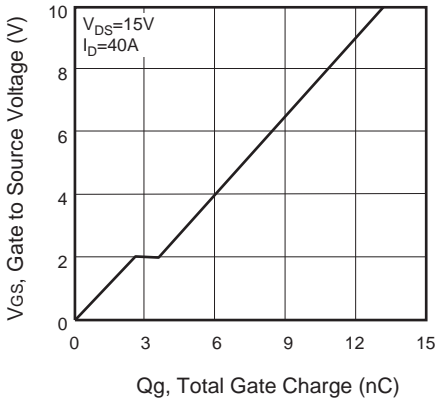


Figure 7. Gate Charge

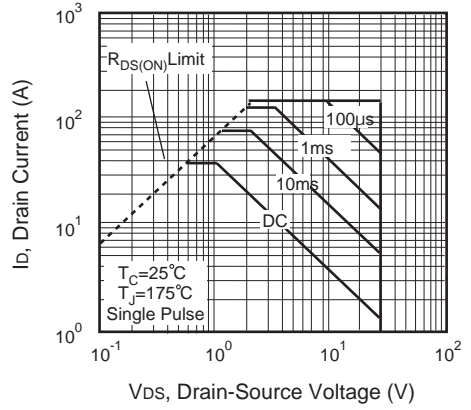


Figure 8. Maximum Safe Operating Area

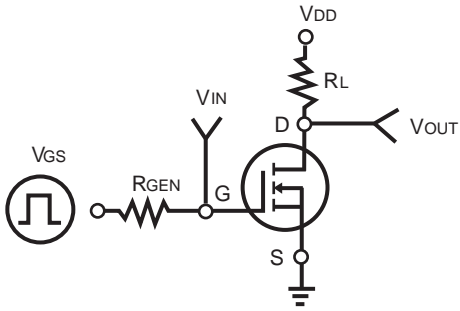


Figure 9. Switching Test Circuit

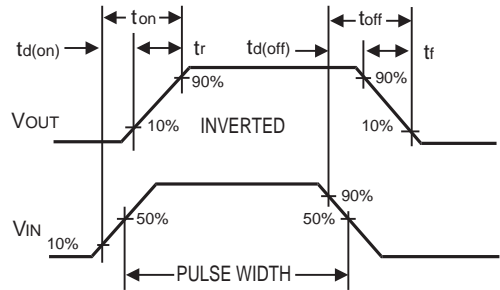


Figure 10. Switching Waveforms

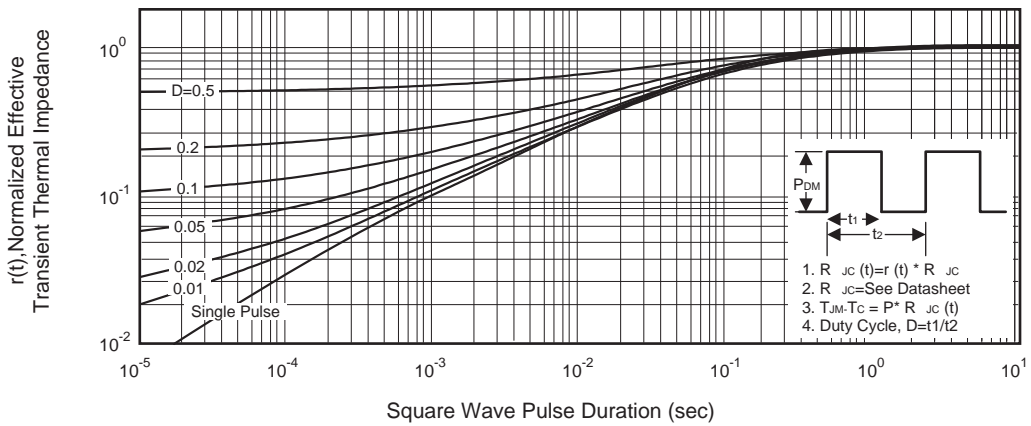


Figure 11. Normalized Thermal Transient Impedance Curve