



CEP02N65A/CEB02N65A CEF02N65A

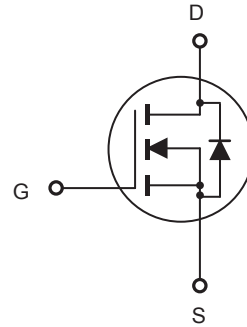
N-Channel Enhancement Mode Field Effect Transistor

PRELIMINARY

FEATURES

| Type | V _{DSS} | R _{DS(ON)} | I _D | @V _{GS} |
|-----------|------------------|---------------------|-------------------|------------------|
| CEP02N65A | 650V | 10.5Ω | 1.3A | 10V |
| CEB02N65A | 650V | 10.5Ω | 1.3A | 10V |
| CEF02N65A | 650V | 10.5Ω | 1.3A ^d | 10V |

- Super high dense cell design for extremely low R_{DS(ON)}.
- High power and current handling capability.
- Lead free product is acquired.



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

| Parameter | Symbol | Limit | | Units |
|--|-----------------------------------|------------|------------------|-------|
| | | TO-220/263 | TO-220F | |
| Drain-Source Voltage | V _{DS} | 650 | | V |
| Gate-Source Voltage | V _{GS} | ±30 | | V |
| Drain Current-Continuous @ T _C = 25 C @ T _C = 100°C | I _D | 1.3 | 1.3 | A |
| | | 0.8 | 0.8 ^d | A |
| Drain Current-Pulsed ^a | I _{DM} ^e | 5.2 | 5.2 ^d | A |
| Maximum Power Dissipation @ T _C = 25°C - Derate above 25°C | P _D | 41 | 27 | W |
| | | 0.33 | 0.22 | W/°C |
| Operating and Store Temperature Range | T _J , T _{stg} | -55 to 150 | | °C |

Thermal Characteristics

| Parameter | Symbol | Limit | | Units |
|---|------------------|-------|-----|-------|
| Thermal Resistance, Junction-to-Case | R _{θJC} | 3 | 4.5 | °C/W |
| Thermal Resistance, Junction-to-Ambient | R _{θJA} | 62.5 | 65 | °C/W |

This is preliminary information on a new product in development now .
Details are subject to change without notice .

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<http://www.cetsemi.com>



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

| Parameter | Symbol | Test Condition | Min | Typ | Max | Units |
|---|--------------|---|-----|-----|------|----------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS} = 0V, I_D = 250\mu A$ | 650 | | | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 650V, V_{GS} = 0V$ | | | 1 | μA |
| Gate Body Leakage Current, Forward | I_{GSSF} | $V_{GS} = 30V, V_{DS} = 0V$ | | | 100 | nA |
| Gate Body Leakage Current, Reverse | I_{GSSR} | $V_{GS} = -30V, V_{DS} = 0V$ | | | -100 | nA |
| On Characteristics^b | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS} = V_{DS}, I_D = 250\mu A$ | 2.5 | | 4.5 | V |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 0.5A$ | | 8.5 | 10.5 | Ω |
| Dynamic Characteristics^c | | | | | | |
| Forward Transconductance | g_{FS} | $V_{DS} = 10V, I_D = 0.6A$ | | 0.8 | | S |
| Input Capacitance | C_{iss} | $V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0\text{ MHz}$ | | 205 | | pF |
| Output Capacitance | C_{oss} | | | 50 | | pF |
| Reverse Transfer Capacitance | C_{rss} | | | 20 | | pF |
| Switching Characteristics^c | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD} = 300V, I_D = 1.2A,$ $V_{GS} = 10V, R_{GEN} = 4.7\Omega$ | | 11 | 22 | ns |
| Turn-On Rise Time | t_r | | | 10 | 20 | ns |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 16 | 32 | ns |
| Turn-Off Fall Time | t_f | | | 8 | 16 | ns |
| Total Gate Charge | Q_g | $V_{DS} = 480V, I_D = 1.2A,$ $V_{GS} = 10V$ | | 6.9 | 9.1 | nC |
| Gate-Source Charge | Q_{gs} | | | 0.9 | | nC |
| Gate-Drain Charge | Q_{gd} | | | 4.6 | | nC |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| Drain-Source Diode Forward Current | I_S^f | | | | 1.3 | A |
| Drain-Source Diode Forward Voltage ^b | V_{SD} | $V_{GS} = 0V, I_S = 0.6A^g$ | | | 1.5 | V |
| Notes : <ul style="list-style-type: none"> a. Repetitive Rating : Pulse width limited by maximum junction temperature . b. Pulse Test : Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$. c. Guaranteed by design, not subject to production testing. d. Limited only by maximum temperature allowed . e. Pulse width limited by safe operating area . f. Full package $I_{S(max)} = 1A$. g. Full package V_{SD} test condition $I_S = 1A$. h. $L = 1mH, I_{AS} = 1.2A, V_{DD} = 50V, R_G = 25\Omega$, Starting $T_J = 25\text{ C}$. | | | | | | |



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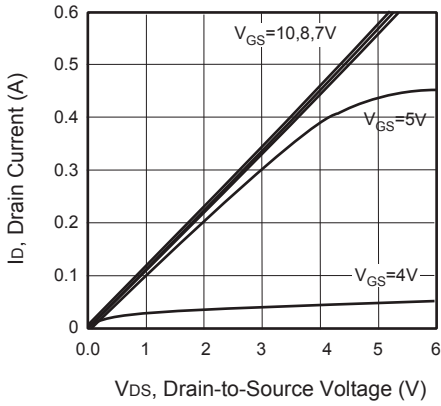


Figure 1. Output Characteristics

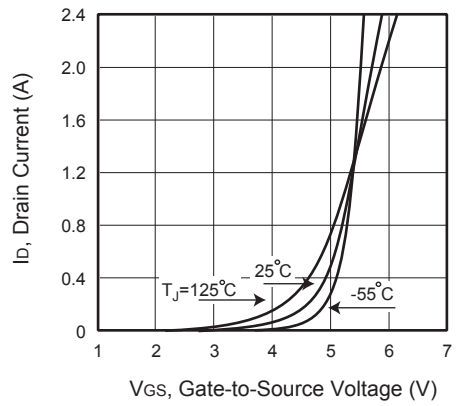


Figure 2. Transfer Characteristics

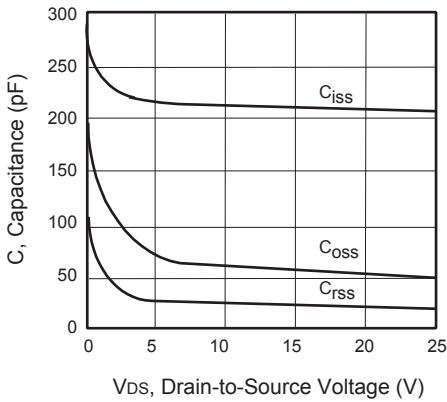


Figure 3. Capacitance

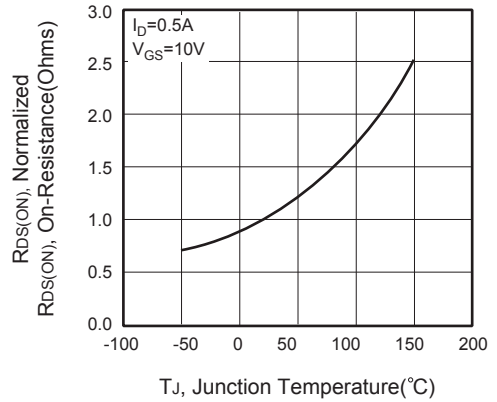


Figure 4. On-Resistance Variation with Temperature



Figure 5. Gate Threshold Variation with Temperature

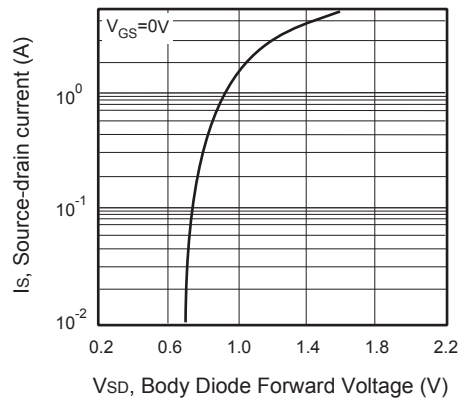


Figure 6. Body Diode Forward Voltage Variation with Source Current



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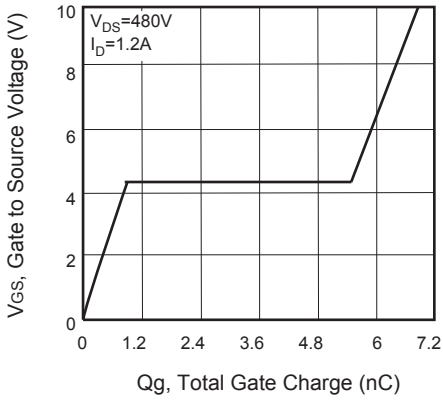


Figure 7. Gate Charge

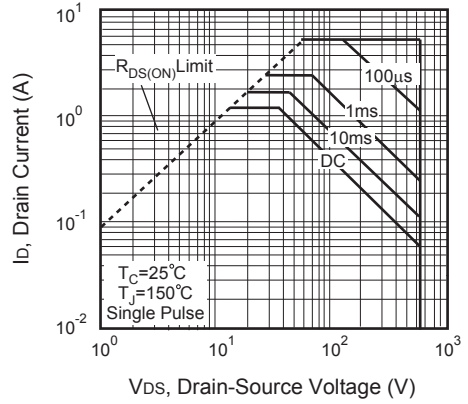


Figure 8. Maximum Safe Operating Area



Figure 9. Switching Test Circuit



Figure 10. Switching Waveforms

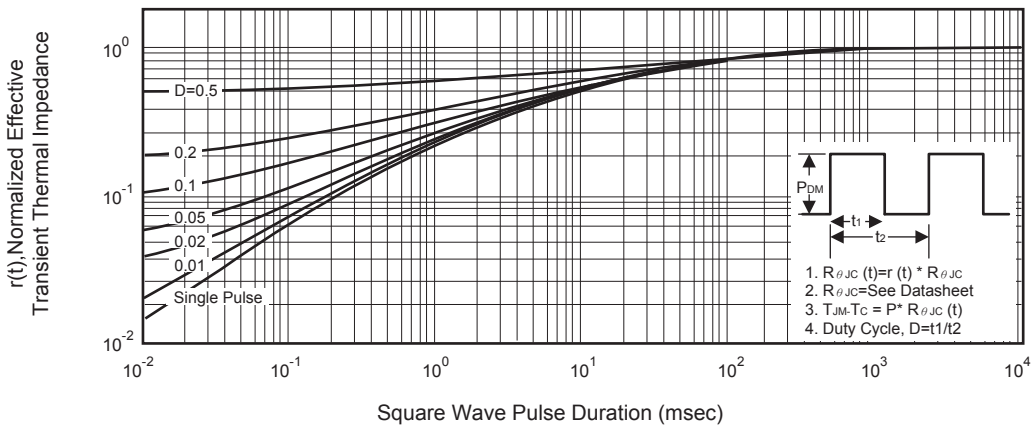


Figure 11. Normalized Thermal Transient Impedance Curve