

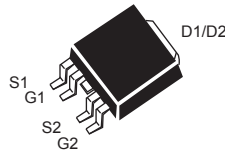
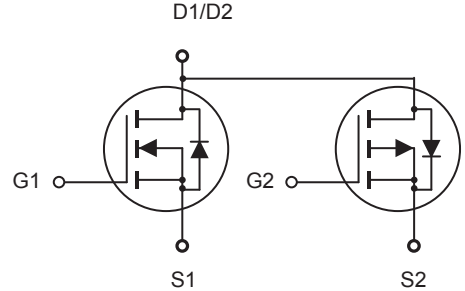


CED4279/CEU4279

Dual Enhancement Mode Field Effect Transistor (N and P Channel)

FEATURES

- 40V , 14A , $R_{DS(ON)} = 32m\Omega$ @ $V_{GS} = 10V$.
 $R_{DS(ON)} = 46m\Omega$ @ $V_{GS} = 4.5V$.
- -40V , -9A , $R_{DS(ON)} = 72m\Omega$ @ $V_{GS} = 10V$.
 $R_{DS(ON)} = 110m\Omega$ @ $V_{GS} = 4.5V$.
- Super high dense cell design for extremely low $R_{DS(ON)}$.
- High power and current handling capability.
- Lead free product is acquired.
- TO-252-4L package.



CEU SERIES
TO-252-4L

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

| Parameter | Symbol | N-Channel | P-Channel | Units |
|---|----------------|------------|-----------|---------------------|
| Drain-Source Voltage | V_{DS} | 40 | 40 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | ± 20 | V |
| Drain Current-Continuous ^e | I_D^e | 14 | -9 | A |
| Drain Current-Pulsed ^a | I_{DM} | 56 | -36 | A |
| Maximum Power Dissipation @ $T_C = 25^\circ\text{C}$ - Derate above 25°C | P_D | 10.4 | | W |
| | | 0.08 | | W/ $^\circ\text{C}$ |
| Operating and Store Temperature Range | T_J, T_{stg} | -55 to 150 | | $^\circ\text{C}$ |

Thermal Characteristics

| Parameter | Symbol | Limit | Units |
|---|-----------------|-------|---------------------------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 12 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 50 | $^\circ\text{C}/\text{W}$ |



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N-Channel 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} | $V_{GS} = 0V, I_D = 250\mu A$ | 40 | | | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 40V, V_{GS} = 0V$ | | | 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 | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS} = V_{DS}, I_D = 250\mu A$ | 1 | | 3 | V |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 8A$ | | 25 | 32 | $m\Omega$ |
| | | $V_{GS} = 4.5V, I_D = 6A$ | | 35 | 46 | $m\Omega$ |
| Dynamic Characteristics ^d | | | | | | |
| Forward Transconductance | g_{FS}^c | $V_{DS} = 5V, I_D = 8A$ | | 10 | | S |
| Input Capacitance | C_{iss} | $V_{DS} = 20V, V_{GS} = 0V, f = 1.0\text{ MHz}$ | | 1055 | | pF |
| Output Capacitance | C_{oss} | | | 160 | | pF |
| Reverse Transfer Capacitance | C_{rss} | | | 100 | | pF |
| Switching Characteristics ^d | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD} = 20V, I_D = 6A, V_{GS} = 10V, R_{GEN} = 3\Omega$ | | 15 | 30 | ns |
| Turn-On Rise Time | t_r | | | 11 | 22 | ns |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 18 | 36 | ns |
| Turn-Off Fall Time | t_f | | | 19 | 38 | ns |
| Total Gate Charge | Q_g | $V_{DS} = 20V, I_D = 6A, V_{GS} = 4.5V$ | | 10 | 13.3 | nC |
| Gate-Source Charge | Q_{gs} | | | 3.7 | | nC |
| Gate-Drain Charge | Q_{gd} | | | 4.2 | | nC |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| Drain-Source Diode Forward Current ^b | I_S | | | | 8 | A |
| Drain-Source Diode Forward Voltage ^c | V_{SD} | $V_{GS} = 0V, I_S = 1A$ | | | 1.2 | 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.□ e.Calculated continuous current based on the maximum allowable junction temperature. Package limitation current=8A. | | | | | | |



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P-Channel 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} | $V_{GS} = 0V, I_D = -250\mu A$ | -40 | | | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = -40V, V_{GS} = 0V$ | | | -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 | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS} = V_{DS}, I_D = -250\mu A$ | -2 | | -4 | V |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS} = -10V, I_D = -8A$ | | 60 | 72 | $m\Omega$ |
| | | $V_{GS} = -4.5V, I_D = -6A$ | | 90 | 110 | $m\Omega$ |
| Dynamic Characteristics^d | | | | | | |
| Forward Transconductance ^c | g_{FS}^c | $V_{DS} = -5V, I_D = -8A$ | | 10 | | S |
| Input Capacitance | C_{iss} | $V_{DS} = -20V, V_{GS} = 0V, f = 1.0\text{ MHz}$ | | 710 | | pF |
| Output Capacitance | C_{oss} | | | 130 | | pF |
| Reverse Transfer Capacitance | C_{rss} | | | 80 | | pF |
| Switching Characteristics^d | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD} = -15V, I_D = -1A, V_{GS} = -10V, R_{GEN} = 6\Omega$ | | 11 | 22 | ns |
| Turn-On Rise Time | t_r | | | 3 | 6 | ns |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 32 | 64 | ns |
| Turn-On Fall Time | t_f | | | 5 | 10 | ns |
| Total Gate Charge | Q_g | $V_{DS} = -20V, I_D = -4.5A, V_{GS} = -4.5V$ | | 5.8 | 7.7 | nC |
| Gate-Source Charge | Q_{gs} | | | 1.9 | | nC |
| Gate-Drain Charge | Q_{gd} | | | 2.5 | | nC |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| Drain-Source Diode Forward Current ^b | I_S | | | | -8 | A |
| Drain-Source Diode Forward Voltage ^c | V_{SD} | $V_{GS} = 0V, I_S = -1A$ | | | -1.2 | 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. □ e. Calculated continuous current based on the maximum allowable junction temperature. Package limitation current=8A. | | | | | | |



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N-CHANNEL

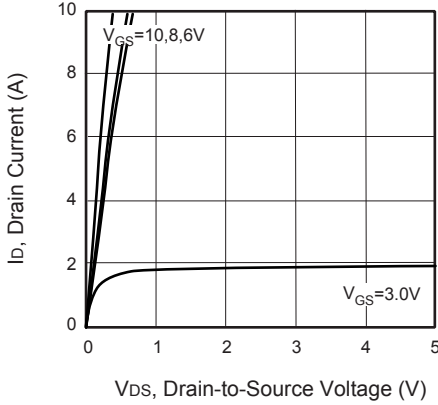


Figure 1. Output Characteristics

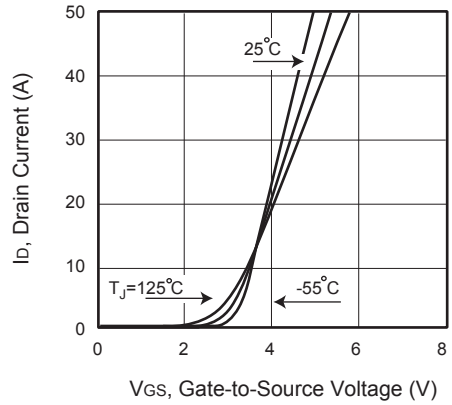


Figure 2. Transfer Characteristics

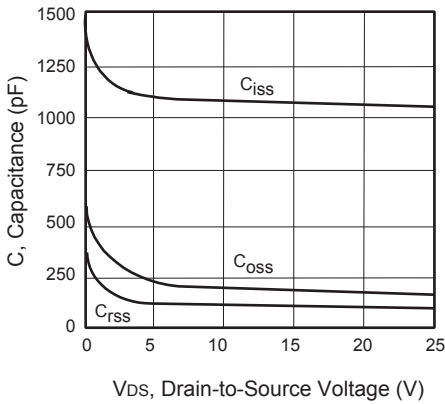


Figure 3. Capacitance

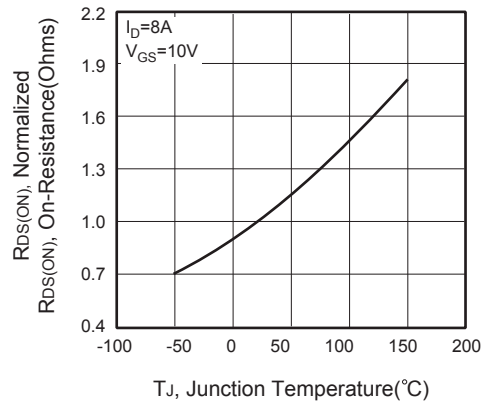


Figure 4. On-Resistance Variation with Temperature

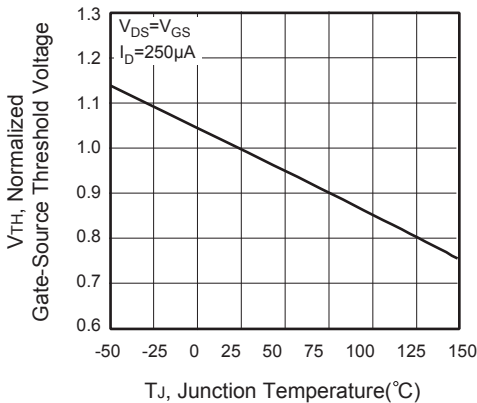


Figure 5. Gate Threshold Variation with Temperature

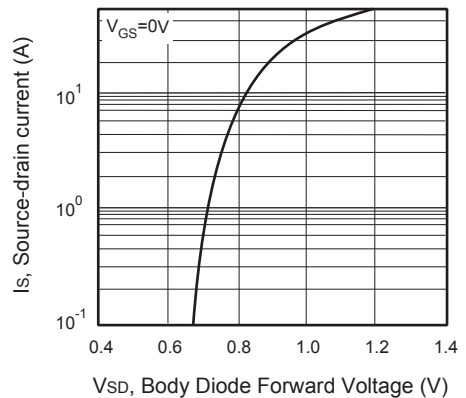


Figure 6. Body Diode Forward Voltage Variation with Source Current



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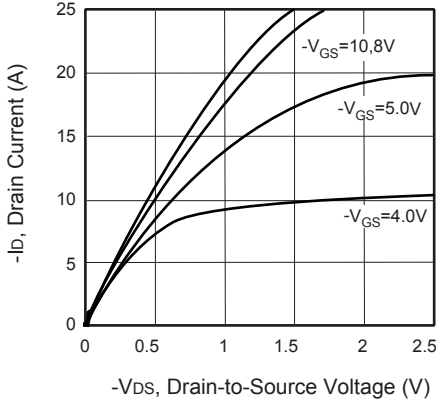


Figure 7. Output Characteristics

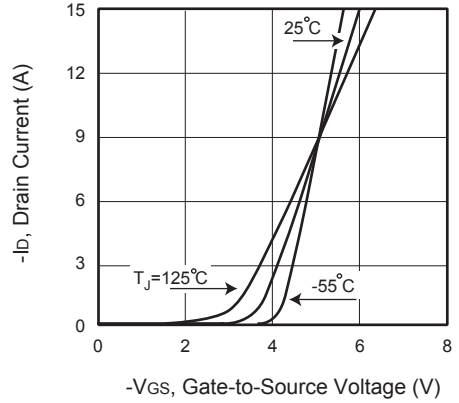


Figure 8. Transfer Characteristics

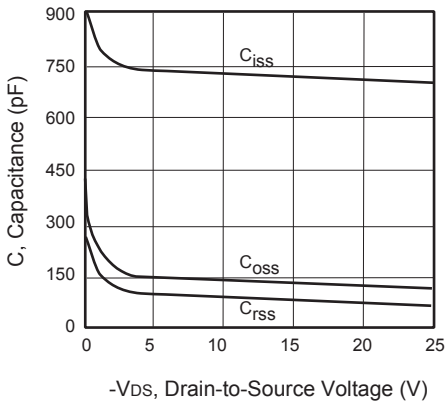


Figure 9. Capacitance

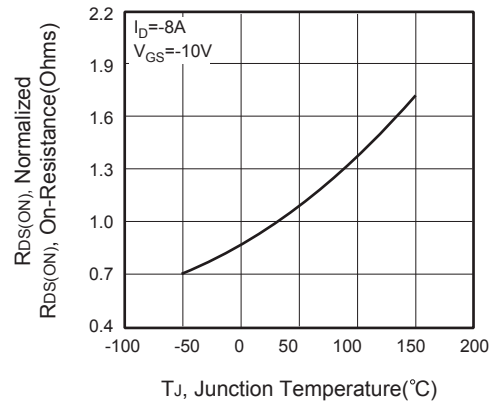


Figure 10. On-Resistance Variation with Temperature

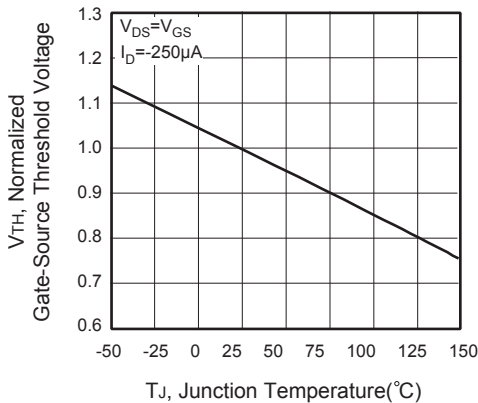


Figure 11. Gate Threshold Variation with Temperature

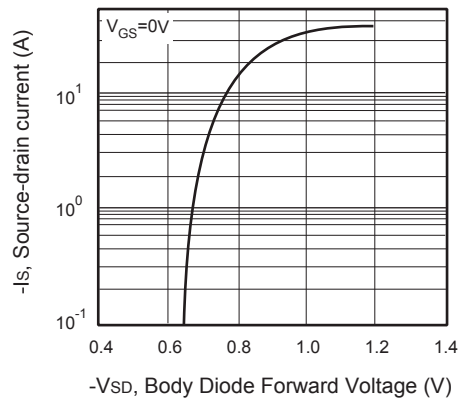


Figure 12. Body Diode Forward Voltage Variation with Source Current



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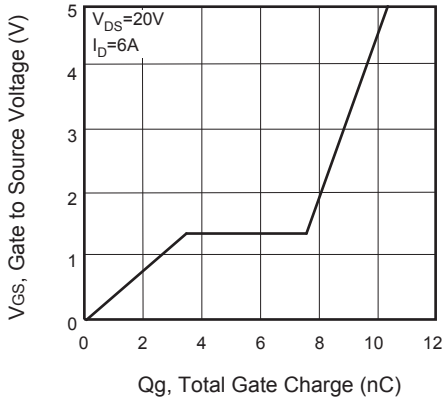


Figure 13. Gate Charge

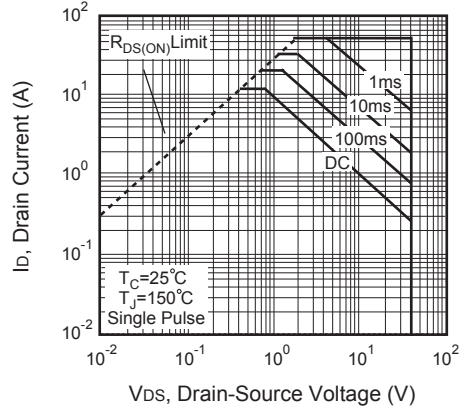


Figure 14. Maximum Safe Operating Area

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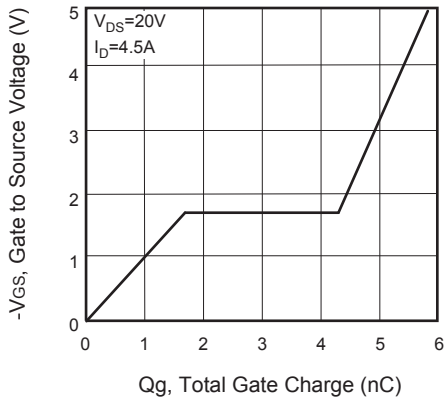


Figure 15. Gate Charge

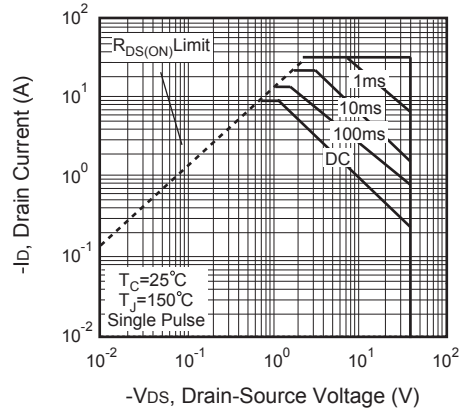


Figure 16. Maximum Safe Operating Area



Figure 17. Switching Test Circuit

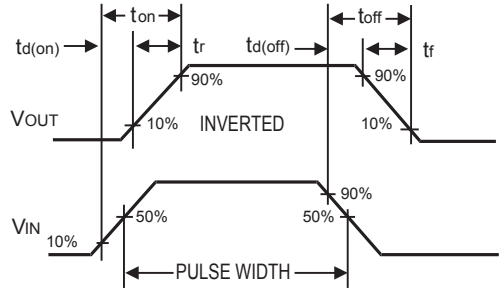


Figure 18. Switching Waveforms

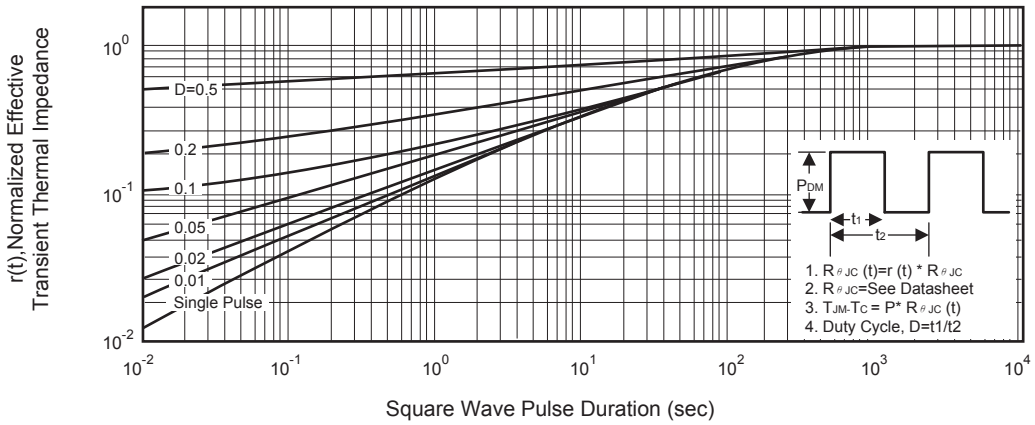


Figure 19. Normalized Thermal Transient Impedance Curve