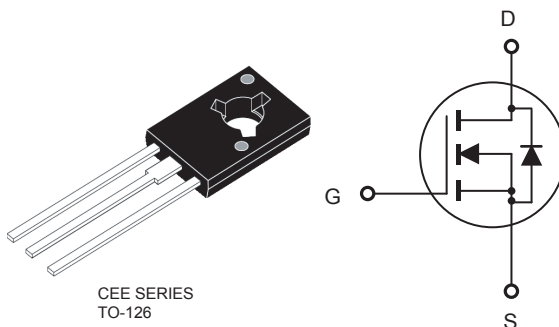


## N-Channel Enhancement Mode Field Effect Transistor

### FEATURES

- 600V, 2.0A,  $R_{DS(ON)} = 5.0\Omega$  @  $V_{GS} = 10V$ .
- Super high dense cell design for extremely low  $R_{DS(ON)}$ .
- High power and current handling capability.
- Lead-free plating ; RoHS compliant.
- TO-126 package.



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

| Parameter                                                                                 | Symbol         | Limit      | Units               |
|-------------------------------------------------------------------------------------------|----------------|------------|---------------------|
| Drain-Source Voltage                                                                      | $V_{DS}$       | 600        | V                   |
| Gate-Source Voltage                                                                       | $V_{GS}$       | $\pm 30$   | V                   |
| Drain Current-Continuous                                                                  | $I_D$          | 2          | A                   |
| Drain Current-Pulsed <sup>a</sup>                                                         | $I_{DM}$       | 8          | A                   |
| Maximum Power Dissipation @ $T_C = 25^\circ\text{C}$<br>- Derate above $25^\circ\text{C}$ | $P_D$          | 56         | W                   |
|                                                                                           |                | 0.44       | W/ $^\circ\text{C}$ |
| Operating and Store Temperature Range                                                     | $T_J, T_{stg}$ | -55 to 150 | $^\circ\text{C}$    |

### Thermal Characteristics

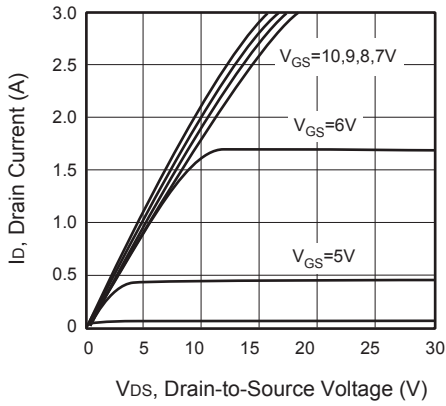
| Parameter                               | Symbol          | Limit | Units              |
|-----------------------------------------|-----------------|-------|--------------------|
| Thermal Resistance, Junction-to-Case    | $R_{\theta JC}$ | 2.3   | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 62.5  | $^\circ\text{C/W}$ |



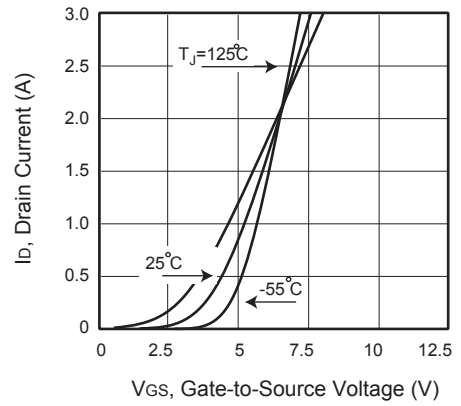
# CEE02N6G

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

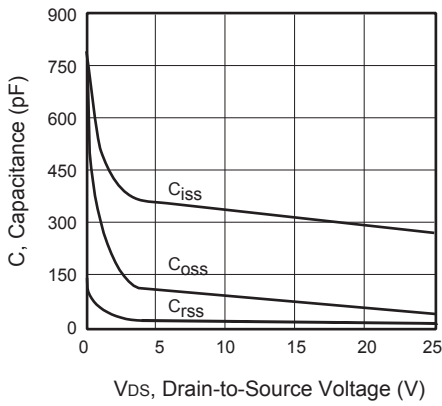
| Parameter                                                                                                                                                                                                                                                                                                                                                              | Symbol       | Test Condition                                              | Min | Typ | Max  | Units    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------------------------------------------------|-----|-----|------|----------|
| Off Characteristics                                                                                                                                                                                                                                                                                                                                                    |              |                                                             |     |     |      |          |
| Drain-Source Breakdown Voltage                                                                                                                                                                                                                                                                                                                                         | $BV_{DSS}$   | $V_{GS} = 0V, I_D = 250\mu A$                               | 600 |     |      | V        |
| Zero Gate Voltage Drain Current                                                                                                                                                                                                                                                                                                                                        | $I_{DSS}$    | $V_{DS} = 600V, V_{GS} = 0V$                                |     |     | 25   | $\mu A$  |
| 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 <sup>b</sup>                                                                                                                                                                                                                                                                                                                                        |              |                                                             |     |     |      |          |
| Gate Threshold Voltage                                                                                                                                                                                                                                                                                                                                                 | $V_{GS(th)}$ | $V_{GS} = V_{DS}, I_D = 250\mu A$                           | 2   |     | 4    | V        |
| Static Drain-Source On-Resistance                                                                                                                                                                                                                                                                                                                                      | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 1A$                                    |     | 4.0 | 5.0  | $\Omega$ |
| Dynamic Characteristics <sup>c</sup>                                                                                                                                                                                                                                                                                                                                   |              |                                                             |     |     |      |          |
| Input Capacitance                                                                                                                                                                                                                                                                                                                                                      | $C_{iss}$    | $V_{DS} = 25V, V_{GS} = 0V, f = 1.0\text{ MHz}$             |     | 300 |      | pF       |
| Output Capacitance                                                                                                                                                                                                                                                                                                                                                     | $C_{oss}$    |                                                             |     | 60  |      | pF       |
| Reverse Transfer Capacitance                                                                                                                                                                                                                                                                                                                                           | $C_{rss}$    |                                                             |     | 16  |      | pF       |
| Switching Characteristics <sup>c</sup>                                                                                                                                                                                                                                                                                                                                 |              |                                                             |     |     |      |          |
| Turn-On Delay Time                                                                                                                                                                                                                                                                                                                                                     | $t_{d(on)}$  | $V_{DD} = 300V, I_D = 1A, V_{GS} = 10V, R_{GEN} = 18\Omega$ |     | 18  | 36   | ns       |
| Turn-On Rise Time                                                                                                                                                                                                                                                                                                                                                      | $t_r$        |                                                             |     | 10  | 20   | ns       |
| Turn-Off Delay Time                                                                                                                                                                                                                                                                                                                                                    | $t_{d(off)}$ |                                                             |     | 28  | 56   | ns       |
| Turn-Off Fall Time                                                                                                                                                                                                                                                                                                                                                     | $t_f$        |                                                             |     | 10  | 20   | ns       |
| Total Gate Charge                                                                                                                                                                                                                                                                                                                                                      | $Q_g$        | $V_{DS} = 480V, I_D = 1A, V_{GS} = 10V$                     |     | 6.8 | 9    | nC       |
| Gate-Source Charge                                                                                                                                                                                                                                                                                                                                                     | $Q_{gs}$     |                                                             |     | 1.4 |      | nC       |
| Gate-Drain Charge                                                                                                                                                                                                                                                                                                                                                      | $Q_{gd}$     |                                                             |     | 3.1 |      | nC       |
| Drain-Source Diode Characteristics and Maximum Ratings                                                                                                                                                                                                                                                                                                                 |              |                                                             |     |     |      |          |
| Drain-Source Diode Forward Current                                                                                                                                                                                                                                                                                                                                     | $I_S$        |                                                             |     |     | 2    | A        |
| Drain-Source Diode Forward Voltage <sup>b</sup>                                                                                                                                                                                                                                                                                                                        | $V_{SD}$     | $V_{GS} = 0V, I_S = 1A$                                     |     |     | 1.5  | V        |
| <div>Notes :<br/>a.Repetitive Rating : Pulse width limited by maximum junction temperature .<br/>b.Pulse Test : Pulse Width <math>\leq 300\mu s</math>, Duty Cycle <math>\leq 2\%</math> .<br/>c.Guaranteed by design, not subject to production testing.<br/>d.Limited only by maximum temperature allowed .<br/>e.Pulse width limited by safe operating area .</div> |              |                                                             |     |     |      |          |



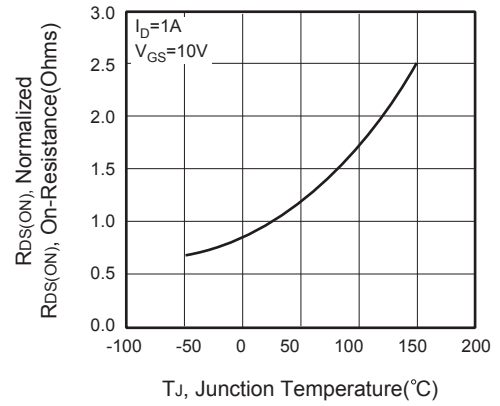
**Figure 1. Output Characteristics**



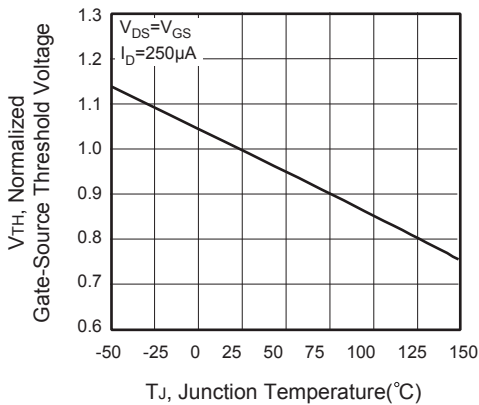
**Figure 2. Transfer Characteristics**



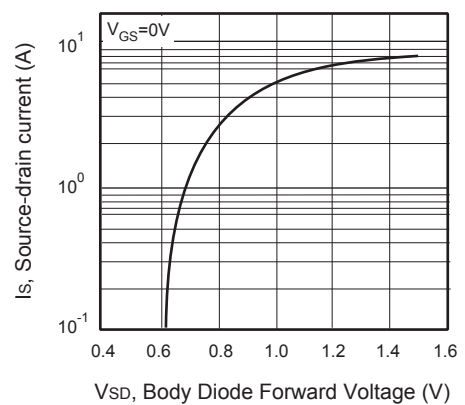
**Figure 3. Capacitance**



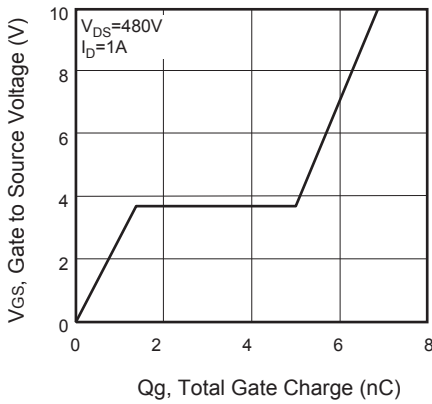
**Figure 4. On-Resistance Variation with Temperature**



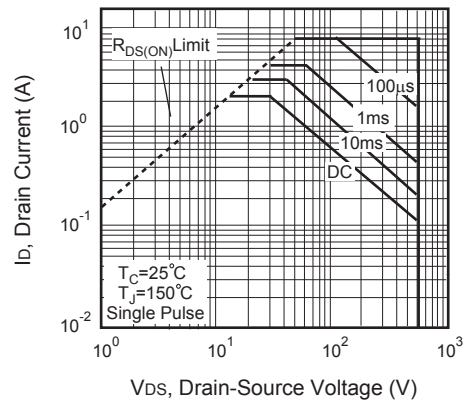
**Figure 5. Gate Threshold Variation with Temperature**



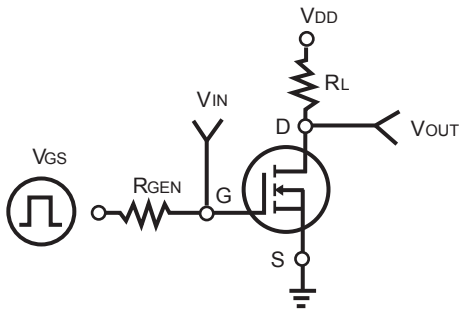
**Figure 6. Body Diode Forward Voltage Variation with Source Current**



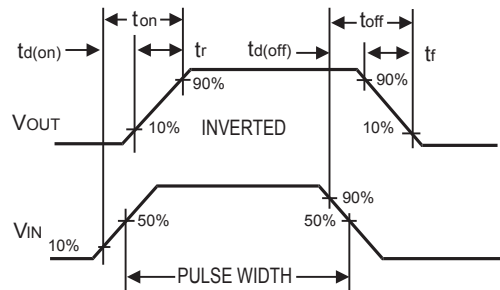
**Figure 7. Gate Charge**



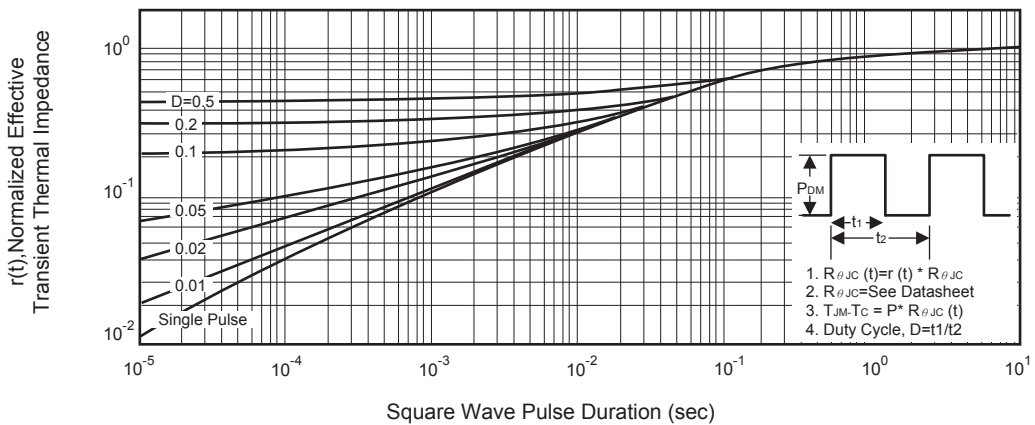
**Figure 8. Maximum Safe Operating Area**



**Figure 9. Switching Test Circuit**



**Figure 10. Switching Waveforms**



**Figure 11. Normalized Thermal Transient Impedance Curve**