

### General Description:

The CS80N07A0 uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of applications. The package form is TO-263, which accords with the RoHS standard.

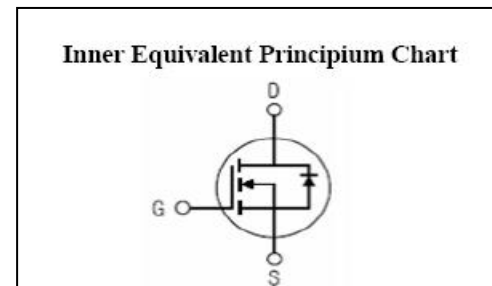
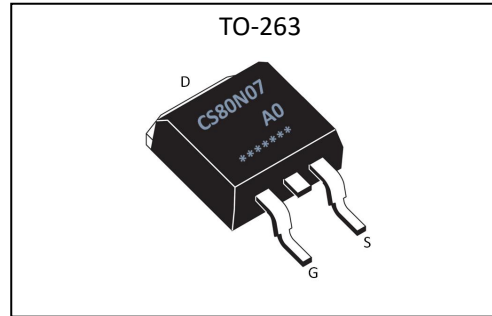
### Features:

- Fast Switching
- Low Gate Charge and Rdson
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

### Applications:

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

|                 |     |    |
|-----------------|-----|----|
| $V_{DSS}$       | 68  | V  |
| $I_D$           | 80  | A  |
| $P_D$           | 156 | W  |
| $R_{DS(ON)max}$ | 8.0 | mΩ |



### Absolute (Tc=25°C unless otherwise specified):

| Symbol         | Parameter                                                  | Rating          | Units              |
|----------------|------------------------------------------------------------|-----------------|--------------------|
| $V_{DSS}$      | Drain-to-Source Voltage                                    | 70              | V                  |
| $I_D$          | Continuous Drain Current                                   | 80              | A                  |
|                | Continuous Drain Current $T_C=100\text{ }^{\circ}\text{C}$ | 52              | A                  |
| $I_{DM}$       | Pulsed Drain Current                                       | 320             | A                  |
| $V_{GS}$       | Gate-to-Source Voltage                                     | $\pm 20$        | V                  |
| $E_{AS}^{a2}$  | Single Pulse Avalanche Energy                              | 600             | mJ                 |
| $E_{AR}^{a1}$  | Avalanche Energy ,Repetitive                               | 50              | mJ                 |
| $I_{AR}^{a1}$  | Avalanche Current                                          | 33              | A                  |
| $dv/dt^{a3}$   | Peak Diode Recovery $dv/dt$                                | 5.0             | V/ns               |
| $P_D$          | Power Dissipation                                          | 156             | W                  |
| $T_J, T_{stg}$ | Operating Junction and Storage Temperature Range           | 175, -55 to 175 | $^{\circ}\text{C}$ |
| $T_L$          | Maximum Temperature for Soldering                          | 300             | $^{\circ}\text{C}$ |



# CS80N07A0

## GL Silicon N-Channel Power MOSFET

**Electrical Characteristics** (Tc=25°C unless otherwise specified) :

| OFF Characteristics          |                                   |                                          |        |      |      |         |
|------------------------------|-----------------------------------|------------------------------------------|--------|------|------|---------|
| Symbol                       | Parameter                         | Test Conditions                          | Rating |      |      | Units   |
|                              |                                   |                                          | Min.   | Typ. | Max. |         |
| $V_{DSS}$                    | Drain to Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$                | 68     | --   | --   | V       |
| $\Delta BV_{DSS}/\Delta T_J$ | Bvdss Temperature Coefficient     | $I_D=250\mu A$ , Reference 25°C          | --     | 0.05 | --   | V/°C    |
| $I_{DSS}$                    | Drain to Source Leakage Current   | $V_{DS}=65V, V_{GS}=0V, T_a=25^\circ C$  | --     | --   | 1    | $\mu A$ |
|                              |                                   | $V_{DS}=56V, V_{GS}=0V, T_a=125^\circ C$ | --     | --   | 250  |         |
| $I_{GSS(F)}$                 | Gate to Source Forward Leakage    | $V_{GS}=+20V$                            | --     | --   | 1    | $\mu A$ |
| $I_{GSS(R)}$                 | Gate to Source Reverse Leakage    | $V_{GS}=-20V$                            | --     | --   | -1   | $\mu A$ |

| ON Characteristics                               |                               |                                   |        |      |      |       |
|--------------------------------------------------|-------------------------------|-----------------------------------|--------|------|------|-------|
| Symbol                                           | Parameter                     | Test Conditions                   | Rating |      |      | Units |
|                                                  |                               |                                   | Min.   | Typ. | Max. |       |
| $R_{DS(ON)}$                                     | Drain-to-Source On-Resistance | $V_{GS}=10V, I_D=40A$             | --     | 6.5  | 8.0  | mΩ    |
| $V_{GS(TH)}$                                     | Gate Threshold Voltage        | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 2.0    | 2.9  | 4.0  | V     |
| Pulse width $t_p \leq 380\mu s, \delta \leq 2\%$ |                               |                                   |        |      |      |       |

| Dynamic Characteristics |                              |                                       |        |      |      |       |
|-------------------------|------------------------------|---------------------------------------|--------|------|------|-------|
| Symbol                  | Parameter                    | Test Conditions                       | Rating |      |      | Units |
|                         |                              |                                       | Min.   | Typ. | Max. |       |
| $g_{fs}$                | Forward Transconductance     | $V_{DS}=5V, I_D=40A$                  | 15     | --   | --   | S     |
| $C_{iss}$               | Input Capacitance            | $V_{GS}=0V, V_{DS}=60V$<br>$f=1.0MHz$ | --     | 3396 | --   | pF    |
| $C_{oss}$               | Output Capacitance           |                                       | --     | 435  | --   |       |
| $C_{rss}$               | Reverse Transfer Capacitance |                                       | --     | 151  | --   |       |

| Resistive Switching Characteristics |                                   |                                                      |        |      |      |       |
|-------------------------------------|-----------------------------------|------------------------------------------------------|--------|------|------|-------|
| Symbol                              | Parameter                         | Test Conditions                                      | Rating |      |      | Units |
|                                     |                                   |                                                      | Min.   | Typ. | Max. |       |
| $t_{d(ON)}$                         | Turn-on Delay Time                | $I_D=40A, V_{DD}=35V$<br>$V_{GS}=10V, R_G=3.0\Omega$ | --     | 15   | --   | ns    |
| $t_r$                               | Rise Time                         |                                                      | --     | 44   | --   |       |
| $t_{d(OFF)}$                        | Turn-Off Delay Time               |                                                      | --     | 31   | --   |       |
| $t_f$                               | Fall Time                         |                                                      | --     | 15   | --   |       |
| $Q_g$                               | Total Gate Charge                 | $I_D=40A, V_{DD}=35V$<br>$V_{GS}=10V$                | --     | 58   | --   | nC    |
| $Q_{gs}$                            | Gate to Source Charge             |                                                      | --     | 22   | --   |       |
| $Q_{gd}$                            | Gate to Drain ( "Miller" ) Charge |                                                      | --     | 15   | --   |       |

### Source-Drain Diode Characteristics

| Symbol   | Parameter                              | Test Conditions              | Rating |      |      | Units |
|----------|----------------------------------------|------------------------------|--------|------|------|-------|
|          |                                        |                              | Min.   | Typ. | Max. |       |
| $I_S$    | Continuous Source Current (Body Diode) |                              | --     | --   | 80   | A     |
| $I_{SM}$ | Maximum Pulsed Current (Body Diode)    |                              | --     | --   | 320  | A     |
| $V_{SD}$ | Diode Forward Voltage                  | $I_S=80A, V_{GS}=0V$         | --     | --   | 1.5  | V     |
| $t_{rr}$ | Reverse Recovery Time                  | $I_S=40A, T_j = 25^\circ C$  | --     | 33   | --   | ns    |
| $Q_{rr}$ | Reverse Recovery Charge                | $dI_F/dt=100A/us, V_{GS}=0V$ | --     | 56   | --   | nC    |

Pulse width  $t_p \leq 380\mu s, \delta \leq 2\%$

| Symbol          | Parameter        | Typ. | Units        |
|-----------------|------------------|------|--------------|
| $R_{\theta JC}$ | Junction-to-Case | 0.8  | $^\circ C/W$ |

<sup>a1</sup>: Repetitive rating; pulse width limited by maximum junction temperature

<sup>a2</sup>: EAS condition :  $T_j=25^\circ C$  ,  $V_{DD}=30V, V_G=10V, L=0.5mH, R_g=25\Omega$

<sup>a3</sup>:  $I_{SD} = 80A, di/dt \leq 100A/us, V_{DD} \leq BV_{DS}$ , Start  $T_j=25^\circ C$

### Test Circuit and Waveform

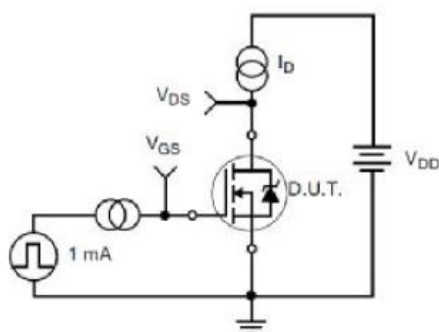


Figure 17. Gate Charge Test Circuit

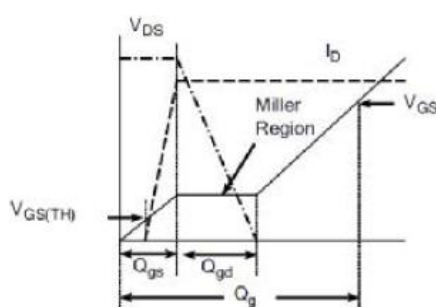


Figure 18. Gate Charge Waveform

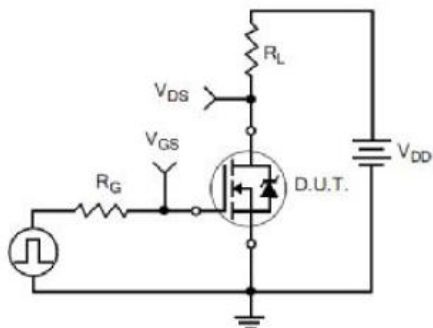


Figure 19. Resistive Switching Test Circuit

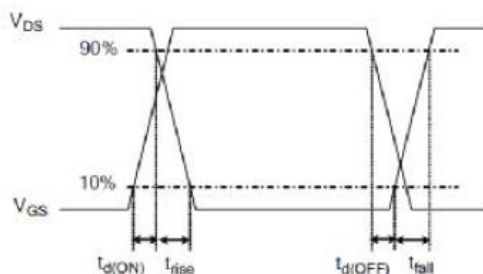


Figure 20. Resistive Switching Waveforms

### Characteristics Curve:

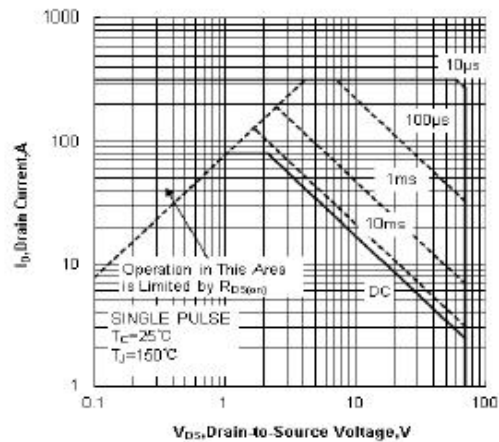


Figure 1 Maximum Forward Bias Safe Operating Area

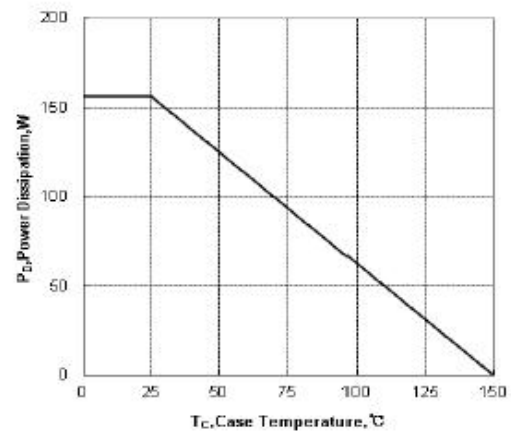


Figure 2 Maximum Power Dissipation vs Case Temperature

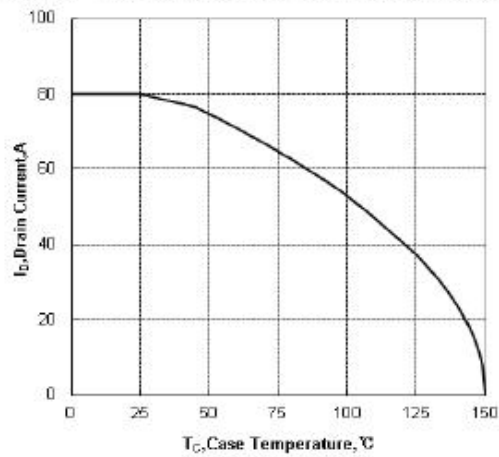


Figure3 Maximum Continuous Drain Current vs Case Temperature

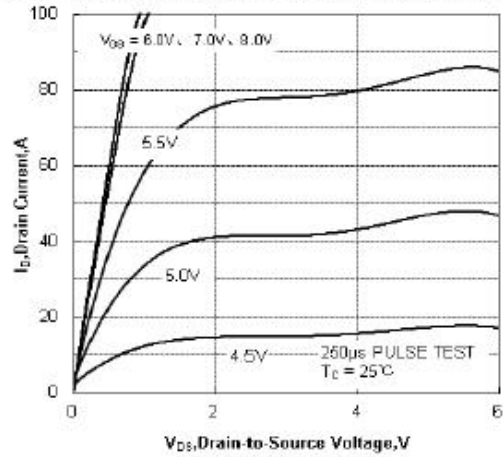


Figure 4 Typical Output Characteristics

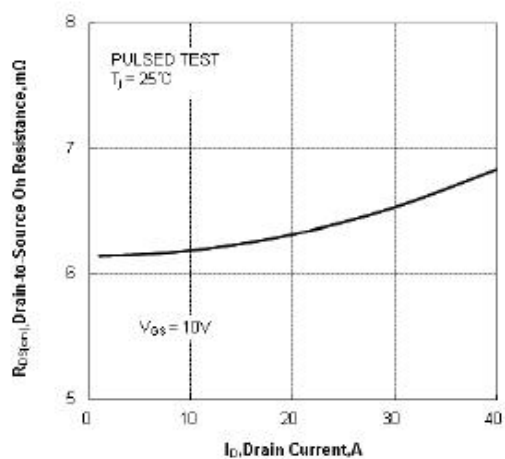


Figure 5 Drain-to-Source On Resistance vs Drain Current

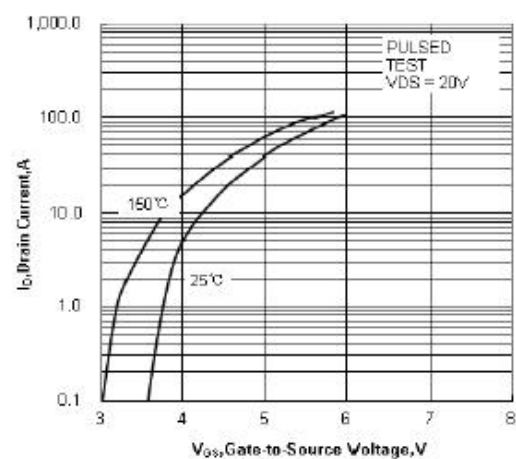


Figure 6 Typical Transfer Characteristics

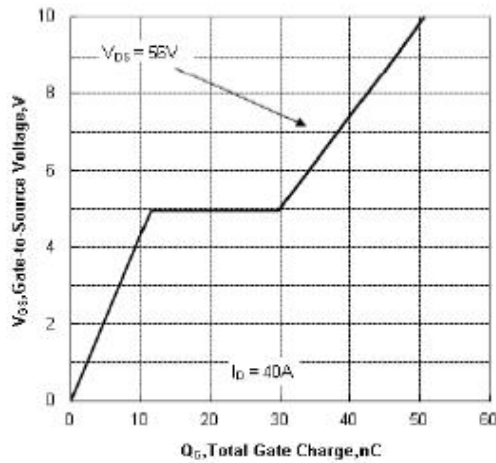


Figure 7 Typical Gate Charge vs Gate to Source Voltage

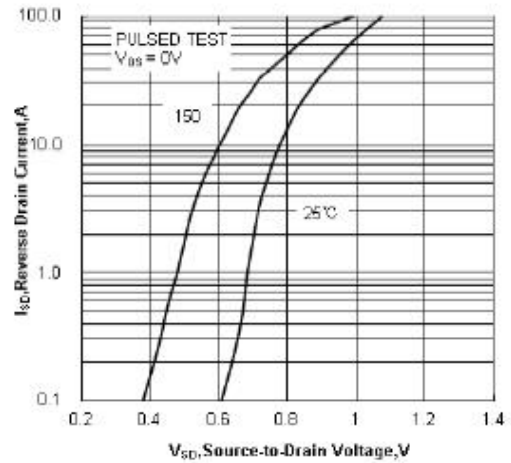


Figure 8 Typical Body Diode Transfer Characteristics

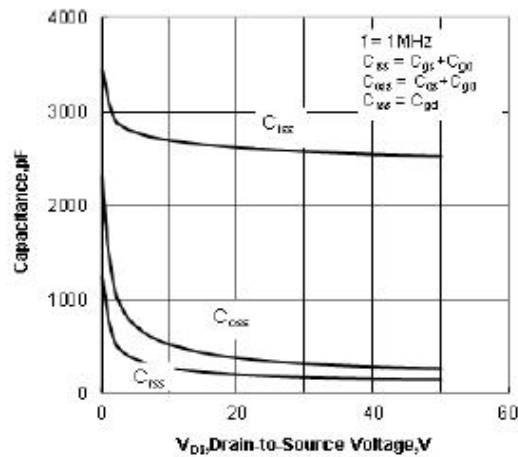


Figure 9 Typical Capacitance vs Drain to Source Voltage

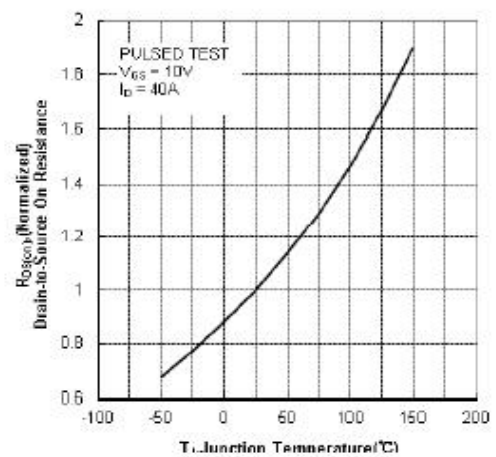


Figure 10 Typical Drain to Source on Resistance vs Junction Temperature

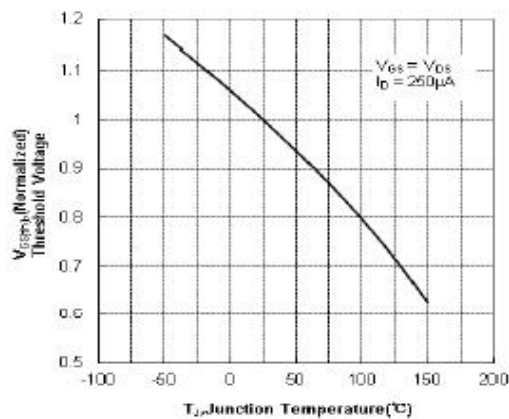


Figure 11 Typical Threshold Voltage vs Junction Temperature

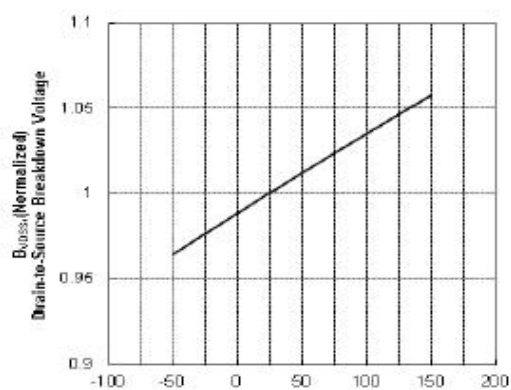


Figure 12 Typical Breakdown Voltage vs Junction Temperature