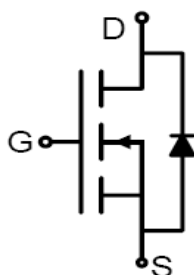
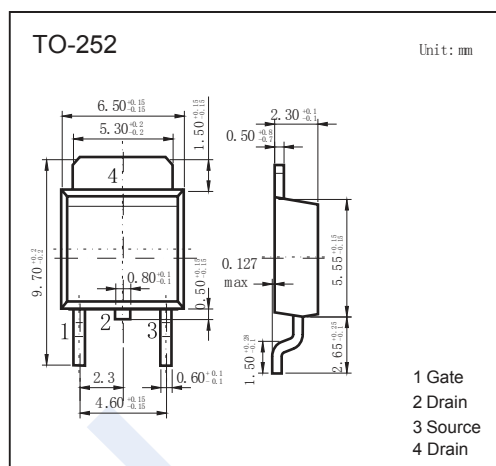


## N-Channel MOSFET

### NDT90N03

#### ■ Features

- $V_{DS} (V) = 30V$
- $I_D = 85 A (V_{GS} = 10V)$
- $R_{DS(ON)} < 5m\Omega (V_{GS} = 10V)$
- $R_{DS(ON)} < 8m\Omega (V_{GS} = 4.5V)$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package



#### ■ Absolute Maximum Ratings $T_a = 25^\circ C$

| Parameter                            |                    | Symbol     | Rating     | Unit         |
|--------------------------------------|--------------------|------------|------------|--------------|
| Drain-Source Voltage                 |                    | $V_{DS}$   | 30         | V            |
| Gate-Source Voltage                  |                    | $V_{GS}$   | $\pm 20$   |              |
| Continuous Drain Current             | $T_c = 25^\circ C$ | $I_D$      | 85         | A            |
|                                      | $T_c = 70^\circ C$ |            | 60         |              |
| Pulsed Drain Current                 |                    | $I_{DM}$   | 200        |              |
| Power Dissipation                    | $T_c = 25^\circ C$ | $P_D$      | 75         | W            |
|                                      | $T_c = 70^\circ C$ |            | 38         |              |
| Repetitive Avalanche Energy (Note.1) |                    | $E_{AS}$   | 110        | mJ           |
| Thermal Resistance.Junction- to-Case |                    | $R_{thJC}$ | 2          | $^\circ C/W$ |
| Junction Temperature                 |                    | $T_J$      | 175        | $^\circ C$   |
| Storage Temperature Range            |                    | $T_{stg}$  | -55 to 175 |              |

Note.1:  $E_{AS}$  condition:  $T_J = 25^\circ C, V_{DD} = 20V, V_G = 10V, R_G = 25\Omega$

## N-Channel MOSFET

### NDT90N03

#### ■ Electrical Characteristics Ta = 25°C

| Parameter                             | Symbol       | Test Conditions                                                       | Min | Typ  | Max       | Unit       |
|---------------------------------------|--------------|-----------------------------------------------------------------------|-----|------|-----------|------------|
| Drain-Source Breakdown Voltage        | $V_{DS}$     | $I_D=250\mu A$ , $V_{GS}=0V$                                          | 30  |      |           | V          |
| Zero Gate Voltage Drain Current       | $I_{DSS}$    | $V_{DS}=30V$ , $V_{GS}=0V$                                            |     |      | 1         | $\mu A$    |
| Gate-Body Leakage Current             | $I_{GSS}$    | $V_{DS}=0V$ , $V_{GS}=\pm 20V$                                        |     |      | $\pm 100$ | nA         |
| Gate Threshold Voltage                | $V_{GS(th)}$ | $V_{DS}=V_{GS}$ , $I_D=250\mu A$                                      | 1.2 |      | 2.4       | V          |
| Static Drain-Source On-Resistance     | $R_{DS(on)}$ | $V_{GS}=10V$ , $I_D=20A$ $T_C=25^\circ C$                             |     |      | 5         | m $\Omega$ |
|                                       |              | $V_{GS}=10V$ , $I_D=20A$ $T_C=125^\circ C$                            |     |      | 6.8       |            |
|                                       |              | $V_{GS}=4.5V$ , $I_D=20A$                                             |     |      | 8         |            |
| Forward Transconductance              | $g_{FS}$     | $V_{DS}=5V$ , $I_D=20A$                                               | 50  |      |           | S          |
| Input Capacitance                     | $C_{iss}$    | $V_{GS}=0V$ , $V_{DS}=15V$ , $f=1MHz$                                 |     | 2100 |           | pF         |
| Output Capacitance                    | $C_{oss}$    |                                                                       |     | 500  |           |            |
| Reverse Transfer Capacitance          | $C_{rss}$    |                                                                       |     | 200  |           |            |
| Gate Resistance                       | $R_g$        | $V_{GS}=0V$ , $V_{DS}=0V$ , $f=1MHz$                                  |     | 1.7  |           | $\Omega$   |
| Total Gate Charge (10V)               | $Q_g$        | $V_{GS}=10V$ , $V_{DS}=15V$ , $I_D=20A$                               |     | 18   |           | nC         |
| Total Gate Charge (4.5V)              |              |                                                                       |     | 8.5  |           |            |
| Gate Source Charge                    | $Q_{gs}$     |                                                                       |     | 4.8  |           |            |
| Gate Drain Charge                     | $Q_{gd}$     |                                                                       |     | 2.5  |           |            |
| Turn-On DelayTime                     | $t_{d(on)}$  | $V_{GS}=10V$ , $V_{DS}=15V$ ,<br>$R_L=0.75\Omega$ , $R_{GEN}=3\Omega$ |     | 7.5  |           | ns         |
| Turn-On Rise Time                     | $t_r$        |                                                                       |     | 4.8  |           |            |
| Turn-Off DelayTime                    | $t_{d(off)}$ |                                                                       |     | 23   |           |            |
| Turn-Off Fall Time                    | $t_f$        |                                                                       |     | 4.5  |           |            |
| Body Diode Reverse Recovery Time      | $t_{rr}$     | $I_F=20A$ , $dI/dt=100A/\mu s$                                        |     | 14   |           | nA         |
| Body Diode Reverse Recovery Charge    | $Q_{rr}$     |                                                                       |     | 16   |           |            |
| Maximum Body-Diode Continuous Current | $I_S$        |                                                                       |     |      | 85        | A          |
| Diode Forward Voltage                 | $V_{SD}$     | $I_S=20A$ , $V_{GS}=0V$                                               |     |      | 1.2       | V          |

#### ■ Marking

|         |          |
|---------|----------|
| Marking | CSD30N39 |
|---------|----------|

## N-Channel MOSFET

### NDT90N03

#### ■ Typical Characteristics

Figure1. Power Dissipation

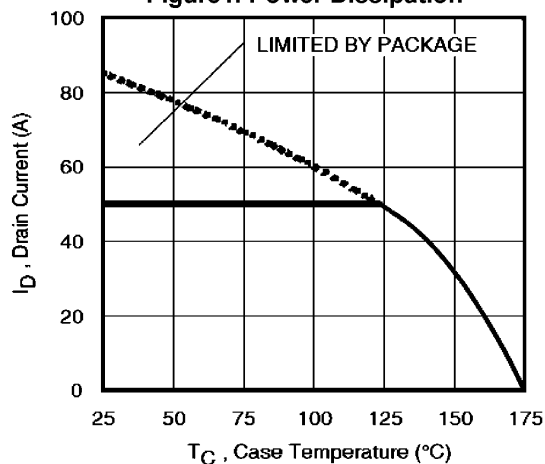


Figure2. Drain Current

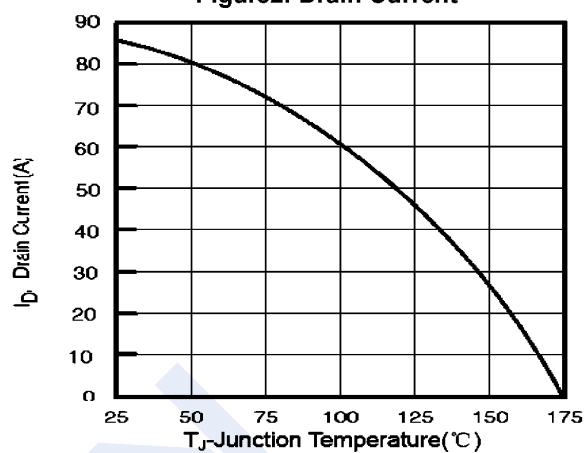


Figure3. Output Characteristics

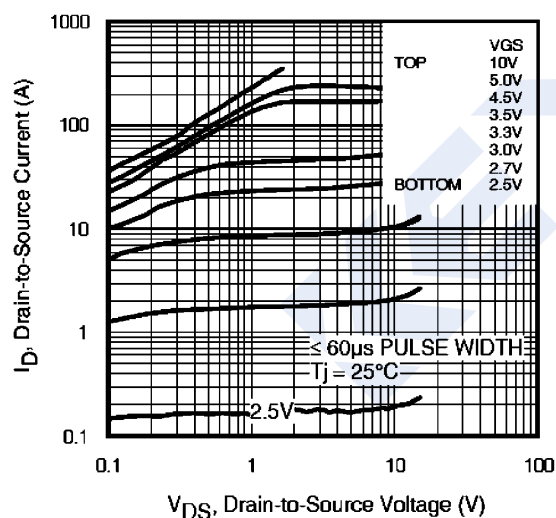


Figure4. Transfer Characteristics

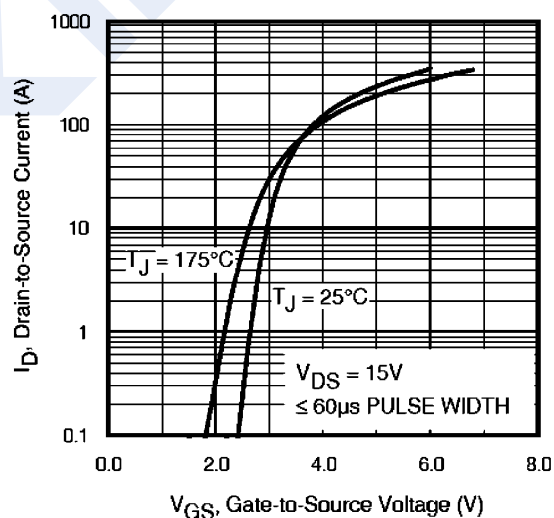
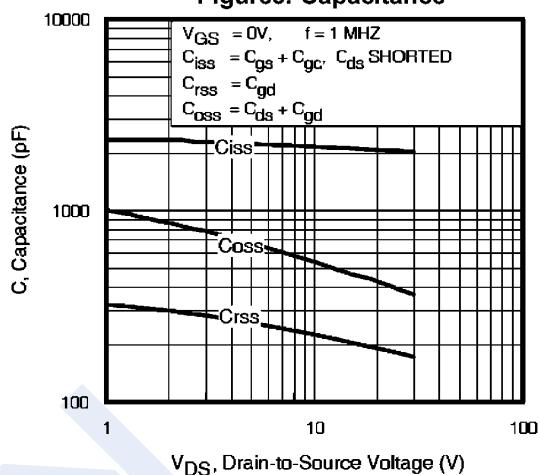
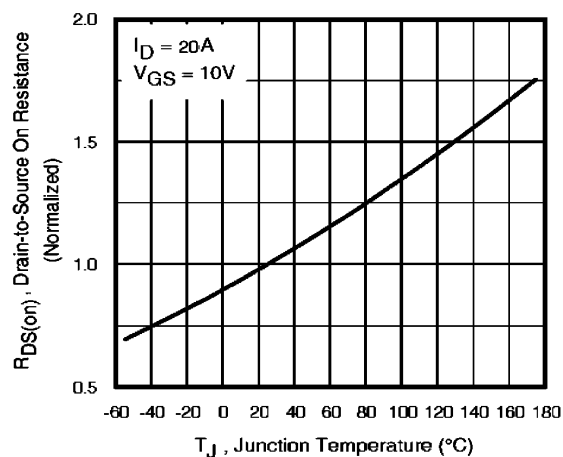


Figure5. Capacitance

Figure6.  $R_{DS(ON)}$  vs Junction Temperature

## N-Channel MOSFET

### NDT90N03

#### ■ Typical Characteristics

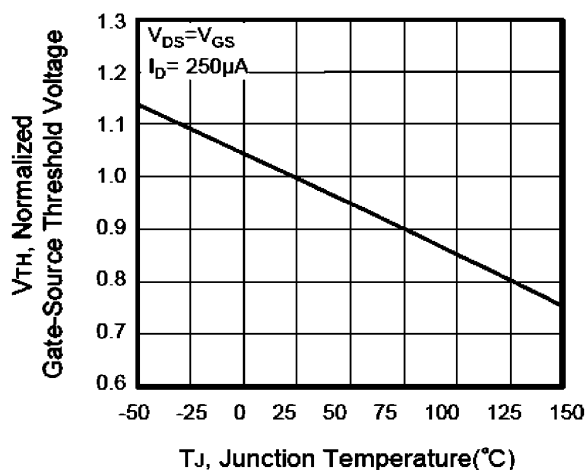
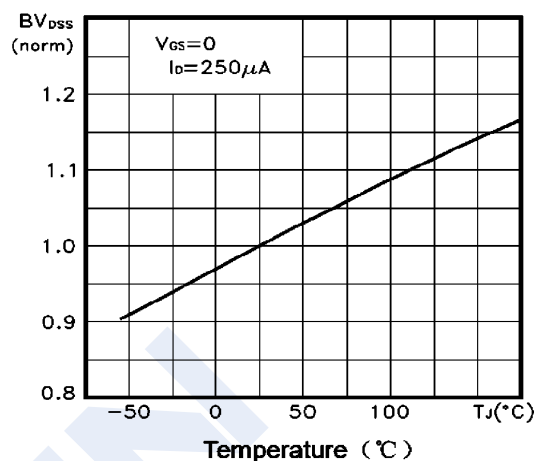
Figure7. Max  $BV_{DS}$  vs Junction TemperatureFigure8.  $V_{GS(th)}$  vs Junction Temperature

Figure9. Gate Charge Waveforms

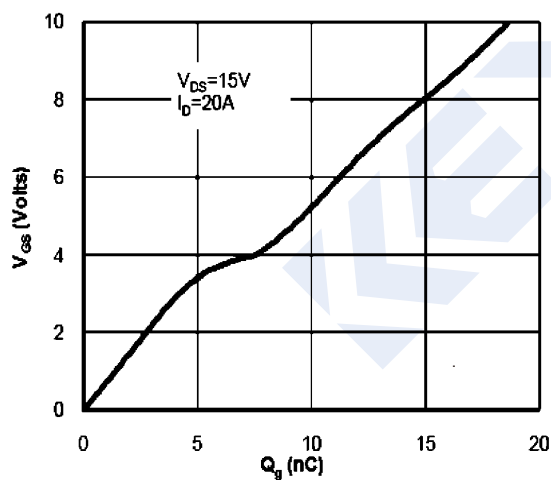


Figure10. Maximum Safe Operating Area

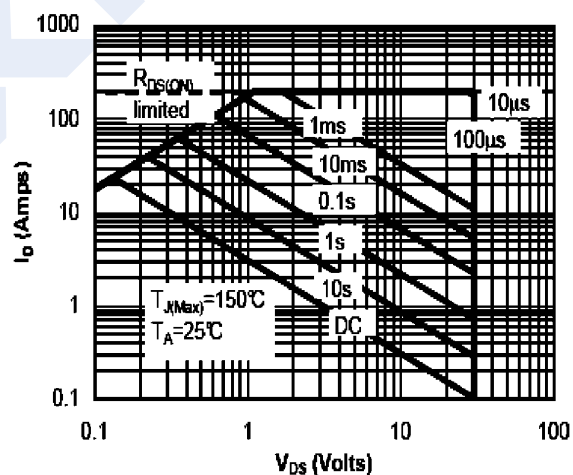


Figure11. Normalized Maximum Transient Thermal Impedance

