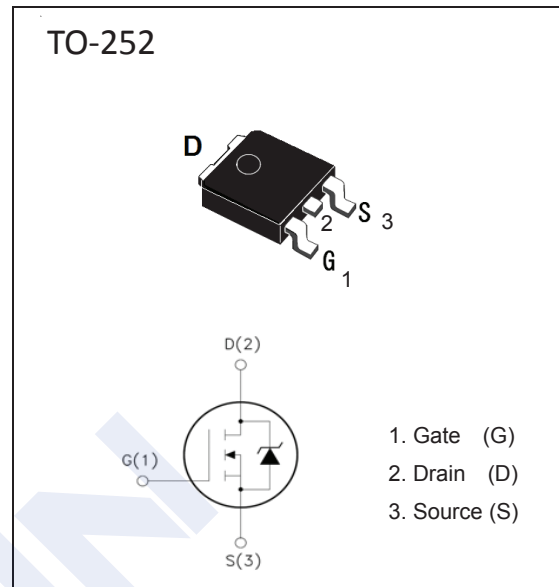


N-Channel MOSFET

NDT120N03

■ Features

- $BV_{DSS} = 30\text{ V}$
- $I_D = 120\text{ A}$
- $R_{DS(on)} < 5.5\text{ m}\Omega @ V_{GS} = 10\text{ V}$
- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge : $Q_g = 70\text{ nC}$ (Typ.).
- 100% Avalanche Tested

■ Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$, unless otherwise specified)

| Parameter | Symbol | Rating | Unit |
|---|-----------------|---------------------------|---------------------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | |
| Continuous Drain Current | I_D | $T_C = 25^\circ\text{C}$ | 120 |
| | | $T_C = 100^\circ\text{C}$ | 70 |
| Pulsed Drain Current | I_{DM} | 400 | A |
| Single Pulse Avalanche Energy | EAS | 350 | mJ |
| Power Dissipation | P_D | 110 | W |
| Thermal Resistance, Junction- to-Case | $R_{\theta JC}$ | 1.36 | $^\circ\text{C}/\text{W}$ |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | -55 to 175 | $^\circ\text{C}$ |
| Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds | T_L | 300 | |

* : EAS condition: $T_J = 25^\circ\text{C}$, $V_{DD} = 15\text{ V}$, $V_G = 10\text{ V}$, $L = 0.5\text{ mH}$, $R_g = 25\ \Omega$

N-Channel MOSFET

NDT120N03

■ Electrical Characteristics (TA = 25°C, unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---------------------------------------|---------|---|-----|------|------|------|
| Static Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BVDSS | ID=250μA, VGS=0V | 30 | | | V |
| Zero Gate Voltage Drain Current | IDSS | VDS=30V, VGS=0V | | | 1 | μA |
| | | VDS=30V, VGS=0V, TJ = 125°C | | | 30 | |
| Gate-Body Leakage Current | IGSS | VDS=0V, VGS=±20V | | | ±100 | nA |
| Gate Threshold Voltage | VGS(th) | VDS=VGS, ID=250μA | 1 | 1.6 | 3 | V |
| Static Drain-Source On-Resistance *3 | RDS(on) | VGS=10V, ID=20A | | 4.0 | 5.5 | mΩ |
| Forward Transconductance | gFS | VDS=10V, ID=20A | 50 | | | S |
| Dynamic Characteristics *4 | | | | | | |
| Input Capacitance | Ciss | VGS=0V, VDS=25V, f=1MHz | | 3400 | | pF |
| Output Capacitance | Coss | | | 356 | | |
| Reverse Transfer Capacitance | Crss | | | 308 | | |
| Turn-On Delay Time | td(on) | VDD=15V, ID=60A, VGS=4.5V, RGEN=1.8Ω | | 11 | | ns |
| Turn-On Rise Time | tr | | | 160 | | |
| Turn-Off Delay Time | td(off) | | | 25 | | |
| Turn-Off Fall Time | tf | | | 60 | | |
| Total Gate Charge | Qg | VDS=15V, VGS=10V, ID=30A | | 70 | | nC |
| Gate Source Charge | Qgs | | | 8.8 | | |
| Gate Drain Charge | Qgd | | | 16.3 | | |
| Diode Characteristics | | | | | | |
| Body Diode Voltage *3 | VSD | IS=20A, VGS=0V | | | 1.2 | V |
| Diode Continuous Forward Current *2 | IS | | | | 120 | A |
| Body Diode Reverse Recovery Time *3 | trr | IF = 60 A, dI/dt = 100 A/μs, TJ = 25°C | | 56 | | ns |
| Body Diode Reverse Recovery Charge *3 | Qrr | | | 110 | | nC |

Notes 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

2. Surface Mounted on FR4 Board, t ≤ 10 sec.

3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

4. Guaranteed by design, not subject to production.

■ Marking

| | |
|---------|-----------------|
| Marking | 120N03 KC*** |
|---------|-----------------|

N-Channel MOSFET

NDT120N03

Typical Electrical and Thermal Characteristics

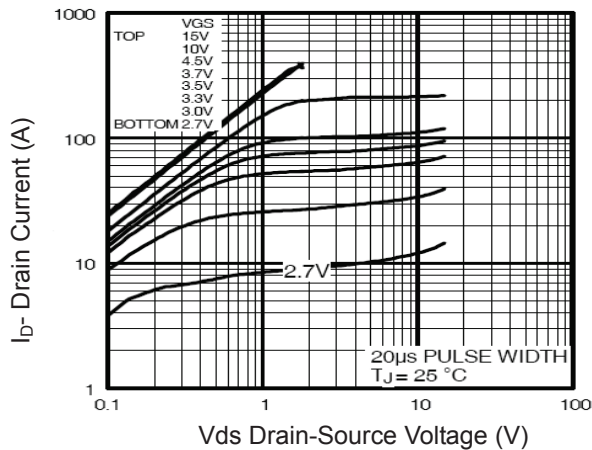


Figure 1 Output Characteristics

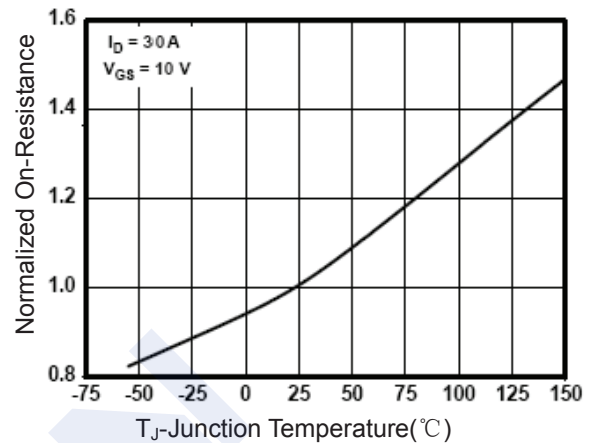


Figure 4 Rdson-Junction Temperature

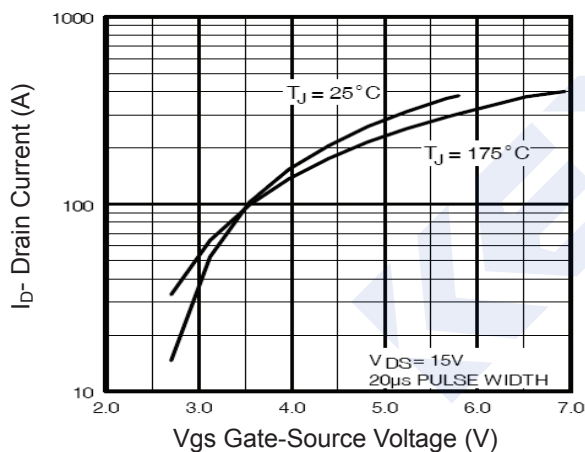


Figure 2 Transfer Characteristics

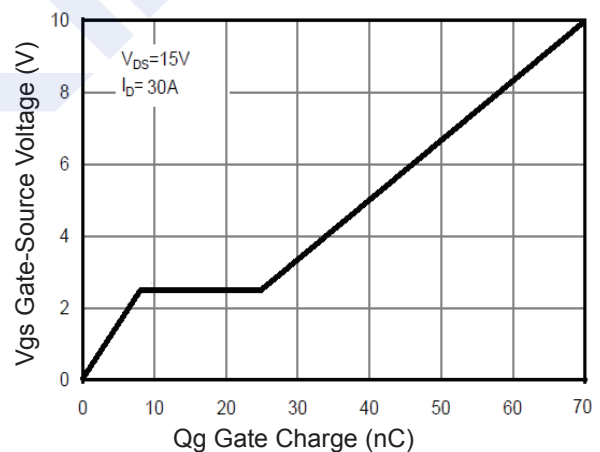


Figure 5 Gate Charge

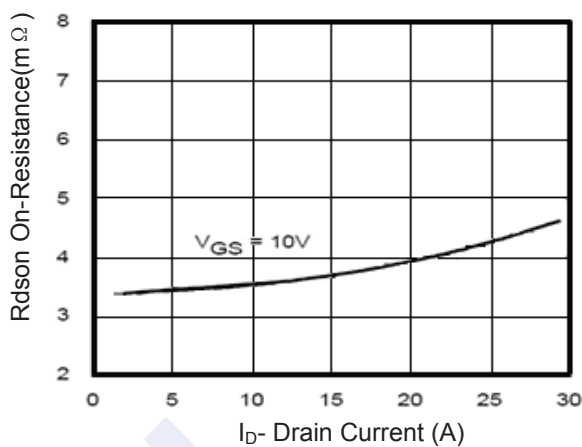


Figure 3 Rdson- Drain Current

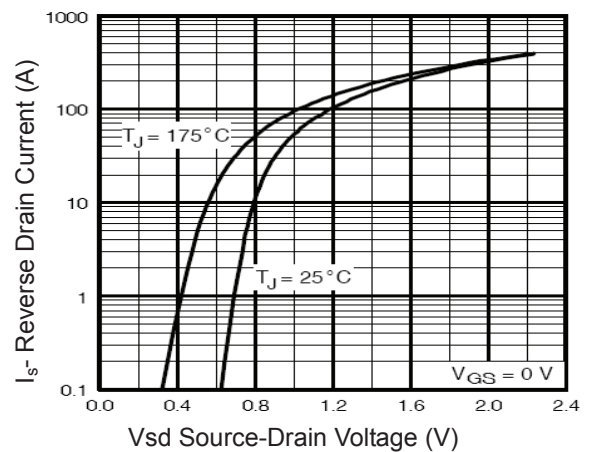


Figure 6 Source- Drain Diode Forward

N-Channel MOSFET

NDT120N03

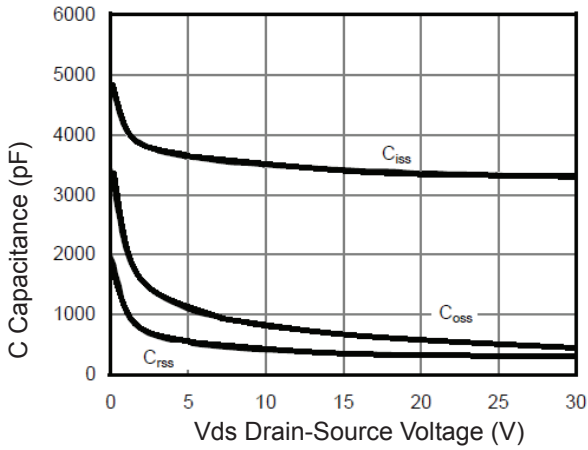


Figure 7 Capacitance vs Vds

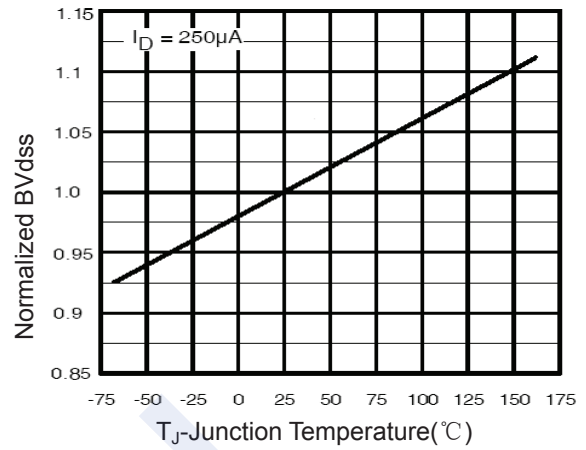


Figure 9 BV_{DSS} vs Junction Temperature

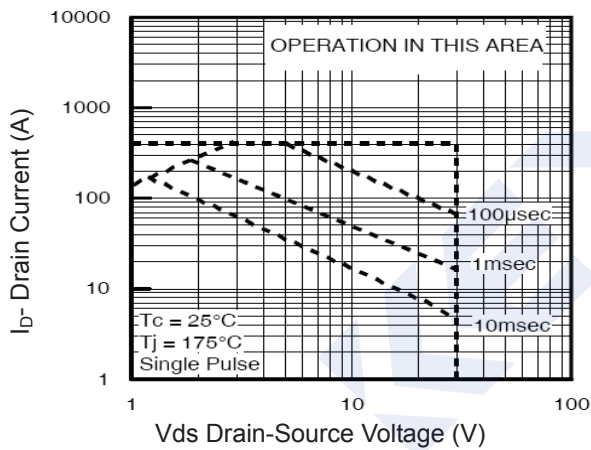


Figure 8 Safe Operation Area

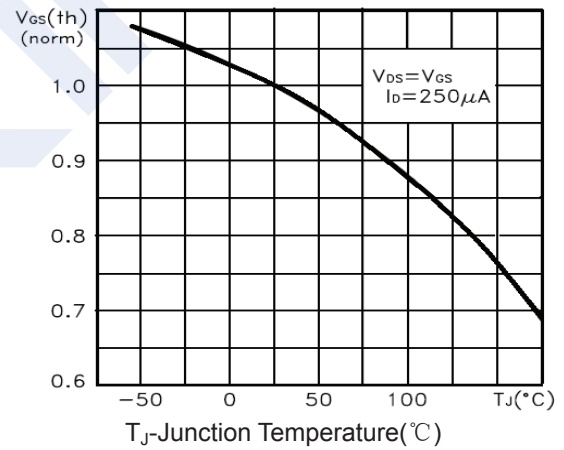


Figure 10 $V_{GS(th)}$ vs Junction Temperature

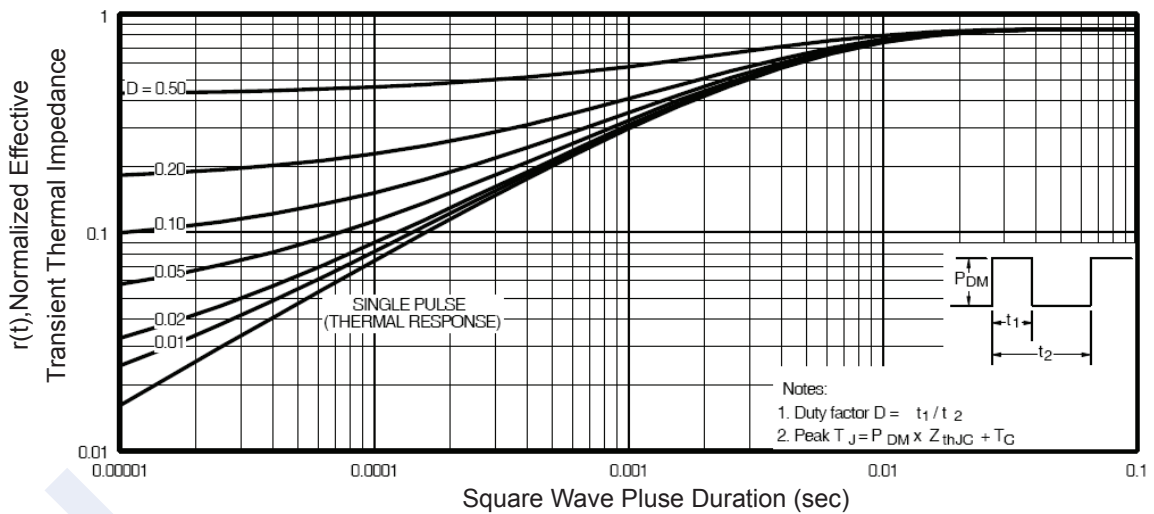


Figure 11 Normalized Maximum Transient Thermal Impedance

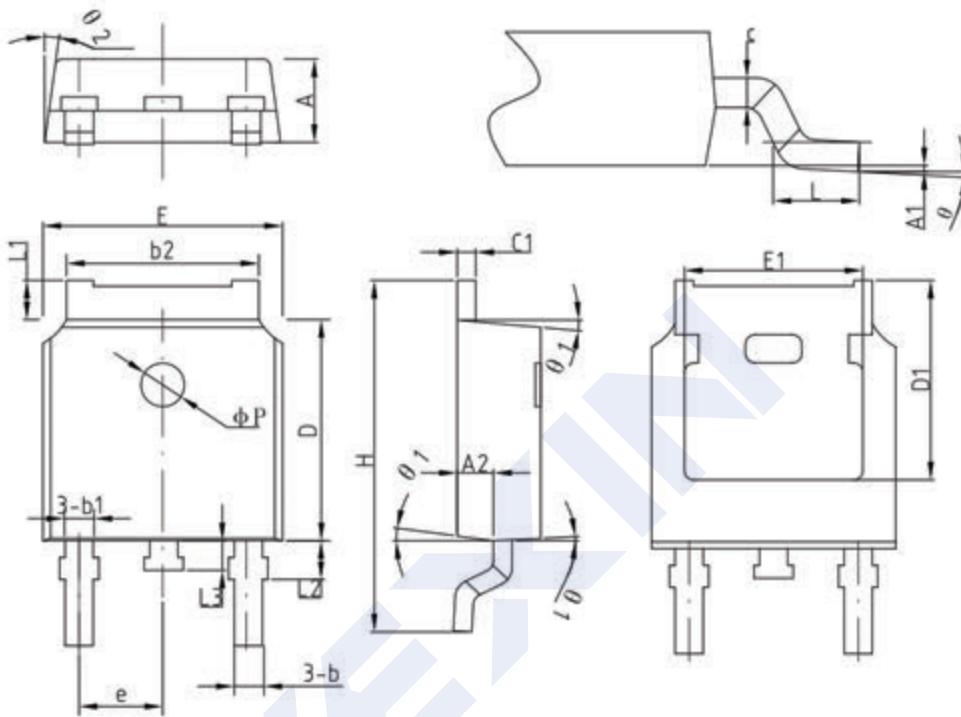
N-Channel MOSFET

NDT120N03

■ Package Dimension

TO-252

Units: mm



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

| SYMBOL | MIN | NOM | MAX |
|--------|----------|-------|-------|
| A | 2.2 | 2.30 | 2.38 |
| A1 | 0 | — | 0.10 |
| A2 | 0.90 | 1.01 | 1.10 |
| b | 0.71 | 0.76 | 0.86 |
| b1 | | 0.76 | |
| b2 | 5.13 | 5.33 | 5.46 |
| c | 0.47 | 0.50 | 0.60 |
| c1 | 0.47 | 0.50 | 0.60 |
| D | 6.0 | 6.10 | 6.20 |
| D1 | — | 5.30 | — |
| E | 6.50 | 6.60 | 6.70 |
| E1 | — | 4.80 | — |
| e | 2.286BSC | | |
| H | 9.70 | 10.10 | 10.40 |
| L | 1.40 | 1.50 | 1.70 |
| L1 | 0.90 | — | 1.25 |
| L2 | | 1.05 | |
| L3 | | 0.8 | |
| φP | | 1.2 | |
| θ | 0° | — | 8° |
| θ 1 | 5° | 7° | 9° |
| θ 2 | 5° | 7° | 9° |