

NDTL03N150C

Power MOSFET 1500V, 10.5Ω, 2.5A, N-Channel



ON Semiconductor®

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Features

- Low On-Resistance
- Ultra High Voltage
- High Speed Switching
- 100% Avalanche Tested
- Pb-Free and RoHS compliance

Typical Applications

- Switch mode power supply
- AC Drive

SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS at Ta = 25°C (Note 1, 2, 3, 4)

| Parameter | | Symbol | Value | Unit |
|---|----------------------|------------------|-------------|------|
| Drain to Source Voltage | | V _{DSS} | 1500 | V |
| Gate to Source Voltage | | V _{GSS} | ±30 | V |
| Drain Current (DC) | | I _D | 2.5 | A |
| Drain Current (Pulse) PW≤10μs, duty cycle≤1% | | I _{DP} | 5 | A |
| Power Dissipation | | P _D | 2.5 | W |
| | T _c =25°C | | 140 | |
| Junction Temperature | | T _j | 150 | °C |
| Storage Temperature | | T _{stg} | -55 to +150 | °C |
| Avalanche Energy (Single Pulse) (Note 2) | | E _{AS} | 34 | mJ |
| Avalanche Current (Note 3) | | I _{AV} | 2.5 | A |

Note 1 : Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

Note 2 : V_{DD}=50V, L=10mH, I_{AV}=2.5A (Fig.1)

Note 3 : L≤10mH, Single Pulse

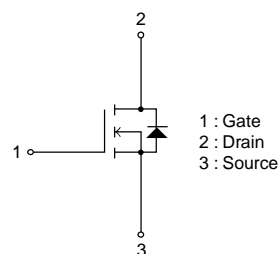
THERMAL RESISTANCE RATINGS

| Parameter | Symbol | Value | Unit |
|-------------------------------|------------------|-------|------|
| Junction to Case Steady State | R _{θJC} | 0.89 | °C/W |
| Junction to Ambient (Note 4) | R _{θJA} | 50.0 | |

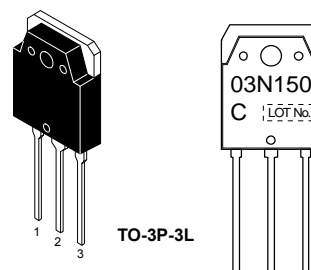
Note 4 : Insertion mounted

| V _{DSS} | R _{DS(on)} Max | I _D Max |
|------------------|-------------------------|--------------------|
| 1500V | 10.5Ω@10V | 2.5A |

ELECTRICAL CONNECTION N-Channel



MARKING



TO-3P-3L

ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

NDTL03N150C

ELECTRICAL CHARACTERISTICS at Ta = 25°C (Note 5, 6, 7)

| Parameter | Symbol | Conditions | Value | | | Unit |
|---|---------------|---|-------|------|-----------|----------|
| | | | min | typ | max | |
| Drain to Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D=10mA, V_{GS}=0V$ | 1500 | | | V |
| Zero-Gate Voltage Drain Current | I_{DSS} | $V_{DS}=1200V, V_{GS}=0V$ | | | 1 | mA |
| Gate to Source Leakage Current | I_{GSS} | $V_{GS}=30V, V_{DS}=0V$ | | | ± 100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=10V, I_D=1mA$ | 2 | | 4 | V |
| Forward Transconductance | g_{FS} | $V_{DS}=20V, I_D=1.25A$ | | 1.9 | | S |
| Static Drain to Source On-State Resistance | $R_{DS(on)}$ | $I_D=1.25A, V_{GS}=10V$ | | 8 | 10.5 | Ω |
| Input Capacitance | C_{iss} | $V_{DS}=30V, f=1MHz$ | | 650 | | pF |
| Output Capacitance | C_{oss} | | | 70 | | pF |
| Reverse Transfer Capacitance | C_{rss} | | | 20 | | pF |
| Turn-ON Delay Time | $t_{d(on)}$ | See Fig.2 | | 15 | | ns |
| Rise Time | t_r | | | 24 | | ns |
| Turn-OFF Delay Time | $t_{d(off)}$ | | | 140 | | ns |
| Fall Time | t_f | | | 47 | | ns |
| Total Gate Charge | Q_g | $V_{DS}=200V, V_{GS}=10V, I_D=2.5A$ | | 34 | | nC |
| Gate to Source Charge | Q_{gs} | | | 4.7 | | nC |
| Gate to Drain "Miller" Charge | Q_{gd} | | | 15 | | nC |
| Forward Diode Voltage | V_{SD} | $I_S=2.5A, V_{GS}=0V$ | | 0.8 | 1.5 | V |
| Reverse Recovery Time | t_{rr} | See Fig.3 | | 350 | | ns |
| Reverse Recovery Charge | Q_{rr} | $I_S=2.5A, V_{GS}=0V, di/dt=100A/\mu s$ | | 2220 | | nC |
| Effective Output Capacitance, Energy Related (Note 6) | $C_{o(er)}$ | $V_{GS}=0V, V_{DS}=0 \text{ to } 1200V$ | | 18.3 | | pF |
| Effective Output Capacitance, Time Related (Note 7) | $C_{o(tr)}$ | | | 29.6 | | pF |

Note 5 : Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted.

Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

Note 6 : $C_{o(er)}$ is a fixed capacitance that gives the same stored energy as C_{oss} while V_{DS} is rising from 0 to 80% $V_{(BR)DSS}$.

Note 7 : $C_{o(tr)}$ is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 80% $V_{(BR)DSS}$.

Fig. 1 Unclamped Inductive Switching Test Circuit

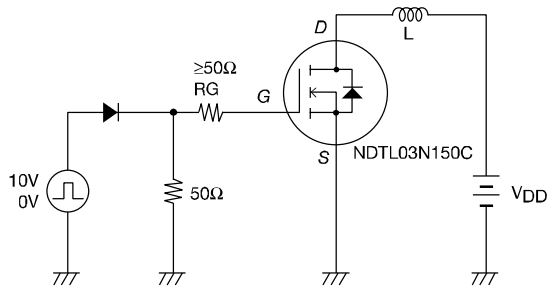


Fig. 2 Switching Time Test Circuit

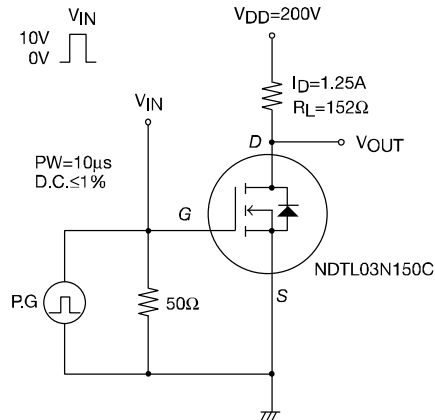
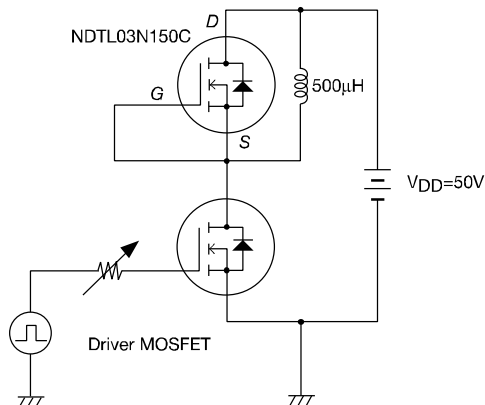
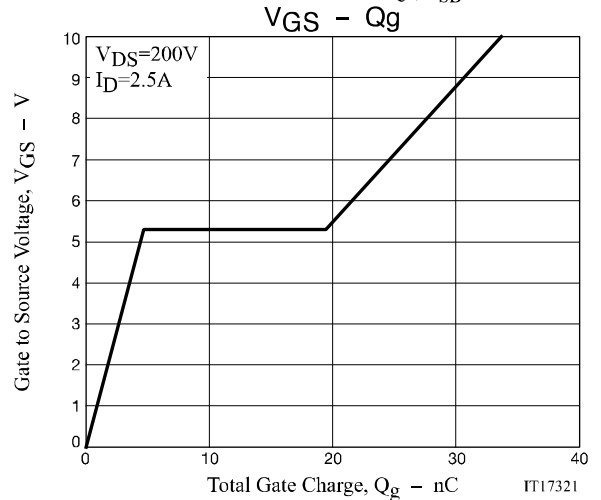
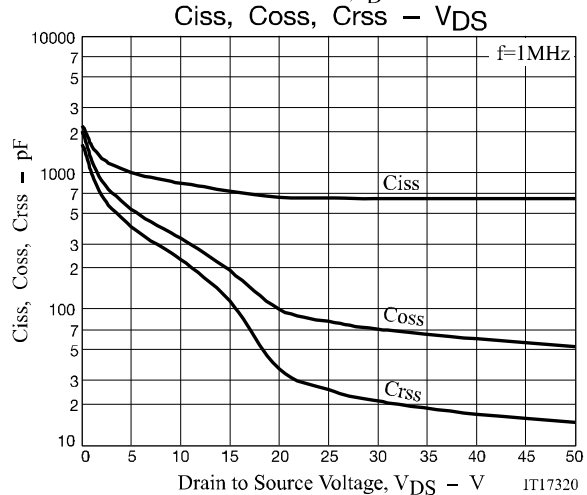
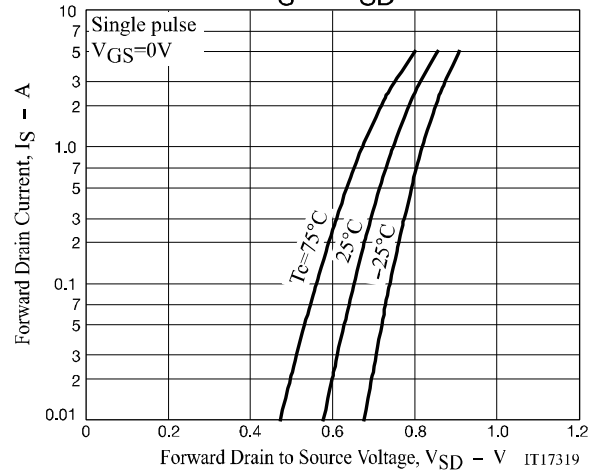
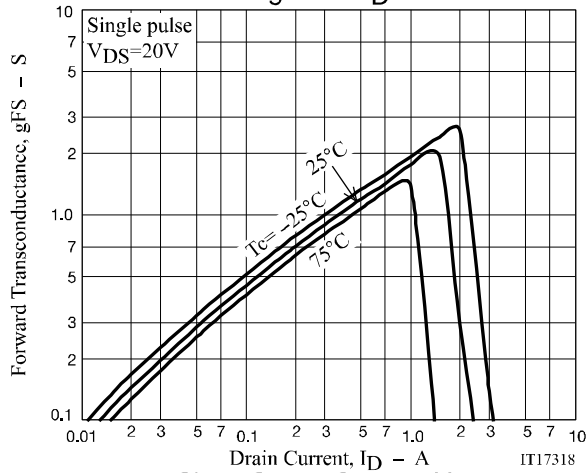
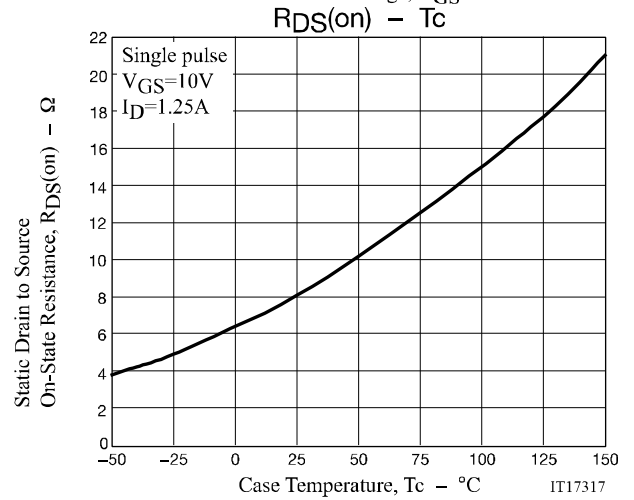
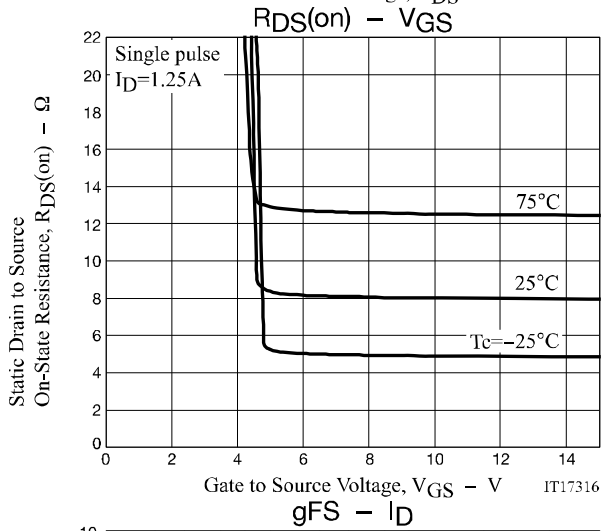
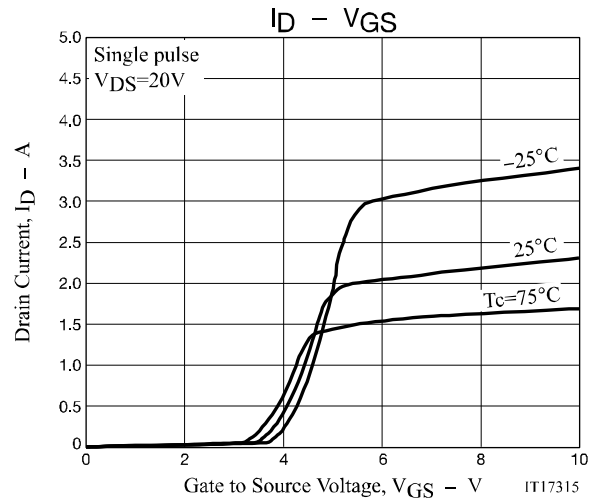
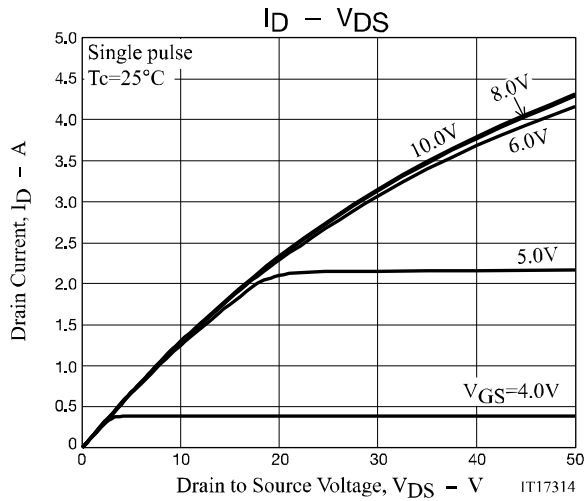


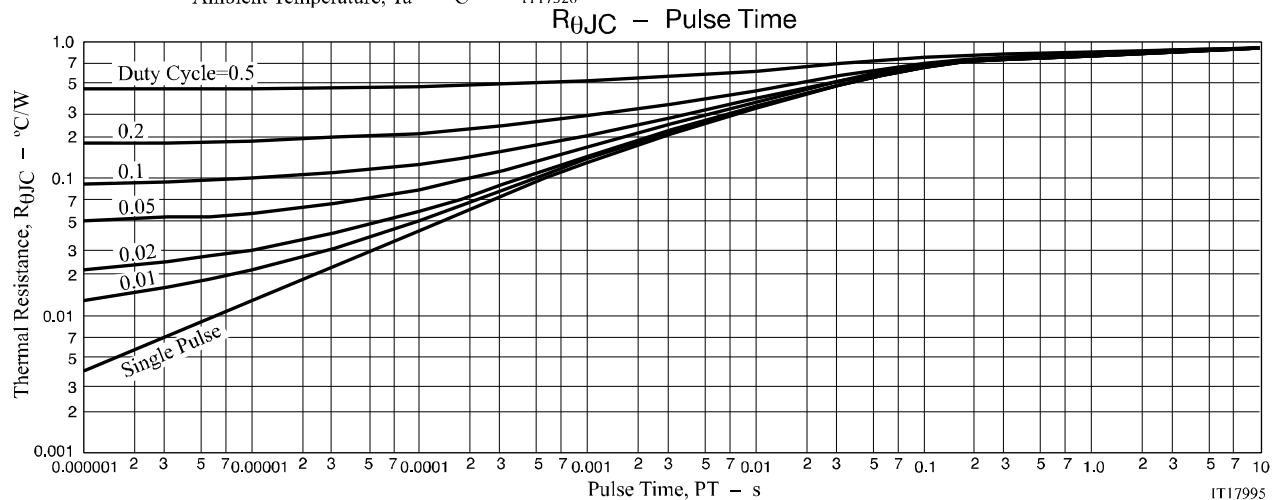
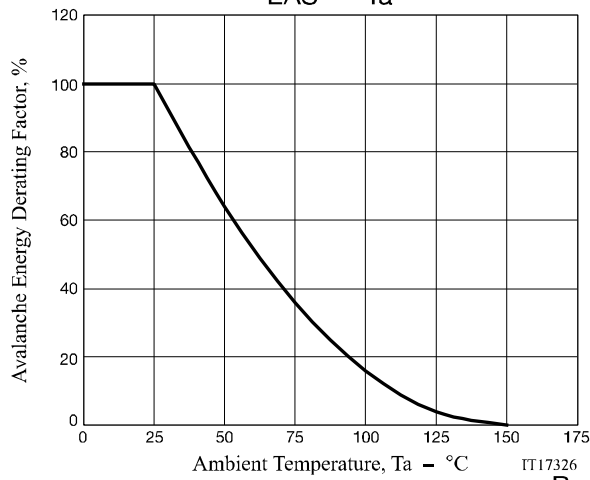
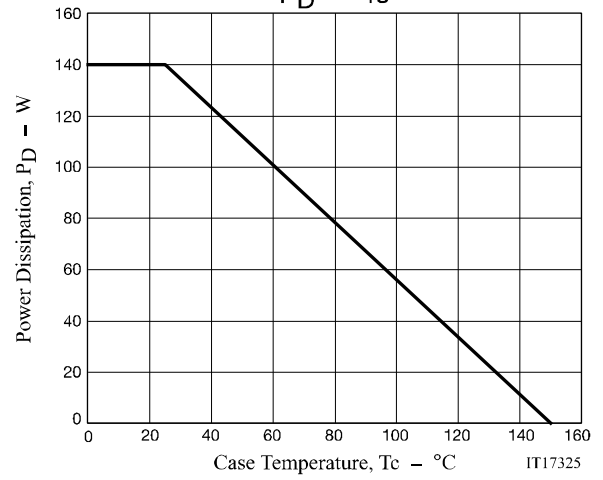
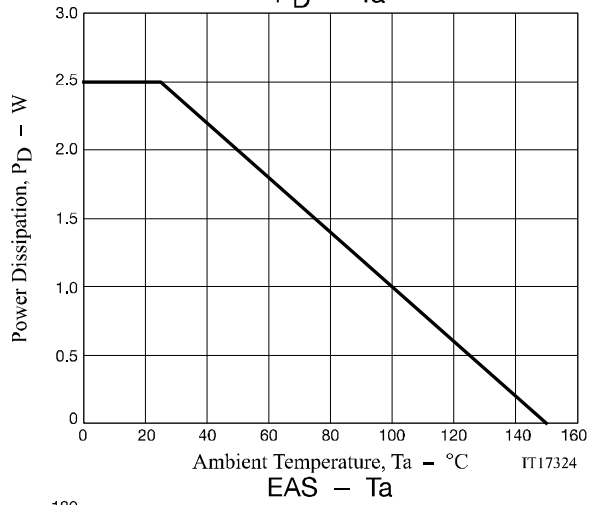
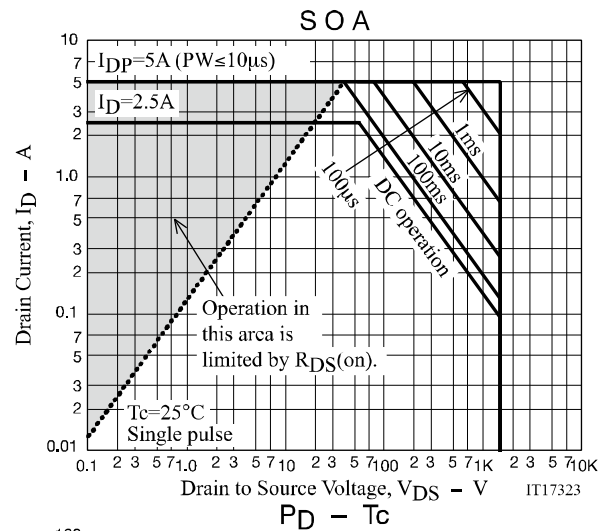
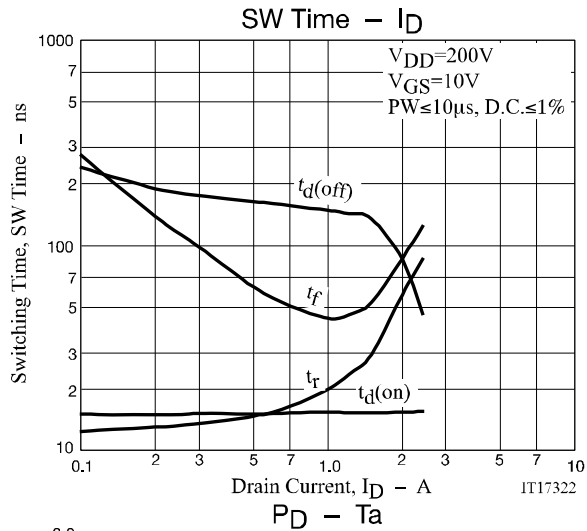
Fig. 3 Reverse Recovery Time Test Circuit



NDTL03N150C



NDTL03N150C



NDTL03N150C

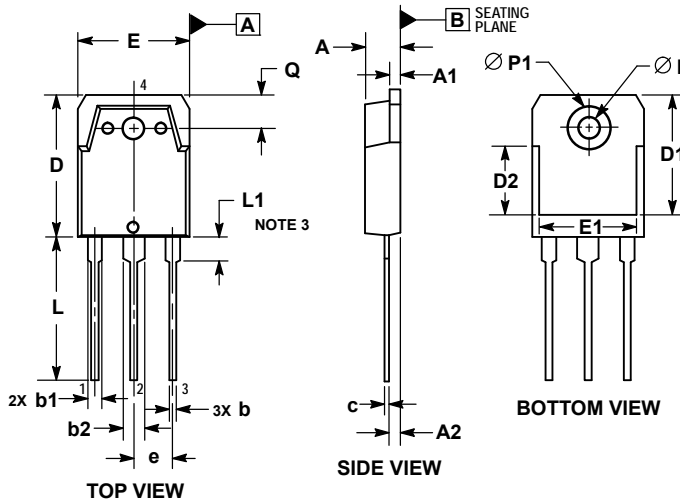
PACKAGE DIMENSIONS

unit : mm

TO-3P-3L

CASE 340AF

ISSUE A



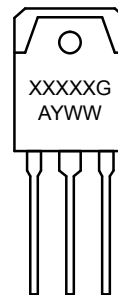
NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. CONTOUR UNCONTROLLED IN THIS AREA.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH OR GATE PROTRUSIONS. MOLD FLASH OR GATE PROTRUSIONS NOT TO EXCEED 0.13 PER SIDE. THESE DIMENSIONS ARE TO BE MEASURED AT THE OUTERMOST EXTREME OF THE PLASTIC BODY.
5. DIMENSIONS b1 AND b2 DO NOT INCLUDE DAMBAR PROTRUSION. DAMBAR PROTRUSION SHALL NOT EXCEED 0.10.

| DIM | MILLIMETERS | | |
|-----|-------------|-------|-------|
| | MIN | NOM | MAX |
| A | 4.60 | 4.80 | 5.00 |
| A1 | 1.45 | 1.50 | 1.65 |
| A2 | 1.20 | 1.40 | 1.60 |
| b | 0.80 | 1.00 | 1.20 |
| b1 | 1.80 | 2.00 | 2.20 |
| b2 | 2.80 | 3.00 | 3.20 |
| c | 0.55 | 0.60 | 0.75 |
| D | 19.70 | 19.90 | 20.10 |
| D1 | 16.56 | 16.76 | 16.96 |
| D2 | 9.80 | 10.00 | 10.20 |
| E | 15.40 | 15.60 | 15.80 |
| E1 | 13.40 | 13.60 | 13.80 |
| e | 5.15 | 5.45 | 5.75 |
| L | 19.80 | 20.00 | 20.20 |
| L1 | 3.30 | 3.50 | 3.70 |
| P | 3.00 | 3.20 | 3.40 |
| P1 | 6.80 | 7.00 | 7.20 |
| Q | 4.80 | 5.00 | 5.20 |

- 1 : Gate
- 2 : Drain
- 3 : Source

GENERIC MARKING DIAGRAM*



- XXXXX = Specific Device Code
- A = Assembly Location
- Y = Year
- WW = Work Week
- G = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G", may or not be present.

ORDERING INFORMATION

| Device | Marking | Package | Shipping (Qty / Packing) |
|--------------|---------|-----------------------|--------------------------|
| NDTL03N150CG | 03N150C | TO-3P-3L (Pb-Free) | 30 / Tube |

Note on usage : Since the NDTL03N150C is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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