# NDTL03N150CG Datasheet


https://www.DiGi-Electronics.com

| | |
|---|---|
| DiGi Electronics Part Number | NDTL03N150CG-DG |
| Manufacturer | onsemi |
| Manufacturer Product Number | NDTL03N150CG |
| Description | MOSFET N-CH 1500V 2.5A TO3P |
| Detailed Description | N-Channel 1500 V 2.5A (Ta) 2.5W (Ta), 140W (Tc) Through Hole TO-3P(L) |

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## Purchase and inquiry

| Manufacturer Product Number: | Manufacturer: |
| --- | --- |
| NDTL03N150CG | onsemi |
| Series: | Product Status: |
| - | Obsolete |
| FET Type: | Technology: |
| N-Channel | MOSFET (Metal Oxide) |
| Drain to Source Voltage (Vdss): | Current - Continuous Drain (Id) @ 25°C: |
| 1500 V | 2.5A (Ta) |
| Drive Voltage (Max Rds On, Min Rds On): | Rds On (Max) @ Id, Vgs: |
| 10V | 10.5Ohm @ 1.25A, 10V |
| Vgs(th) (Max) @ Id: | Gate Charge (Qg) (Max) @ Vgs: |
| - | 34 nC @ 10 V |
| Vgs (Max): | Input Capacitance (Ciss) (Max) @ Vds: |
| ±30V | 650 pF @ 30 V |
| FET Feature: | Power Dissipation (Max): |
| - | 2.5W (Ta), 140W (Tc) |
| Operating Temperature: | Mounting Type: |
| 150°C (TJ) | Through Hole |
| Supplier Device Package: | Package / Case: |
| TO-3P(L) | TO-3PL |
| Base Product Number: | |
| NDTL03 | |

## Environmental & Export classification

| RoHS Status: | Moisture Sensitivity Level (MSL): |
| --- | --- |
| ROHS3 Compliant | 1 (Unlimited) |
| REACH Status: | ECCN: |
| REACH Unaffected | EAR99 |
| HTSUS: | |
| 8541.29.0095 | |

# NDTL03N150C

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

ON Semiconductor®

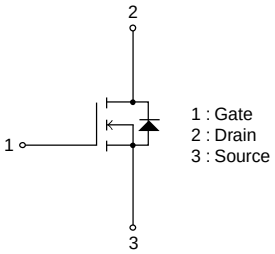
www.onsemi.com

### 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

| $V_{DSS}$ | $R_{DS}$(on) Max | $I_D$ Max |
|---|---|---|
| 1500V | 10.5Ω@10V | 2.5A |

### ELECTRICAL CONNECTION
### N-Channel




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

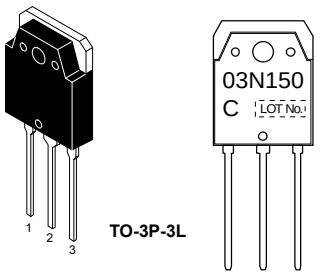
| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain to Source Voltage | | $V_{DSS}$ | 1500 | V |
| Gate to Source Voltage | | $V_{GSS}$ | ±30 | V |
| Drain Current (DC) | | $I_D$ | 2.5 | A |
| Drain Current (Pulse) PW≤10μs, duty cycle≤1% | | $I_{DP}$ | 5 | A |
| Power Dissipation | | $P_D$ | 2.5 | W |
| | Tc=25°C | | 140 | |
| Junction Temperature | | Tj | 150 | °C |
| Storage Temperature | | Tstg | –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

### MARKING




### THERMAL RESISTANCE RATINGS

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Junction to Case Steady State | $R_{\theta JC}$ | 0.89 | °C/W |
| Junction to Ambient (Note 4) | $R_{\theta JA}$ | 50.0 | |

Note 4 : Insertion mounted

### 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 | Ciss | $V_{DS}$=30V, f=1MHz | | 650 | | pF |
| Output Capacitance | Coss | | | 70 | | pF |
| Reverse Transfer Capacitance | Crss | | | 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 | Qg | $V_{DS}$=200V, $V_{GS}$=10V, $I_D$=2.5A | | 34 | | nC |
| Gate to Source Charge | Qgs | | | 4.7 | | nC |
| Gate to Drain “Miller” Charge | Qgd | | | 15 | | nC |
| Forward Diode Voltage | $V_{SD}$ | $I_S$=2.5A, $V_{GS}$=0V | | 0.8 | 1.5 | V |
| Reverse Recovery Time | trr | See Fig.3 $I_S$=2.5A, $V_{GS}$=0V, di/dt=100A/μs | | 350 | | ns |
| Reverse Recovery Charge | Qrr | | | 2220 | | nC |
| Effective Output Capacitance, Energy Related (Note 6) | Co(er) | $V_{GS}$=0V, $V_{DS}$=0 to 1200V | | 18.3 | | pF |
| Effective Output Capacitance, Time Related (Note 7) | Co(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 : Co(er) is a fixed capacitance that gives the same stored energy as Coss while $V_{DS}$ is rising from 0 to 80% $V_{(BR)DSS}$.

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

**Fig. 1 Unclamped Inductive Switching Test Circuit**

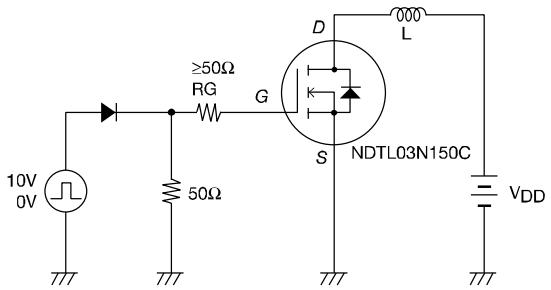



**Fig. 2 Switching Time Test Circuit**

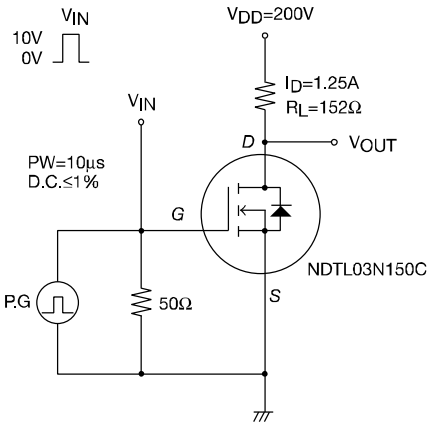
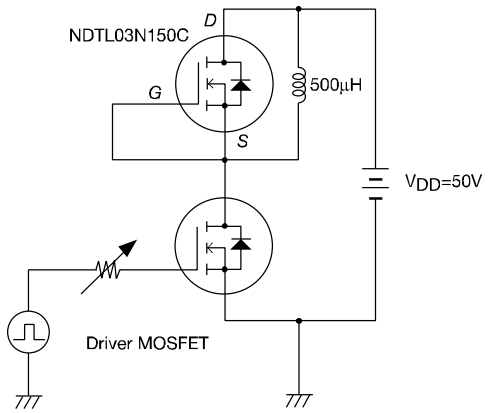
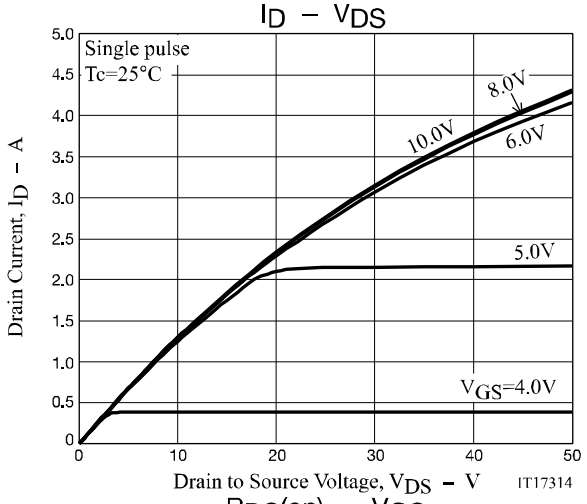
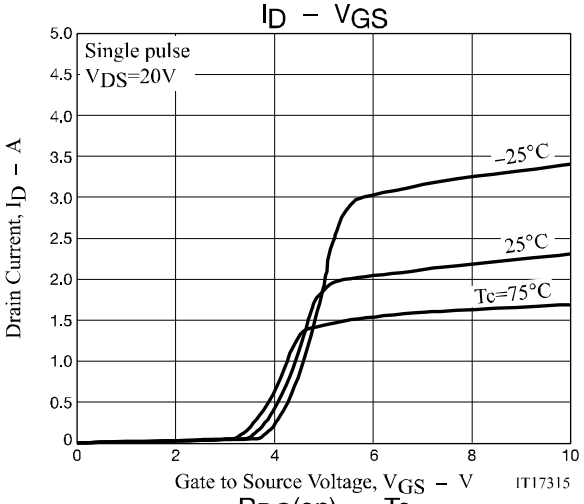


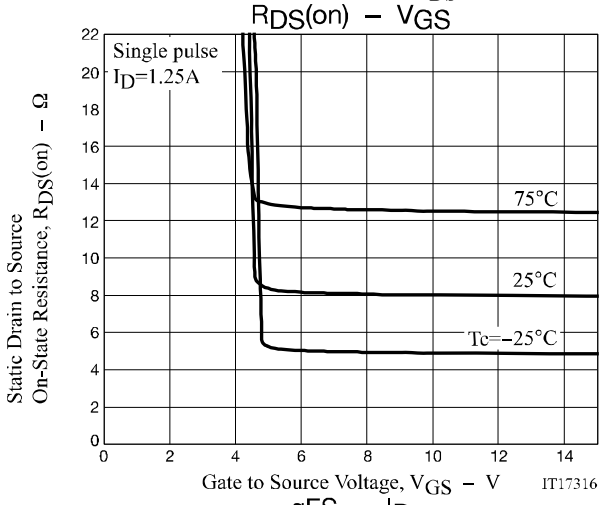

**Fig. 3 Reverse Recovery Time Test Circuit**

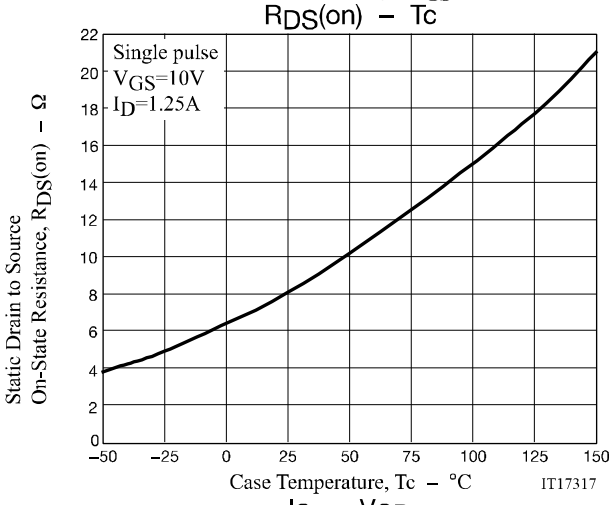


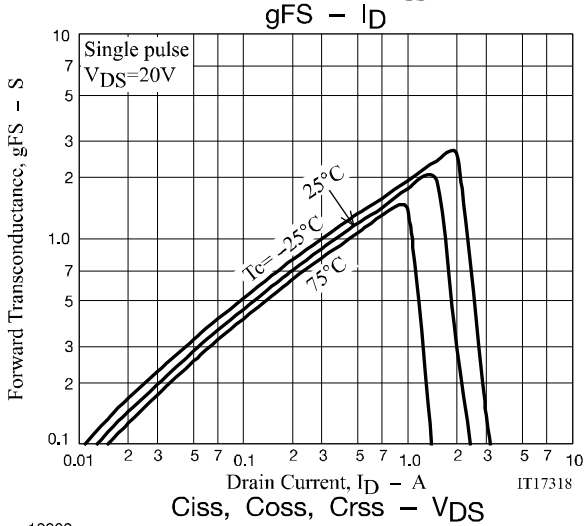
# NDTL03N150C

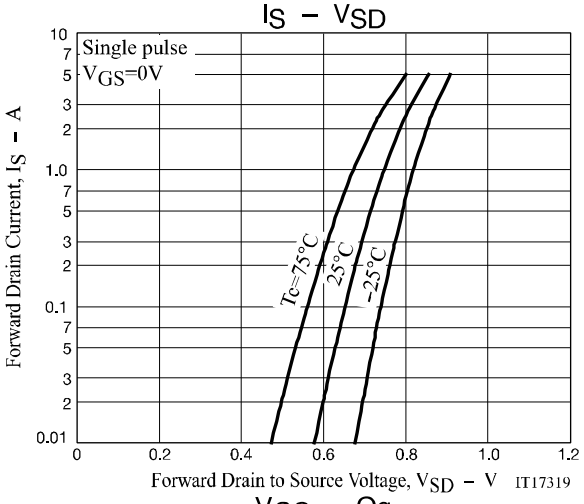


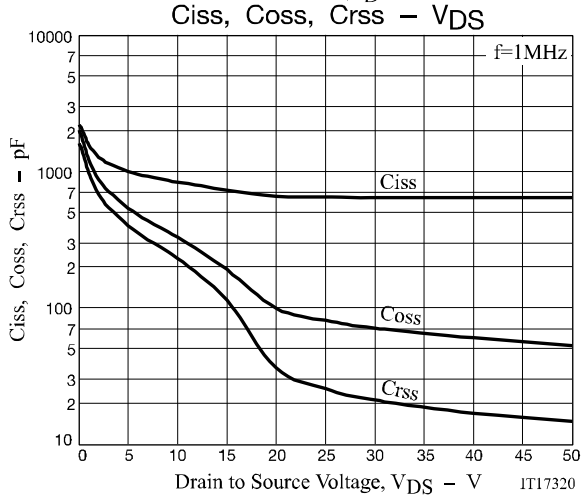



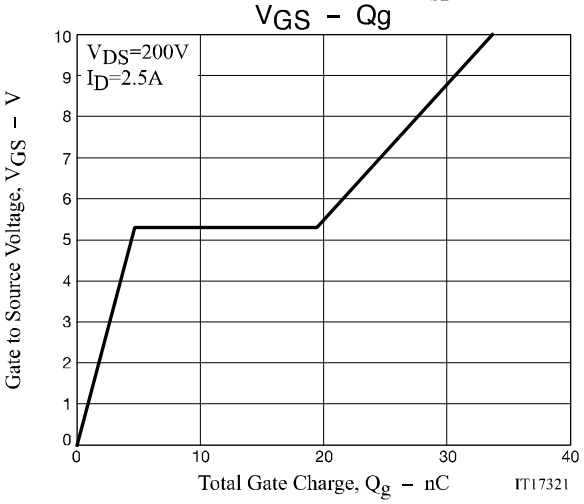



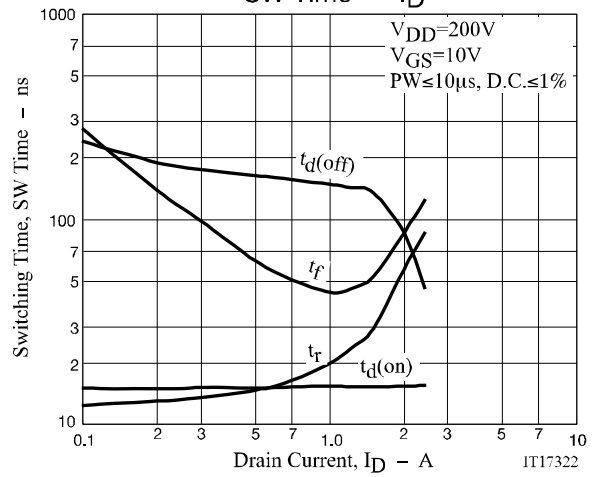



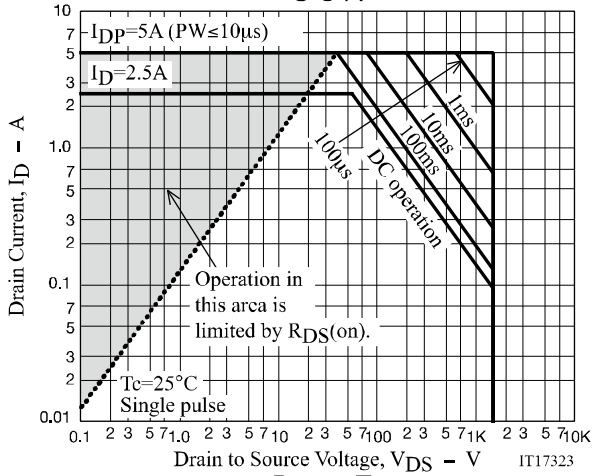



# NDTL03N150C

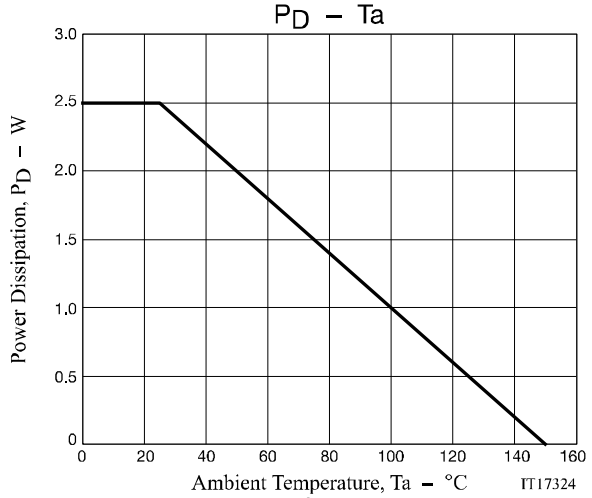
SW Time – $I_D$



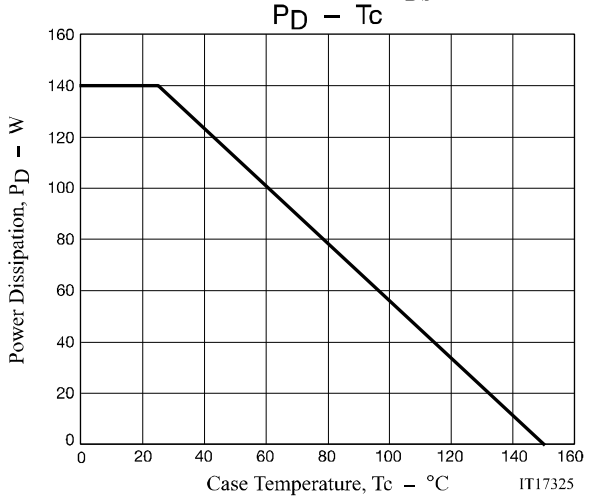

S O A



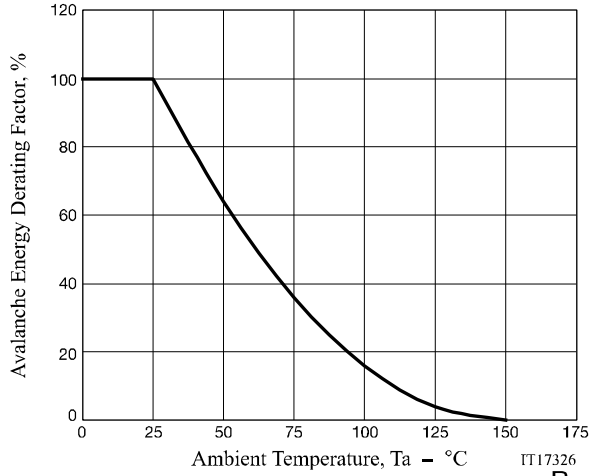

$P_D$ – Ta



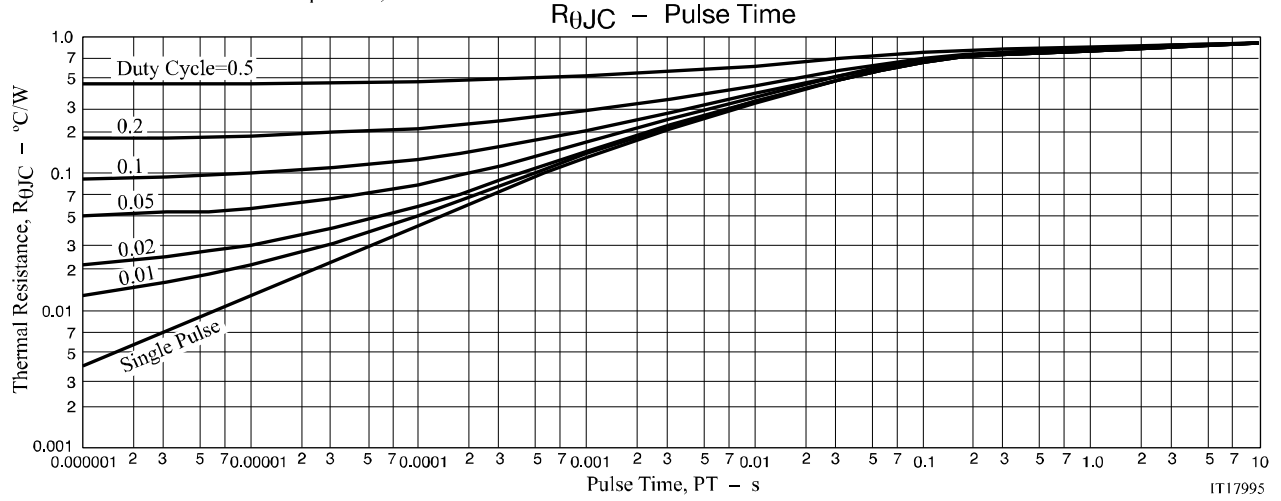

$P_D$ – Tc




EAS – Ta




$R_{\theta JC}$ – Pulse Time

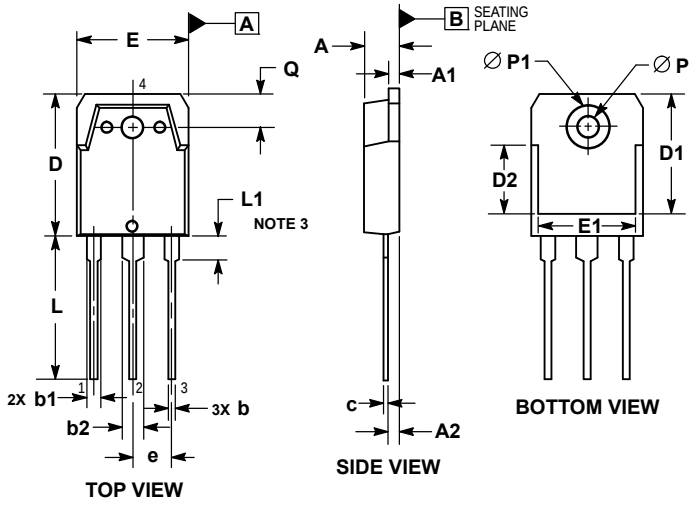


# NDTL03N150C

## PACKAGE DIMENSIONS

unit : mm

**TO-3P-3L**
CASE 340AF
ISSUE A

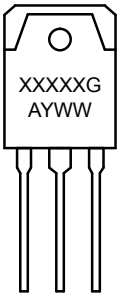



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. CONTOUR UNCONTROLLED IN THIS AREA.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH OR GATE PROTRUSIONS. MOLD FLASH OR GATE PROTRUSIONS NOT TO EXCEED 0.13 PER SIDE. THESE DIMENSIONS ARE TO BE MEA SURED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

| | MILLIMETERS | | |
|---|---|---|---|
| DIM | 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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