NDTL03N150C

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

ON Semiconductor®

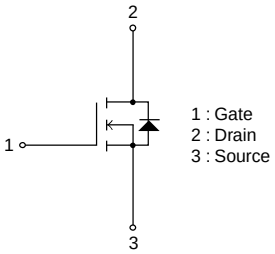
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Features
- Low On-Resistance
- Ultra High Voltage
- High Speed Switching
- 100% Avalanche Tested
- Pb-Free and RoHS compliance

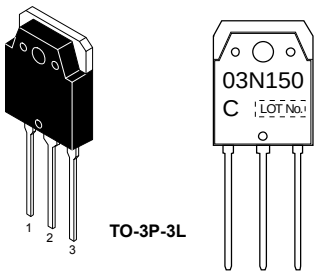
Typical Applications
- Switch mode power supply
- AC Drive

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

ELECTRICAL CONNECTION
N-Channel



MARKING



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

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.

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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

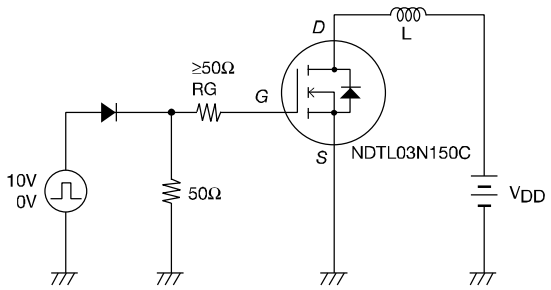


Fig. 2 Switching Time Test Circuit

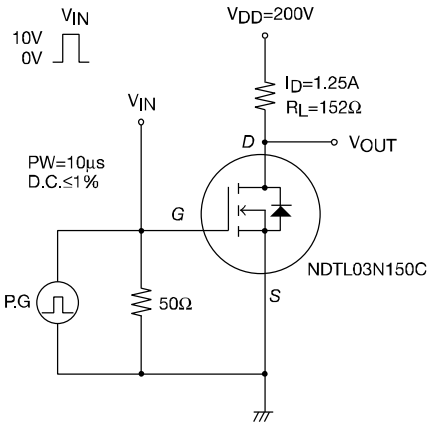
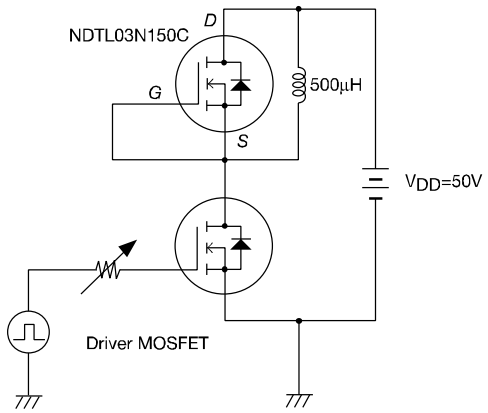
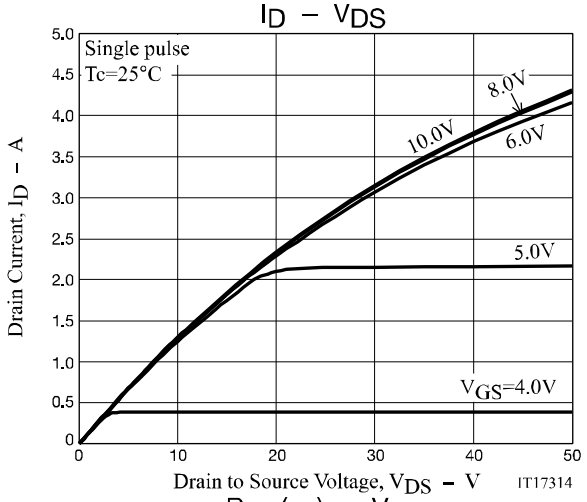
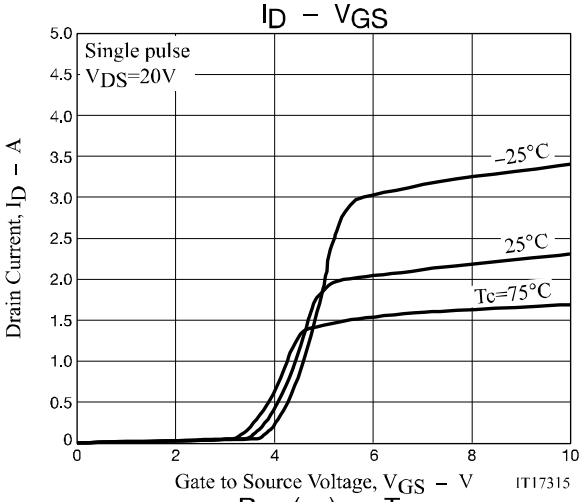
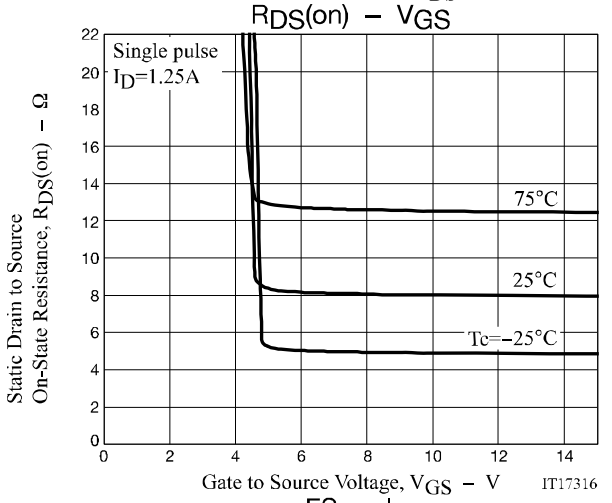


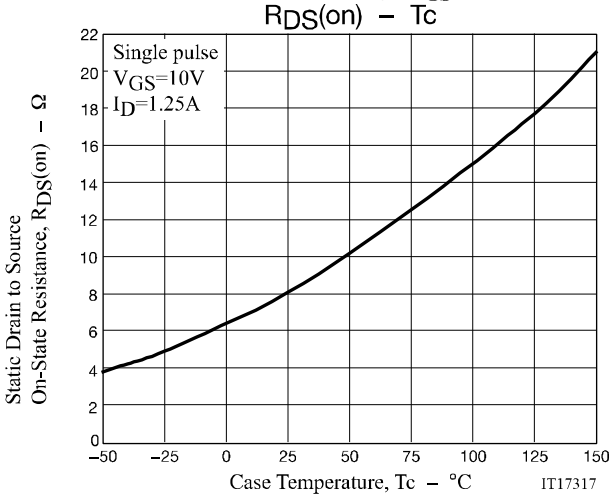
Fig. 3 Reverse Recovery Time Test Circuit

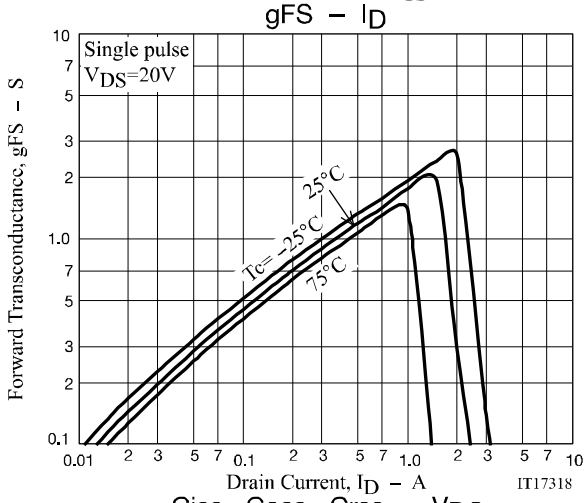


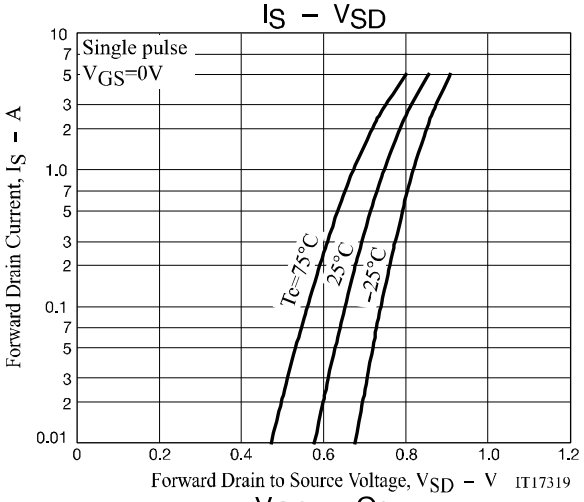

ID – VDS
Single pulse
Tc=25°C
8.0V
10.0V
6.0V
5.0V
VGS=4.0V
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT17314

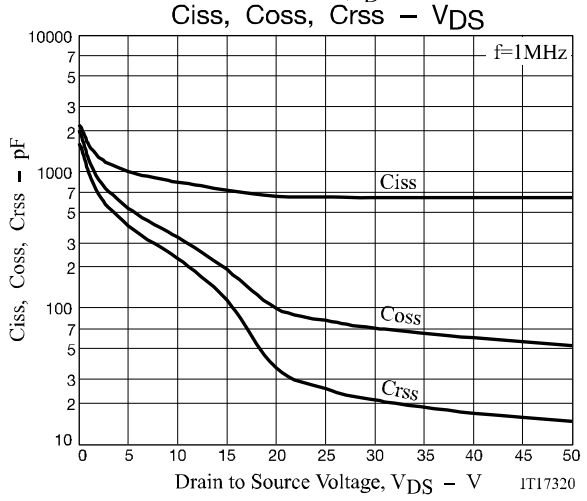

ID – VGS
Single pulse
VDS=20V
–25°C
25°C
Tc=75°C
Drain Current, ID – A
Gate to Source Voltage, VGS – V
IT17315

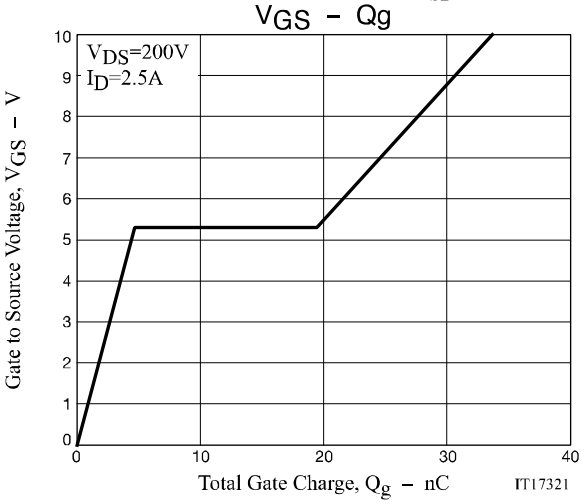

RDS(on) – VGS
Single pulse
ID=1.25A
75°C
25°C
Tc=–25°C
Static Drain to Source On-State Resistance, RDS(on) – Ω
Gate to Source Voltage, VGS – V
IT17316


RDS(on) – Tc
Single pulse
VGS=10V
ID=1.25A
Static Drain to Source On-State Resistance, RDS(on) – Ω
Case Temperature, Tc – °C
IT17317

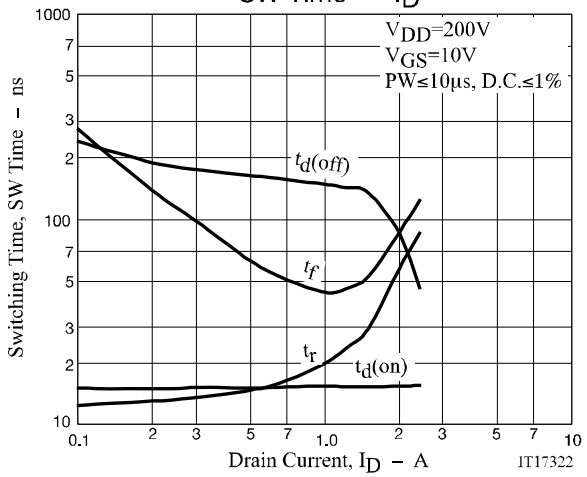

gFS – ID
Single pulse
VDS=20V
25°C
Tc=–25°C
75°C
Forward Transconductance, gFS – S
Drain Current, ID – A
IT17318


IS – VSD
Single pulse
VGS=0V
Tc=75°C
25°C
–25°C
Forward Drain Current, IS – A
Forward Drain to Source Voltage, VSD – V
IT17319

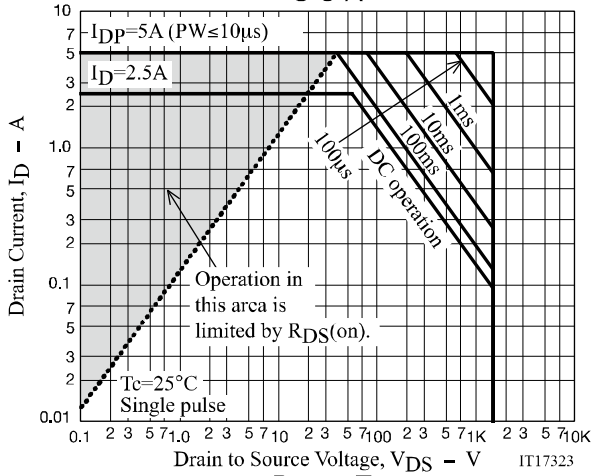

Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain to Source Voltage, VDS – V
IT17320


VGS – Qg
VDS=200V
ID=2.5A
Gate to Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT17321

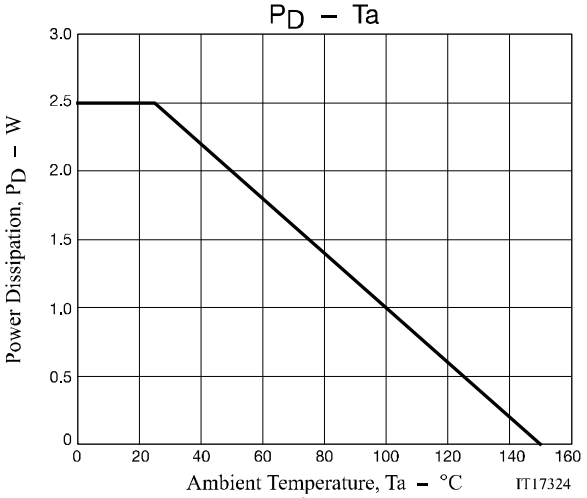
SW Time – I_D



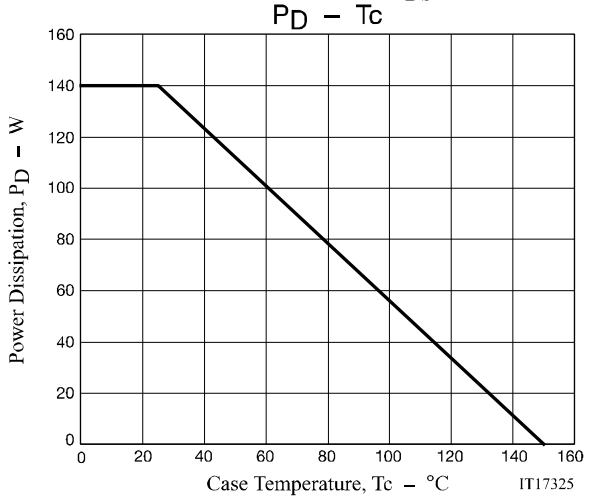
S O A



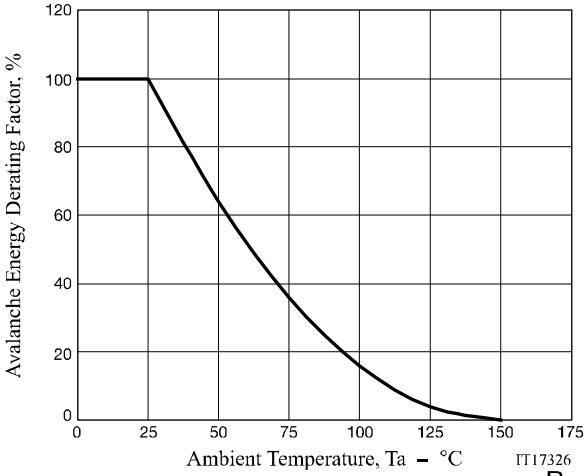
P_D – Ta



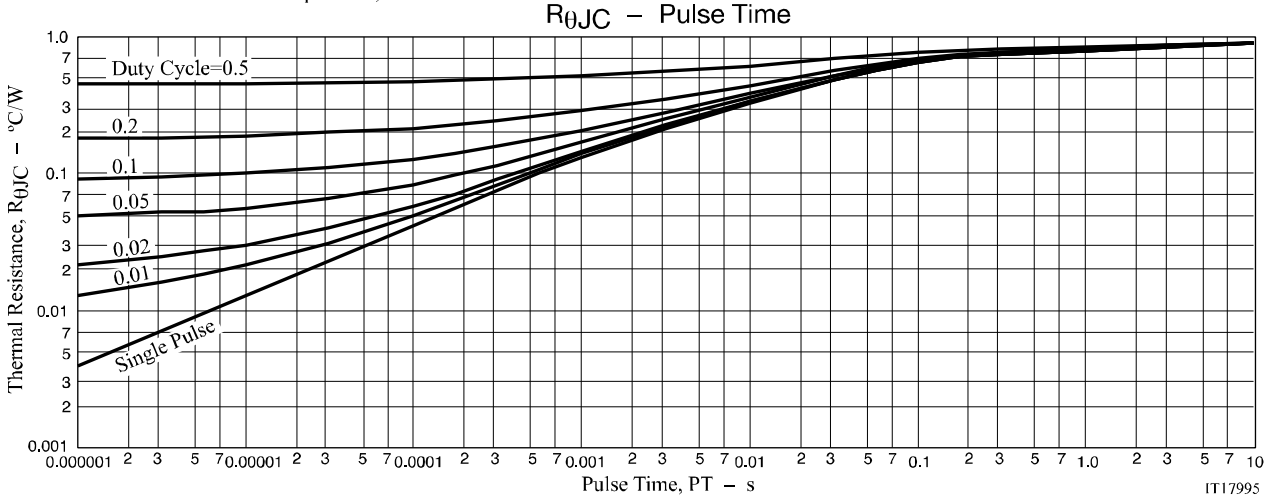
P_D – Tc



EAS – Ta

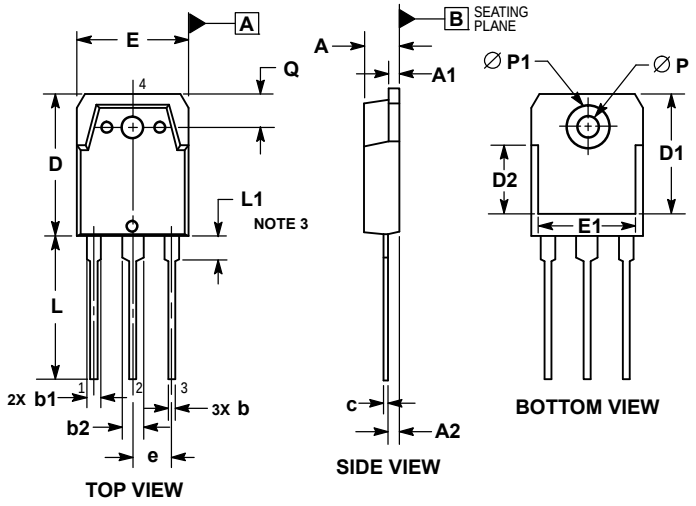


$R_{\theta JC}$ – Pulse Time



PACKAGE DIMENSIONS
unit : mm

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

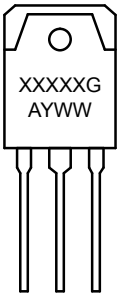


NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. CONTOUR UNCONTROLLED IN THIS AREA.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH OR GATE PROTRUSIONS. MOLD FLASH OR GATE PROTRUSIONS NOT TO EXCEED 0.13 PER SIDE. THESE DIMENSIONS ARE TO BE MEA SURED 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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