NDPL180N10B

Power MOSFET
100V, 3.0mΩ, 180A, N-Channel

ON Semiconductor®

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Features

- Ultra Low On-Resistance
- Low Gate Charge
- High Speed Switching
- 100% Avalanche Test
- Pb-Free and RoHS compliance

V_{DSS}	$R_{DS(on)}$ Max	I_D Max
100V	3.0mΩ@ 15V	180A
	3.5mΩ@ 10V	

Specifications

Absolute Maximum Ratings at Ta = 25°C (Note 1)

Parameter	Symbol	Value	Unit
Drain to Source Voltage	V_{DSS}	100	V
Gate to Source Voltage	V_{GSS}	±20	V
Drain Current (DC)	I_D	180	A
Drain Current (DC) Limited by Package	I_{DL}	100	A
Drain Current (Pulse) PW≤10μs, duty cycle≤1%	I_{DP}	600	A
Power Dissipation	P_D	2.1	W
Tc=25°C		200	
Junction Temperature	Tj	175	°C
Storage Temperature	Tstg	−55 to +175	°C
Source Current (Body Diode)	I_S	100	A
Avalanche Energy (Single Pulse) (Note 2)	E_{AS}	451	mJ
Lead Temperature for Soldering Purposes, 3mm from Case for 10 Seconds	T_L	260	°C

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.

2 : V_{DD}=48V, L=100μH, I_{AV}=70A (Fig.1)

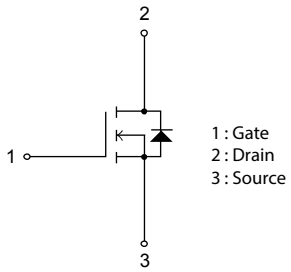
Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Junction to Case Steady State	$R_{\theta JC}$	0.75	°C/W
Junction to Ambient (Note 3)	$R_{\theta JA}$	71.4	

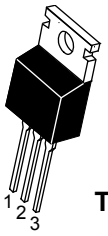
Note 3 : Insertion mounted

Electrical Connection

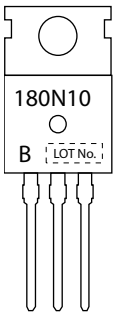
N-Channel



Marking



TO-220-3L



ORDERING INFORMATION

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

Electrical Characteristics at Ta = 25°C (Note 4)

Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=10mA, V_{GS}=0V	100			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=100V, V_{GS}=0V			10	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±200	nA
Gate Threshold Voltage	$V_{GS}(th)$	V_{DS}=10V, I_D=1mA	2		4	V
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=50A		150		S
Static Drain to Source On-State Resistance	$R_{DS}(on)1$	I_D=50A, V_{GS}=15V		2.5	3.0	mΩ
	$R_{DS}(on)2$	I_D=50A, V_{GS}=10V		2.7	3.5	mΩ
Input Capacitance	Ciss	V_{DS}=50V, f=1MHz		6,950		pF
Output Capacitance	Coss			3,000		pF
Reverse Transfer Capacitance	Crss			15		pF
Turn-ON Delay Time	$t_d(on)$	See Fig.2		95		ns
Rise Time	t_r			320		ns
Turn-OFF Delay Time	$t_d(off)$			185		ns
Fall Time	t_f			130		ns
Total Gate Charge	Qg	V_{DS}=48V, V_{GS}=10V, I_D=100A		95		nC
Gate to Source Charge	Qgs			31		nC
Gate to Drain “Miller” Charge	Qgd			26		nC
Forward Diode Voltage	V_{SD}	I_S=100A, V_{GS}=0V		0.9	1.5	V
Reverse Recovery Time	t_{rr}	See Fig.3		150		ns
Reverse Recovery Charge	Q_{rr}	I_S=100A, V_{GS}=0V, V_{DD}=50V, di/dt=100A/μs		580		nC

Note 4 : 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.

Fig.1 Unclamped Inductive Switching Test Circuit

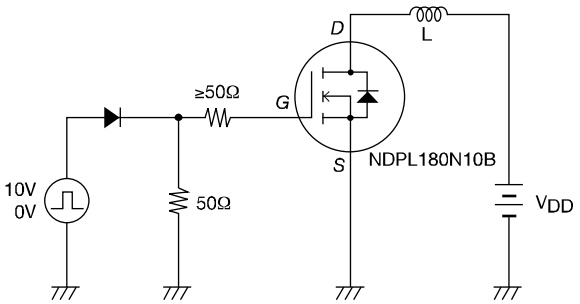


Fig.2 Switching Time Test Circuit

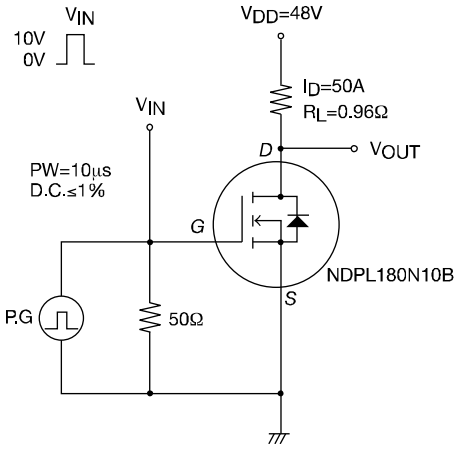
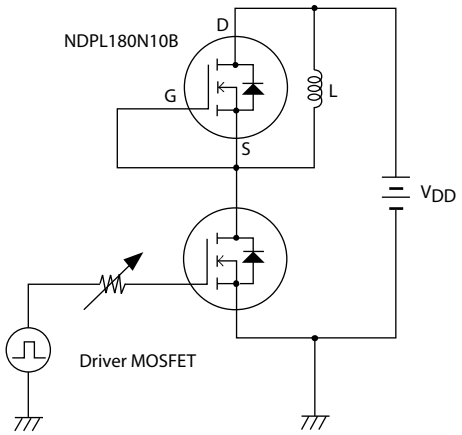
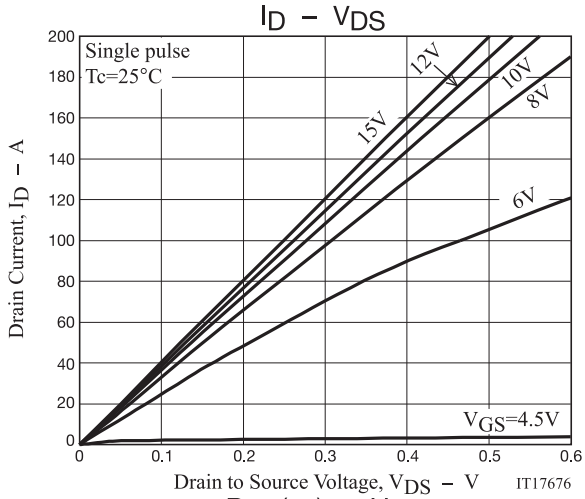
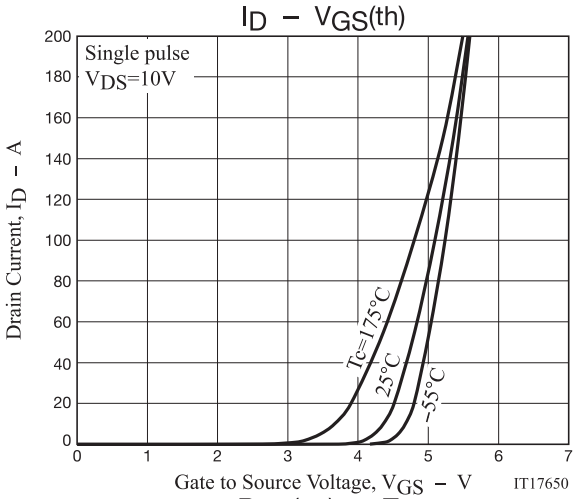
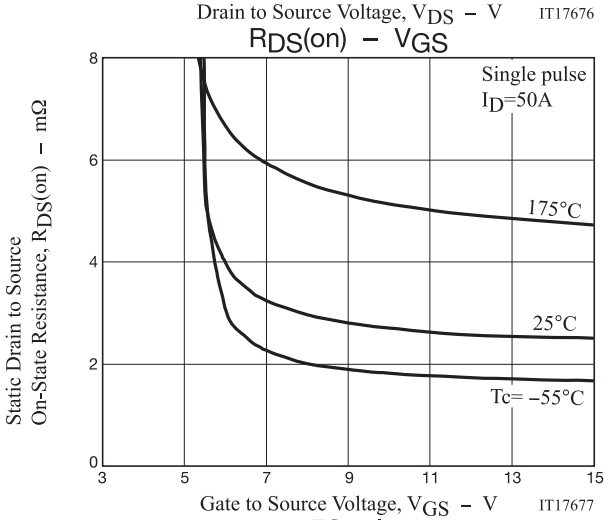


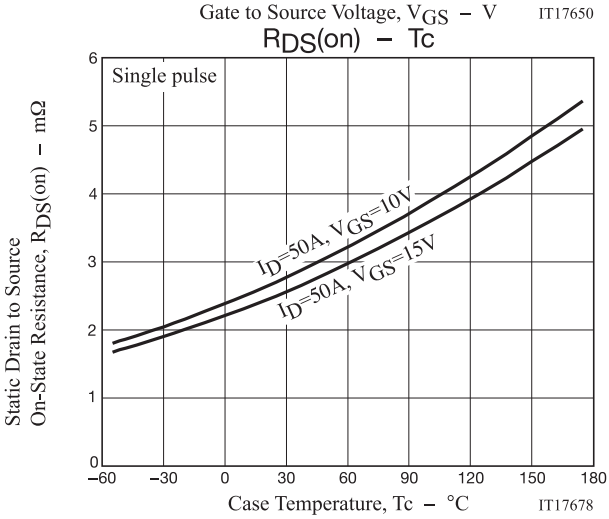
Fig.3 Reverse Recovery Time Test Circuit

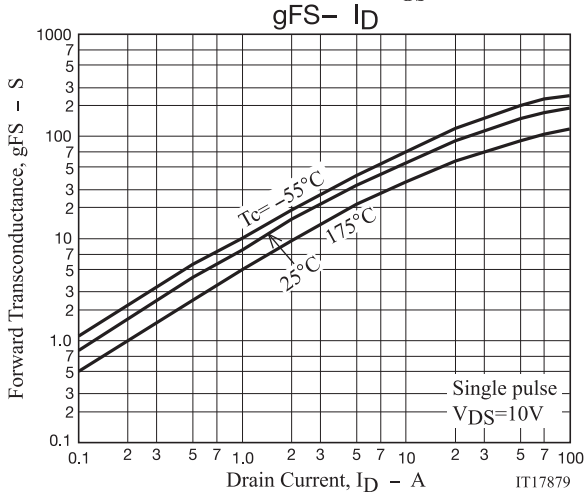


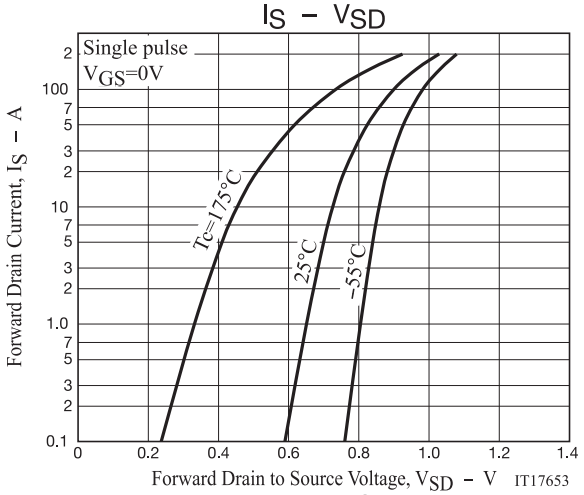

ID – VDS
Single pulse
Tc=25°C
12V
15V
10V
8V
6V
VGS=4.5V
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT17676

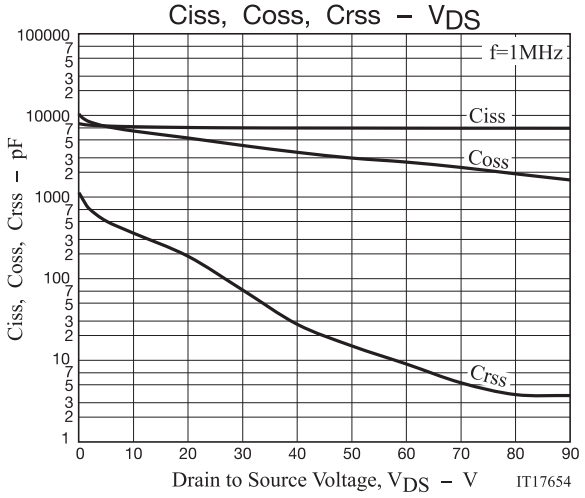

ID – VGS(th)
Single pulse
VDS=10V
Tc=175°C
25°C
–55°C
Drain Current, ID – A
Gate to Source Voltage, VGS – V
IT17650

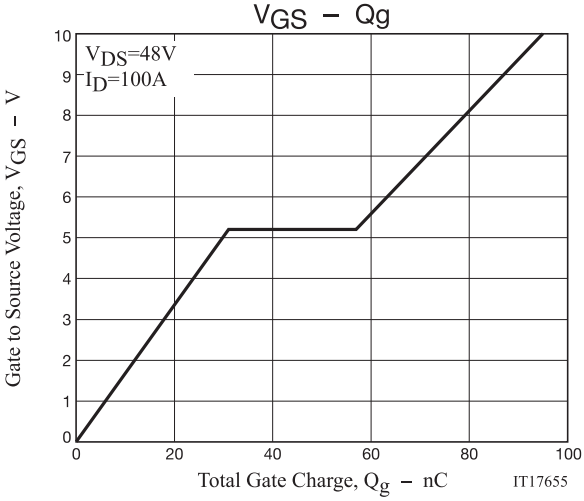

RDS(on) – VGS
Single pulse
ID=50A
175°C
25°C
Tc= –55°C
Static Drain to Source
On-State Resistance, RDS(on) – mΩ
Gate to Source Voltage, VGS – V
IT17677


RDS(on) – Tc
Single pulse
ID=50A, VGS=10V
ID=50A, VGS=15V
Static Drain to Source
On-State Resistance, RDS(on) – mΩ
Case Temperature, Tc – °C
IT17678

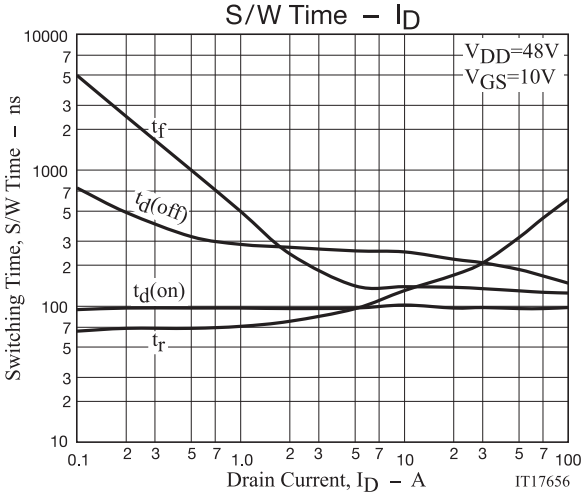

gFS– ID
Tc= –55°C
175°C
25°C
Single pulse
VDS=10V
Forward Transconductance, gFS – S
Drain Current, ID – A
IT17879


IS – VSD
Single pulse
VGS=0V
Tc=175°C
25°C
–55°C
Forward Drain Current, IS – A
Forward Drain to Source Voltage, VSD – V
IT17653

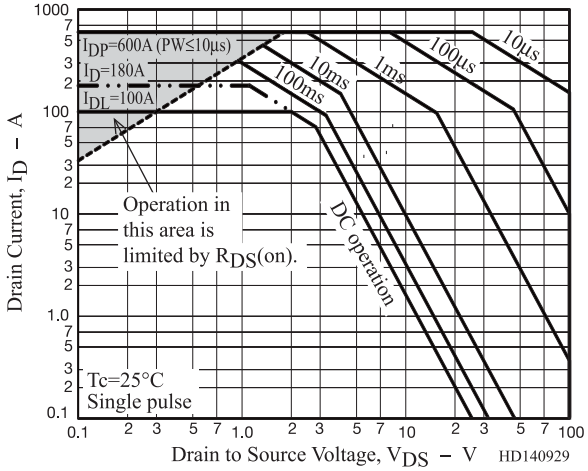

Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain to Source Voltage, VDS – V
IT17654


VGS – Qg
VDS=48V
ID=100A
Gate to Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT17655

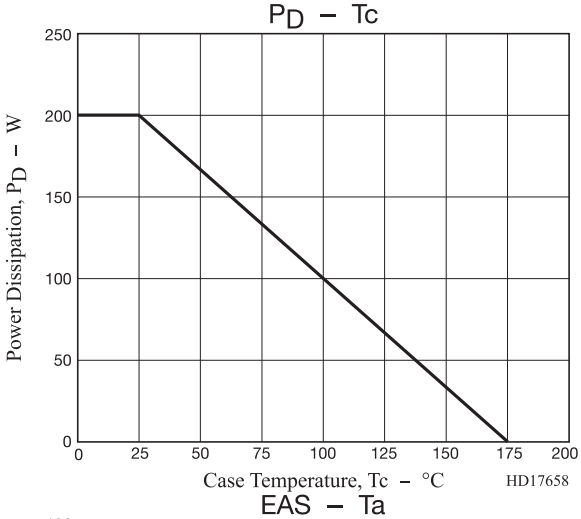
S/W Time – I_D



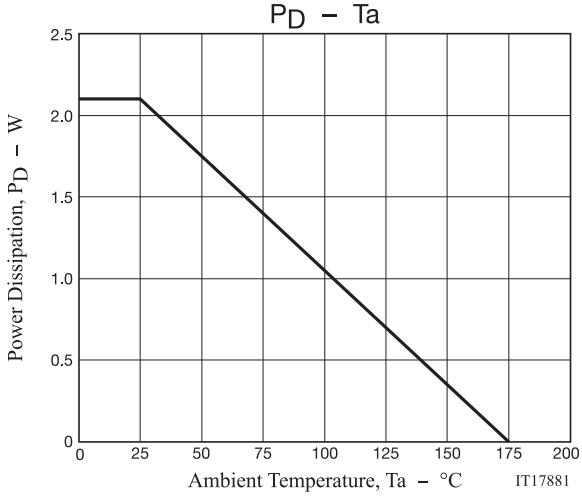
S O A



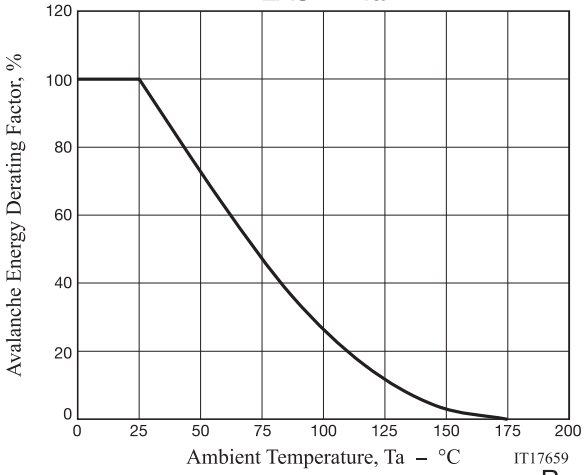
P_D – Tc



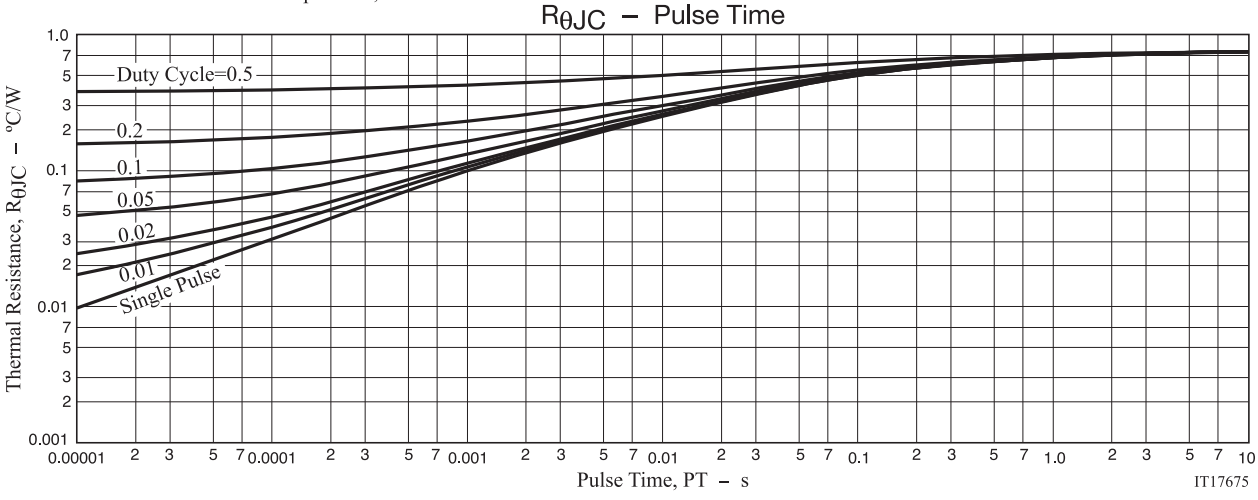
P_D – Ta



EAS – Ta



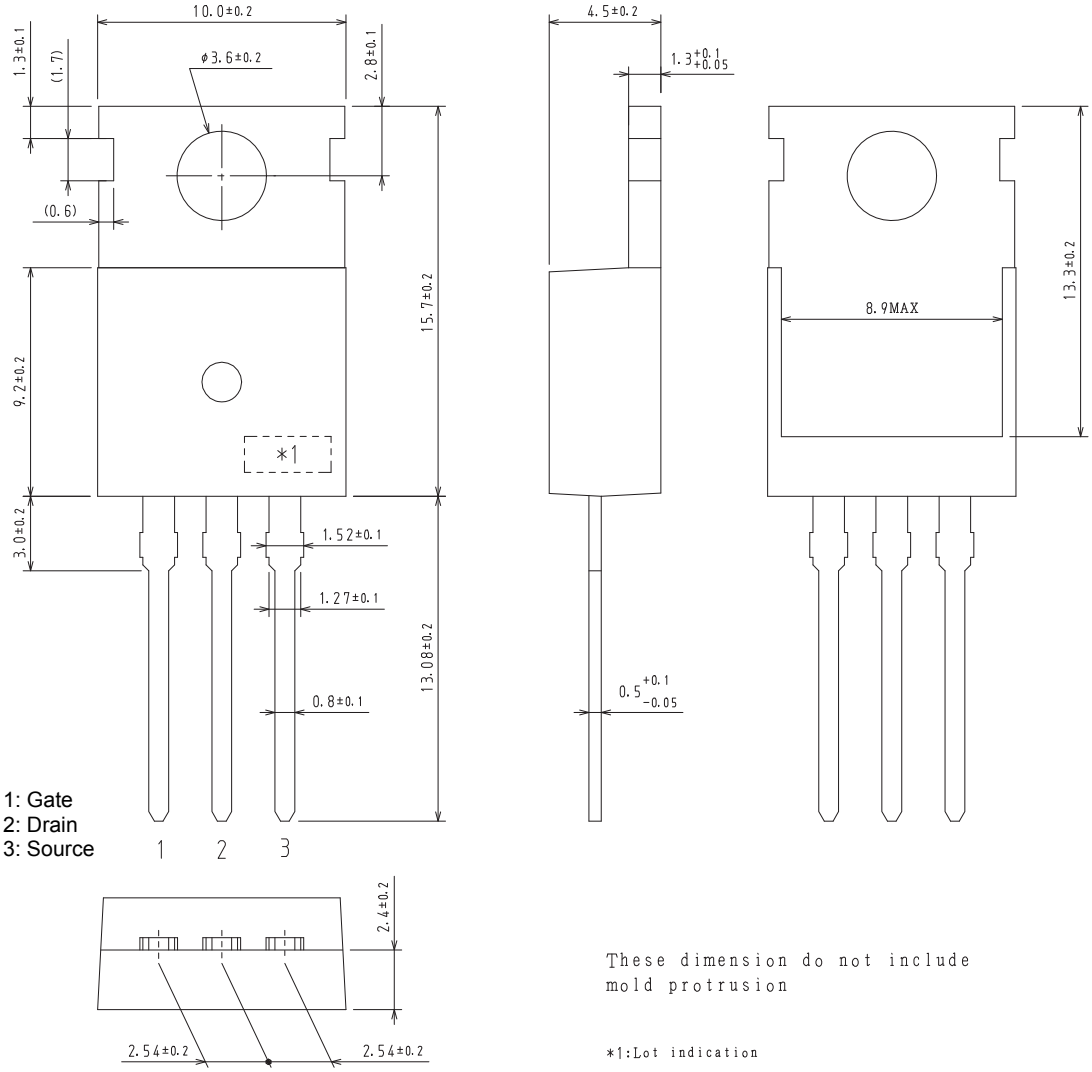
$R_{\theta JC}$ – Pulse Time



Package Dimensions

unit : mm

TO-220, 3-Lead / TO-220-3L
CASE 221AU
ISSUE O



These dimension do not include mold protrusion

*1:Lot indication

ORDERING INFORMATION

Device	Package	Shipping	Note
NDPL180N10BG	TO-220, 3-Lead TO-220-3L	50 pcs. / Tube	Pb-Free

Note on usage : Since the NDPL180N10B is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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