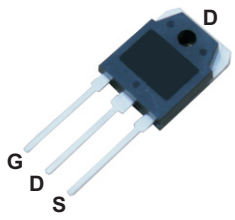
N-Channel Power MOSFET
(75A, 100Volts)

DESCRIPTION

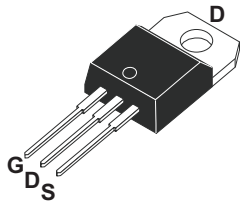
The Nell **75N10** is a three-terminal silicon device with current conduction capability of 75A, fast switching speed, low on-state resistance, breakdown voltage rating of 100V, and max. threshold voltage of 5 volts.

They are designed as an extremely efficient and reliable device for use in a wide variety of applications.

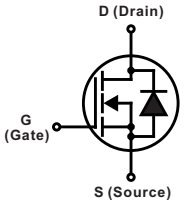
These transistors can be operated directly from integrated circuits.



TO-3PB
(75N10A)



TO-220AB
(75N10B)



FEATURES

- $R_{DS(ON)}$ = 0.025Ω @ V_{GS} = 10V
- Ultra low gate charge(74nC typical)
- Low reverse transfer capacitance (C_{RSS} = 275pF typical)
- Fast switching capability
- 100% avalanche energy specified
- Improved dv/dt capability
- 150°C operation temperature

PRODUCT SUMMARY	
I_D (A)	75
I_D (A), Package Limited	75
V_{DSS} (V)	100
$R_{DS(ON)}$ (Ω)	0.025 @ V_{GS} = 10V
Q_G(nC) typical	74

ABSOLUTE MAXIMUM RATINGS (T_C = 25°C unless otherwise specified)

SYMBOL	PARAMETER	TEST CONDITIONS	VALUE	UNIT
V_{DSS}	Drain to Source voltage	T_J=25°C to 150°C	100	V
V_{DGR}	Drain to Gate voltage	R_{GS}=1MΩ	100	
V_{GS}	Gate to Source voltage		±20	
I_D	Continuous Drain Current	T_C=25°C	75	A
		T_C=100°C	50	
I_{DM}	Pulsed Drain current(Note 1)		200	
I_{AR}	Avalanche current(Note 1)		50	
E_{AR}	Repetitive avalanche energy(Note 1)		30	mJ
E_{AS}	Single pulse avalanche energy(Note 3)	I_{AS}=50A, L=0.8mH	1000	
dv/dt	Peak diode recovery dv/dt(Note 4)		10	V /ns
P_D	Total power dissipation	T_C=25°C	300	W
	Linear derating factor above T_C=25°C		1.90	
T_J	Operation junction temperature		-55 to 150	°C/W °C
T_{STG}	Storage temperature		-55 to 150	
T_L	Maximum soldering temperature, for 10 seconds	1.6mm from case	300	
	Mounting torque, #6-32 or M3 screw		10 (1.1)	lbf·in (N·m)

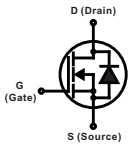
Note: 1.Caluclated continuous current based on maximum allowable junction temperature. Package limitation current is 75A
2.Repetitive rating: pulse width limited by junction temperature.
3.L = 0.8mH, I_{AS} ≤ 50A , R_G = 25Ω,T_J ≤ 150°C.
4.I_{SD} ≤ 50A, di/dt ≤ 100A/μs, V_{DD} ≤ $V_{(BR)DSS}$, T_J = 150°C.

THERMAL RESISTANCE

SYMBOL	PARAMETER		Min.	Typ.	Max.	UNIT
$R_{th(j-c)}$	Thermal resistance, junction to case				0.42	°C/W
$R_{th(j-a)}$	Thermal resistance, junction to ambient	TO-220AB			62	
		TO-3PB			40	

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise specified)

SYMBOL	PARAMETER	TEST CONDITIONS		Min.	Typ.	Max.	UNIT
◎ OFF CHARACTERISTICS							
$V_{(BR)DSS}$	Drain to source breakdown voltage	V_{GS} = 0V, I_D = 250μA		100			V
$V_{(BR)DSS}$/ T_J	Breakdown voltage temperature coefficient	I_D = 1mA, referenced to 25°C			0.105		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=100V, V_{GS}=0V	T_C = 25°C			25	μA
		V_{DS}=80V, V_{GS}=0V	T_C=125°C			250	
I_{GSS}	Gate to source forward leakage current	V_{GS} = 20V, V_{DS} = 0V				100	nA
	Gate to source reverse leakage current	V_{GS} = -20V, V_{DS} = 0V				-100	
◎ ON CHARACTERISTICS							
$R_{DS(ON)}$	Static drain to source on-state resistance	V_{GS} = 10V, I_D = 37.5A (Note 1)			21	25	mΩ
$V_{GS(TH)}$	Gate threshold voltage	V_{GS}=V_{DS}, I_D=250μA		2.5		5.0	V
g_{fS}	Forward transconductance	V_{DS}=10V, I_D=37.5A		20	28		S
◎ DYNAMIC CHARACTERISTICS							
C_{ISS}	Input capacitance	V_{DS} = 25V, V_{GS} = 0V, f =1MHz			2250		pF
C_{OSS}	Output capacitance				890		
C_{RSS}	Reverse transfer capacitance				275		
◎ SWITCHING CHARACTERISTICS							
$t_{d(ON)}$	Turn-on delay time	V_{DD} = 50V, I_D = 75A,R_G = 10Ω, V_{GS} = 10V(Note 1)			27		ns
t_r	Rise time				53		
$t_{d(OFF)}$	Turn-off delay time				66		
t_f	Fall time				45		
Q_G	Total gate charge	V_{DS} = 50V, V_{GS} = 10V, I_D = 37.5A			74		nC
Q_{GS}	Gate to source charge				18		
Q_{GD}	Gate to drain charge (Miller charge)				40		
L_D	Internal drain inductance	Between lead, 6mm from package and center of die			4.5		μH
L_S	Internal source inductance				7.5		

SOURCE TO DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25°C unless otherwise specified)						
SYMBOL	**PARAMETER**	**TEST CONDITIONS**	**Min.**	**Typ.**	**Max.**	**UNIT**
V_{SD}	Diode forward voltage	I_{SD} = 75A, V_{GS} = 0V			1.5	V
$I_S(I_{SD})$	Continuous source to drain current	Integral reverse P-N junction diode in the MOSFET 			75	A
I_{SM}	Pulsed source current				200	
t_{rr}	Reverse recovery time	I_{SD} = 75A, V_{GS} = 0V, dI_F/dt = 100A/μs		120		ns
Q_{rr}	Reverse recovery charge			1.4		μC
t_{ON}	Forward turn-on time	Intrinsic turn-on time is negligible (turn-on is domonated by LS+LD)				

Note: 1. Pulse test: Pulse width ≤ 400μs, duty cycle ≤ 2%.

ORDERING INFORMATION SCHEME

75 N 10 A

Current rating, I_D

75 = 75A

MOSFET series

N = N-Channel

Voltage rating, V_{DS}

10 = 100V

Package type

A = TO-220AB
B = TO-3PB

Fig.1 Output characteristics

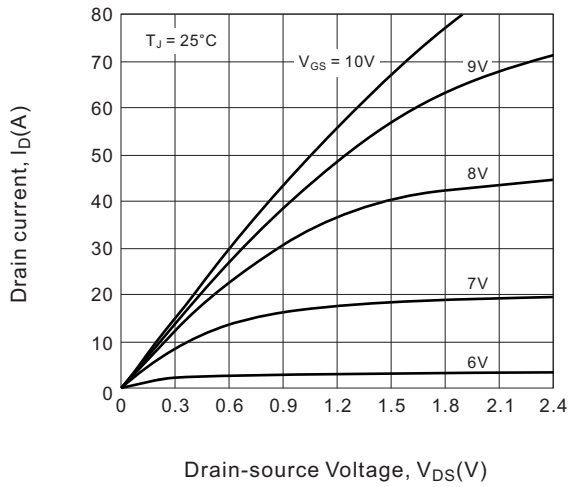


Fig.2 Extended output characteristics

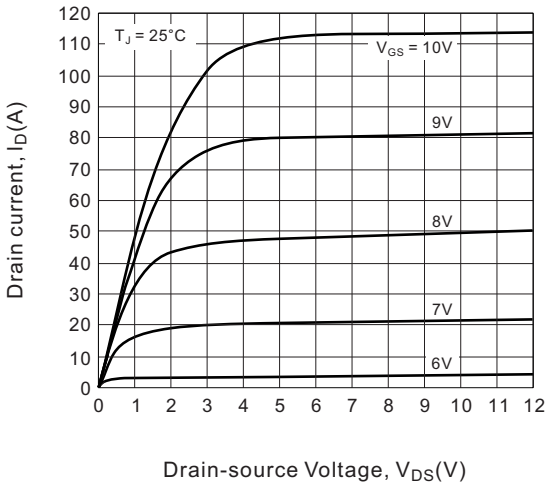


Fig.3 Output characteristics

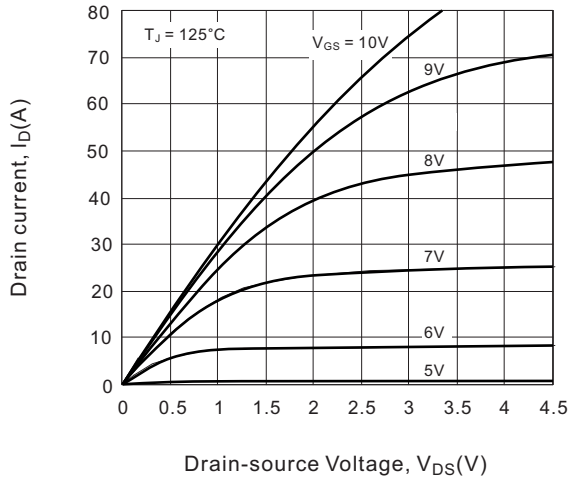


Fig.4 $R_{DS(on)}$ Normalized to 0.5 I_D value vs. Junction temperature

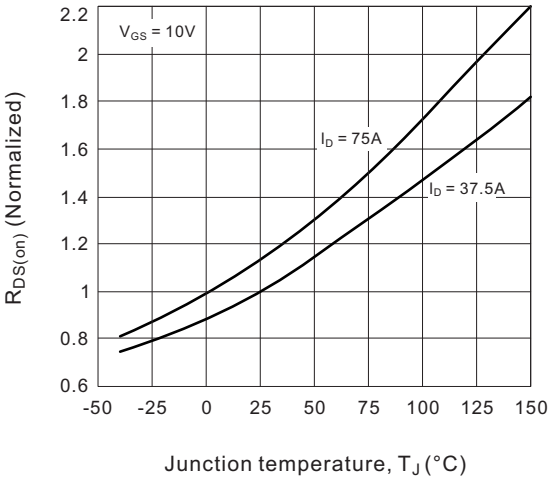


Fig.5 $R_{DS(on)}$ Normalized to 0.5 I_D value vs. Drain current

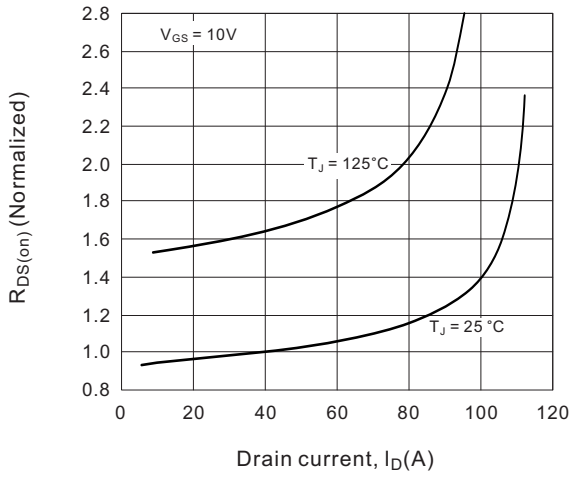


Fig.6 Maximum drain current vs. Case temperature

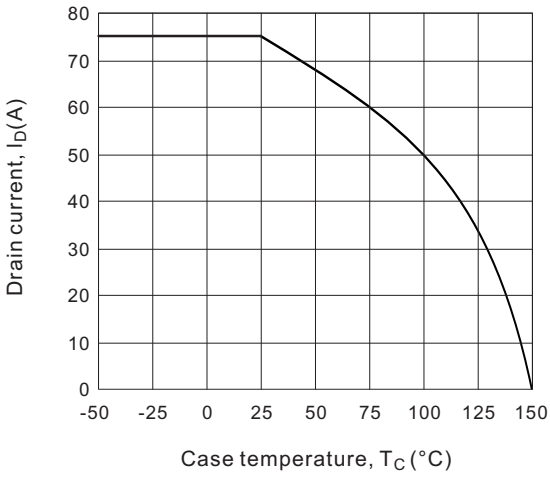


Fig.7 Typical transfer characteristics

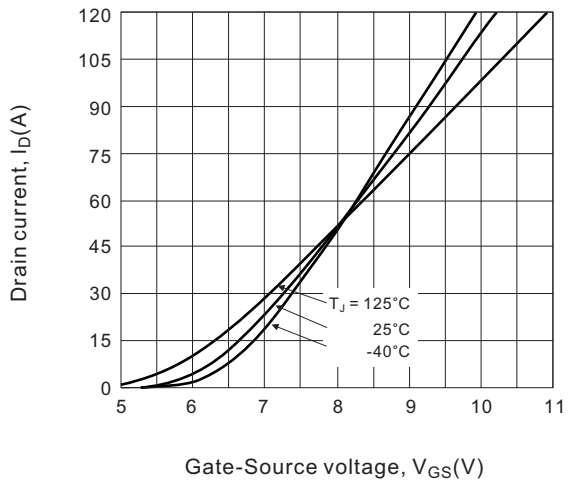


Fig.8 Forward transconductance

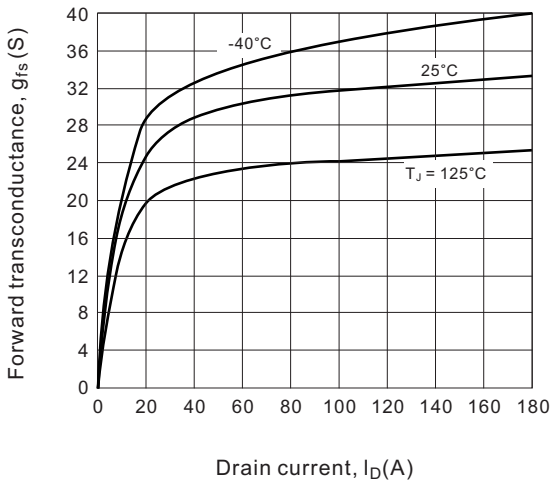


Fig.9 Typical source to drain diode forward voltage

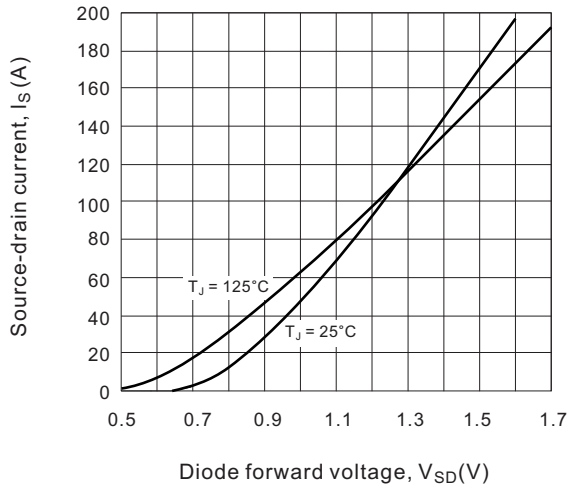


Fig.10 Gate charge characteristics

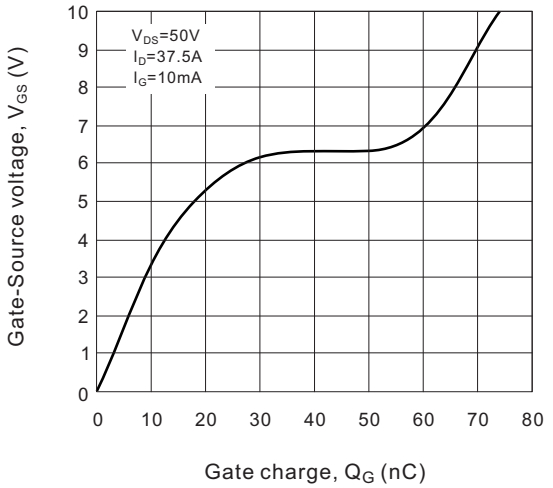


Fig.11 Typical capacitance vs. drain-Source voltage

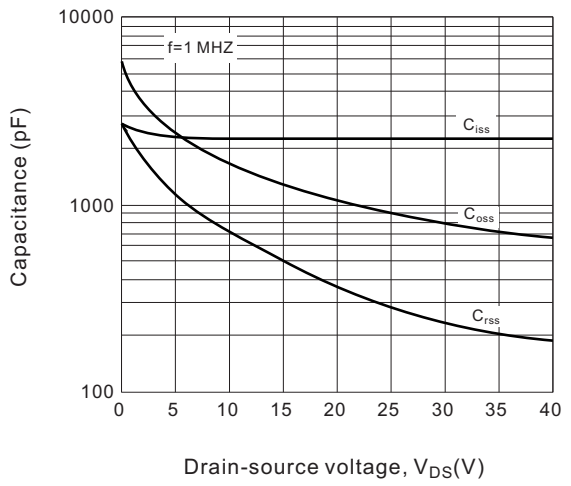


Fig.12 Maximum safe operating area

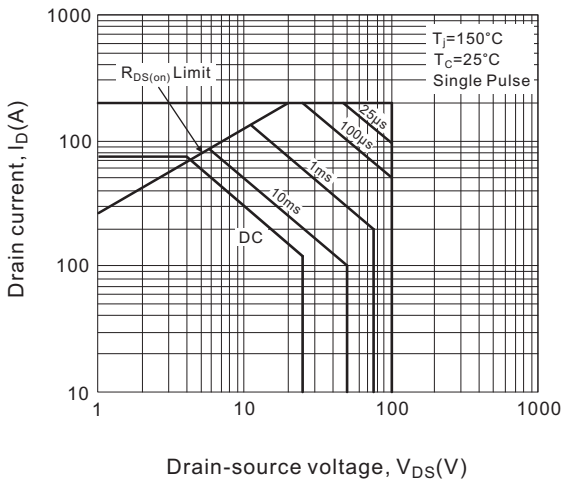


Fig.13 Maximum transient thermal Resistance

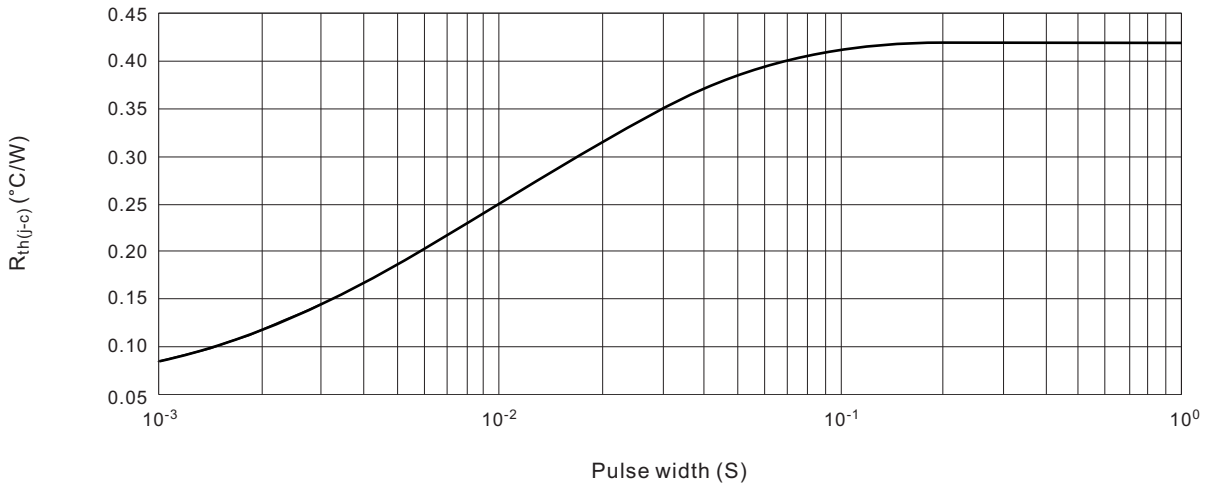


Fig.14a. Switching time test circuit

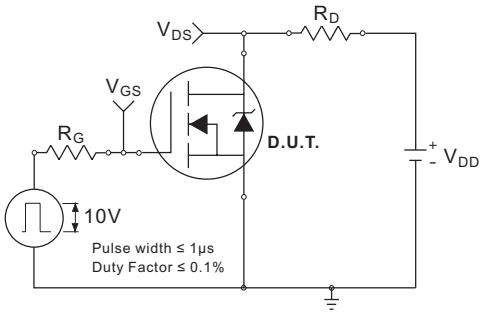


Fig.14b. Switching time waveforms

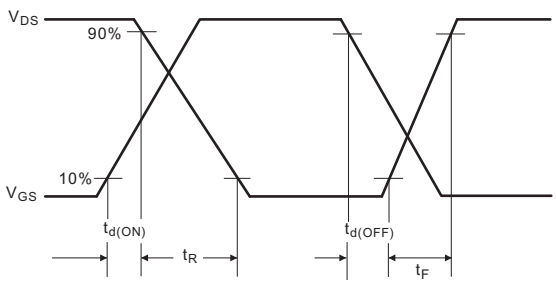


Fig.15a. Unclamped Inductive test circuit

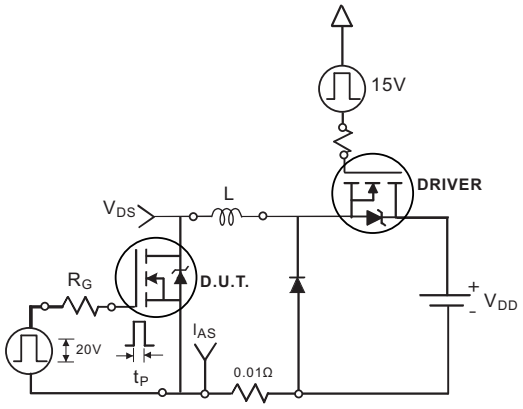


Fig.15b. Unclamped Inductive waveforms

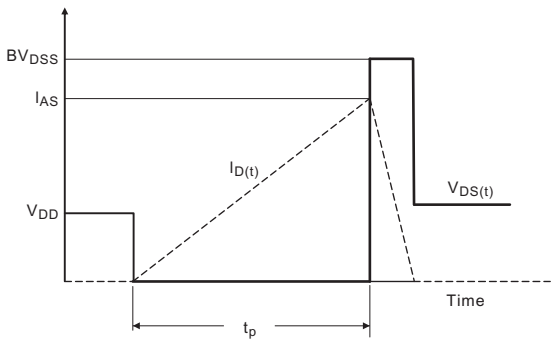


Fig.16a. Basic gate charge waveform

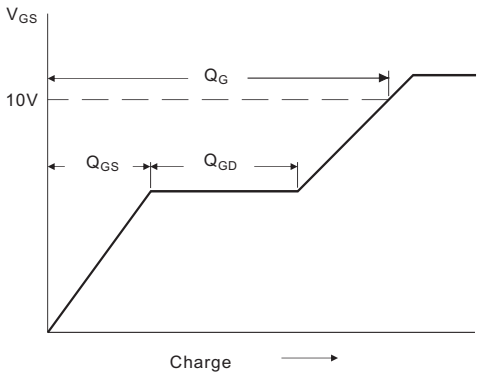


Fig.16b. Gate charge test circuit

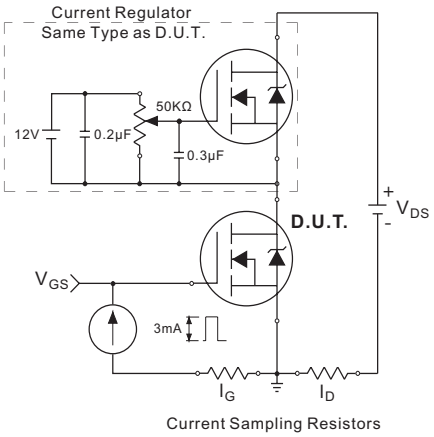
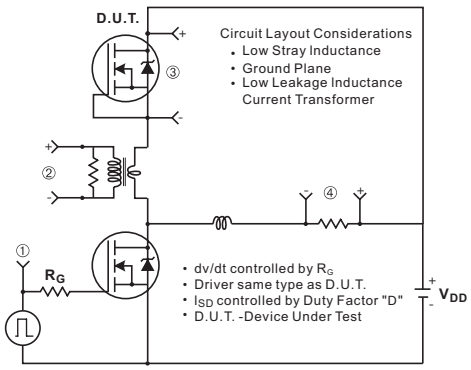
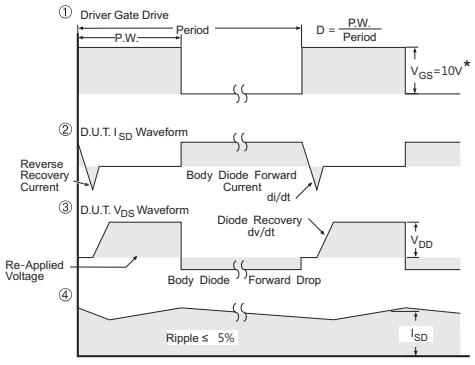


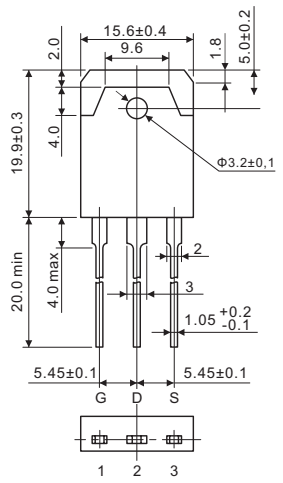
Fig.17 Peak diode recovery dv/dt test circuit for N-Channel MOSFET

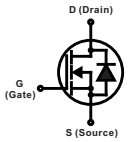




*VGS = 5V for Logic Level Devices

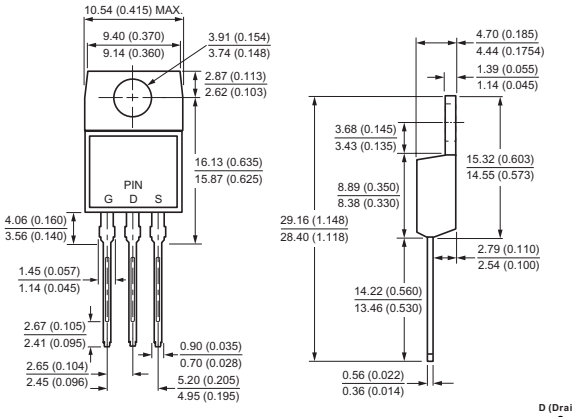
TO-3PB

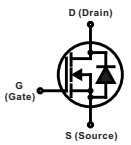




All dimensions in millimeters(inches)

TO-220AB





All dimensions in millimeters(inches)