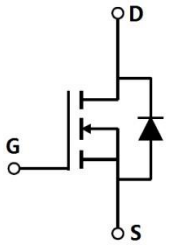
APJ15N70F

650V N-SJ Enhancement Mode MOSFET

General Description

APJ15N70F use advanced Super juction MOS technology to provide low $R_{DS(ON)}$, low gate charge, fast switching and excellent avalanche characteristics. This device offers extremely fast and robust body diode, and is suitable for telecom and power supplies.



Features

Low RDS(on) & FOM

Extremely low switching loss

Excellent stability and uniformity

Easy to drive

Applications

Lighting

Server power supply

Telecom

Solar invertor

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
APJ15N70F	TO-220F-3L	APJ15N70F XXX YYYY	1000

Absolute Maximum Ratings at T_j=25℃ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain source voltage	V_{DS}	700	V
Gate source voltage	V_{GS}	±30	V
Continuous drain current[1], T_C=25 ℃	I_D	15	A
Continuous drain current[1], T_C=100 ℃		11	
Pulsed drain current[2], T_C=25 ℃	$I_{D,pulse}$	54	A
Power dissipation[3] for TO220, TO262, TO263, TO247, T_C=25 ℃	P_D	151	W
Power dissipation[3] for TO220F , T_C=25 ℃		34	
Single pulsed avalanche energy[5]	E_{AS}	272	mJ
MOSFET dv/dt ruggedness, V_{DS}=0…480 V	dv/dt	100	V/ns
Reverse diode dv/dt, V_{DS}=0…480 V, I_{SD}≤I_D	dv/dt	50	V/ns
Operation and storage temperature	T_{stg}, T_j	-55 to 150	℃

Thermal resistance, junction-case	$R_{\theta JC}$	3.68	℃/W
Thermal resistance, junction-ambient[4)]	$R_{\theta JA}$	62.5	℃/W

Electrical Characteristics at T_j=25 ℃ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-source breakdown voltage	BV_{DSS}	650			V	V_{GS}=0 V, I_D=250 μA
		700	770			V_{GS}=0 V, I_D=250 μA, T_j=150 ℃
Gate threshold voltage	$V_{GS(th)}$	3.5		4.5	V	V_{DS}=V_{GS}, I_D=250 μA
Drain-source on-state resistance	$R_{DS(ON)}$		0.18	0.22	Ω	V_{GS}=10 V, I_D=9 A
			0.45			V_{GS}=10 V, I_D=9 A, T_j=150 ℃
Gate-source leakage current	I_{GSS}			100	nA	V_{GS}=30 V
				-100		V_{GS}=-30 V
Drain-source leakage current	I_{DSS}			10	μA	V_{DS}=650 V, V_{GS}=0 V
Input capacitance	C_{iss}		1493		pF	V_{GS}=0 V, V_{DS}=50 V, f=1 MHz
Output capacitance	C_{oss}		101		pF	
Reverse transfer capacitance	C_{rss}		2.05		pF	
Turn-on delay time	$t_{d(on)}$		45.28		ns	V_{GS}=10 V, V_{DS}=400 V, R_G=20 Ω, I_D=18 A
Rise time	t_r		82.64		ns	
Turn-off delay time	$t_{d(off)}$		42.20		ns	
Fall time	t_f		32.56		ns	
Total gate charge	Q_g		21.7		nC	I_D=18 A, V_{DS}=400 V, V_{GS}=10 V
Gate-source charge	Q_{gs}		8.04		nC	
Gate-drain charge	Q_{gd}		7.4		nC	
Gate plateau voltage	$V_{plateau}$		7.2		V	
Diode forward current	I_S			18	A	V_{GS}<V_{th}
Pulsed source current	I_{SP}			54		
Diode forward voltage	V_{SD}			1.2	V	I_S=18 A, V_{GS}=0 V
Reverse recovery time	t_{rr}		143.3		ns	V_R=400V, I_S=18 A, di/dt=100 A/μs
Reverse recovery charge	Q_{rr}		767		nC	
Peak reverse recovery current	I_{rrm}		10.7		A	

1) Calculated continuous current based on maximum allowable junction temperature.
2) Repetitive rating, pulse width limited by max. junction temperature.
3) Pd is based on max. junction temperature, using junction-case thermal resistance.
4) The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 ℃.
5) V_{DD}=100 V, R_G=25 Ω, L=10 mH, starting T_j=25 ℃.

Electrical Characteristics Diagrams

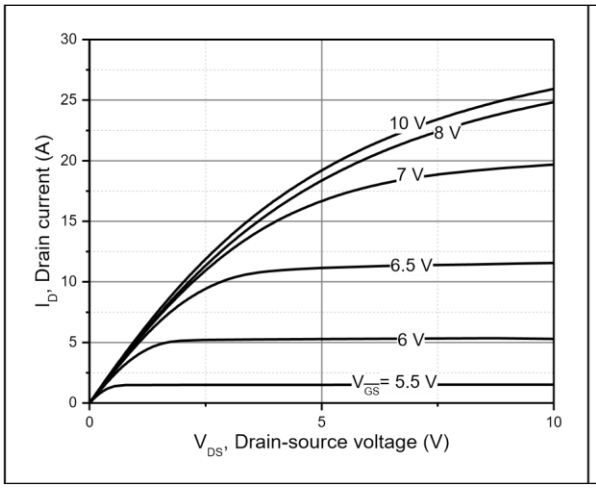


Figure 1, Typ. output characteristics

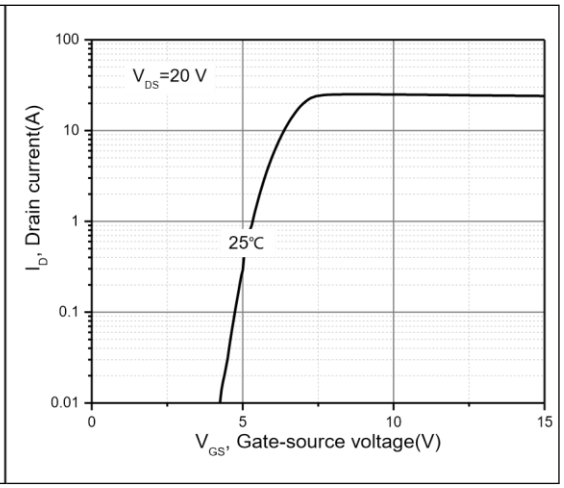


Figure 2, Typ. transfer characteristics

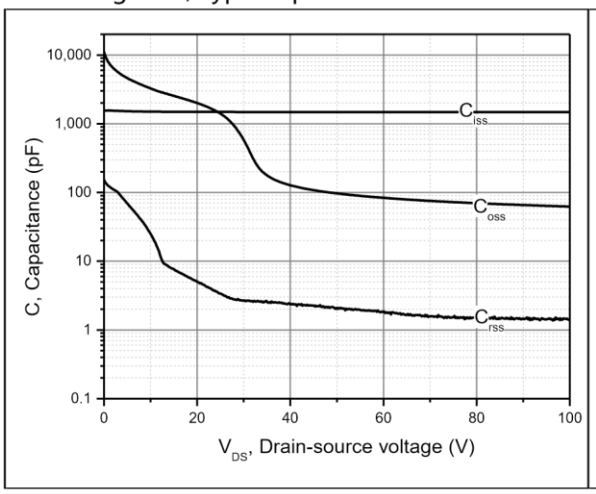


Figure 3, Typ. capacitances

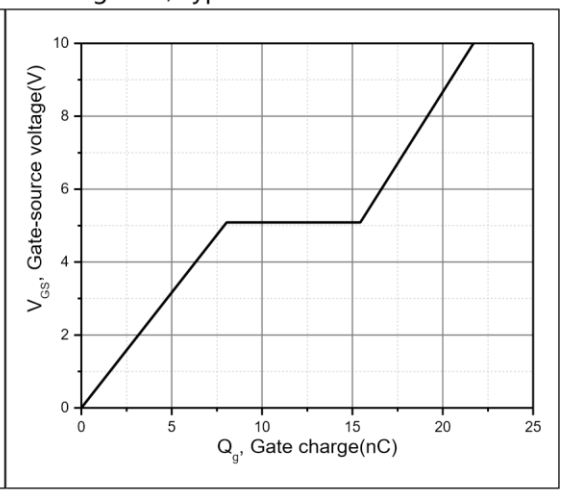


Figure 4, Typ. gate charge

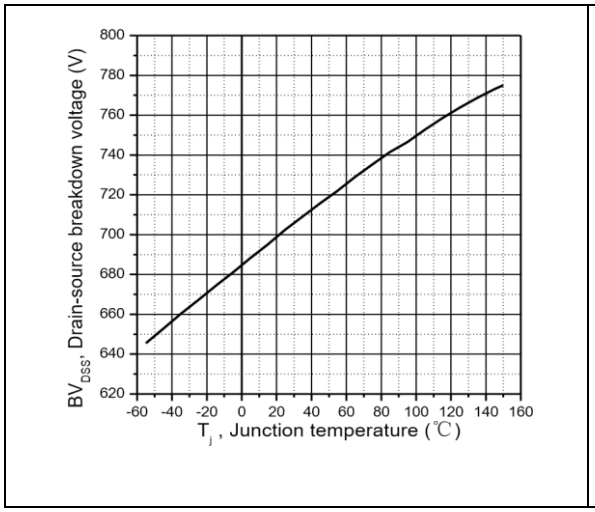


Figure 5, Drain-source breakdown voltage

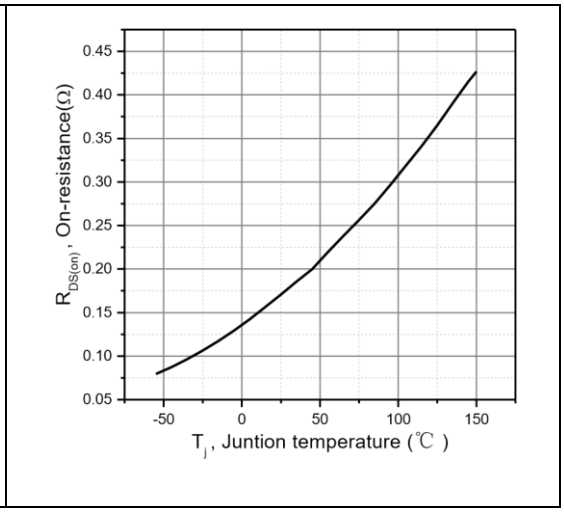


Figure 6, Drain-source on-state resistance

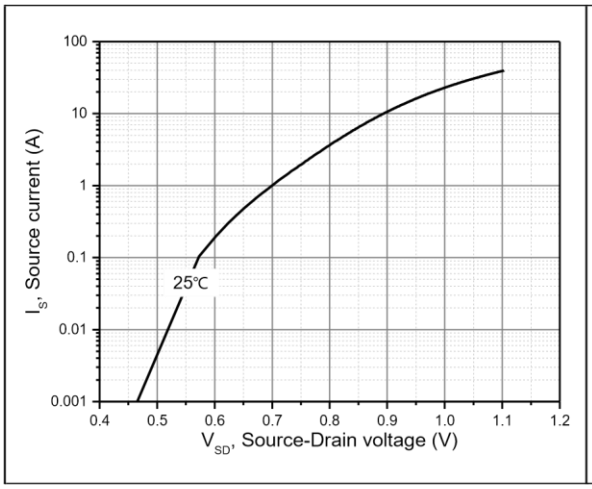


Figure 7, Forward characteristic of body diode

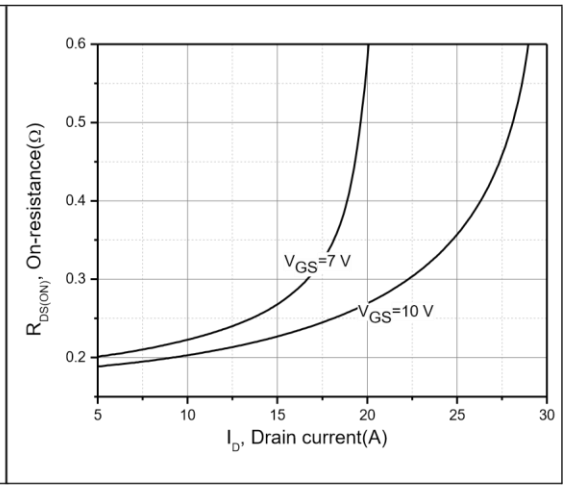


Figure 8, Drain-source on-state resistance

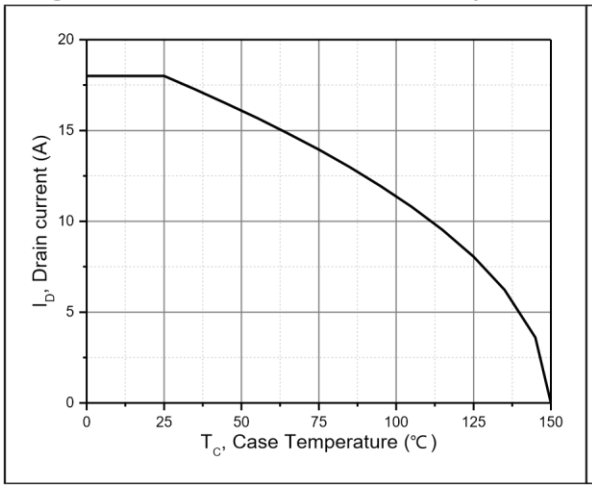


Figure 9, Drain current

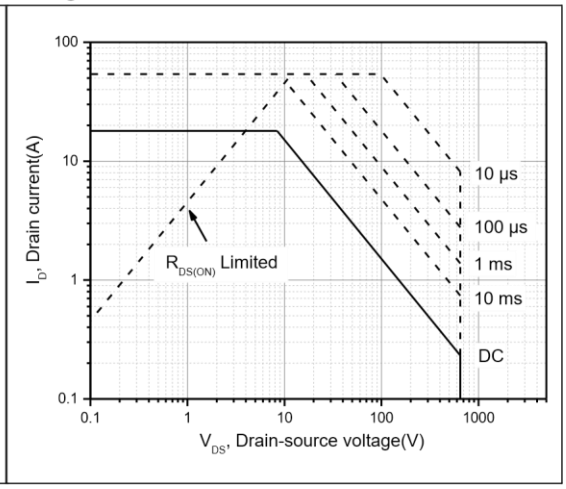


Figure 10, Safe operation area for TO220/TO262/TO263/TO247 T_C=25 ℃

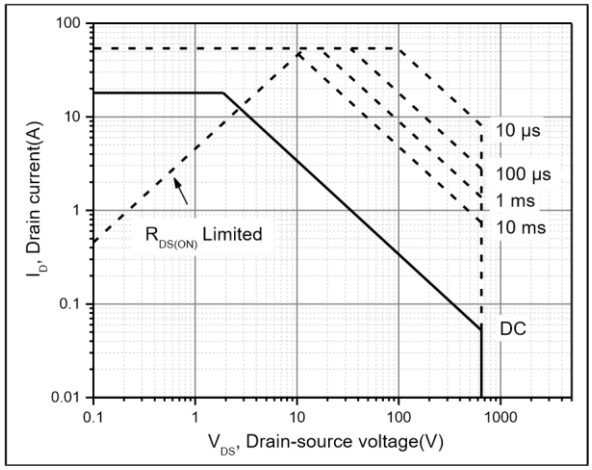


Figure 11, Safe operation area for TO220F T_C=25 ℃

Test circuits and waveforms

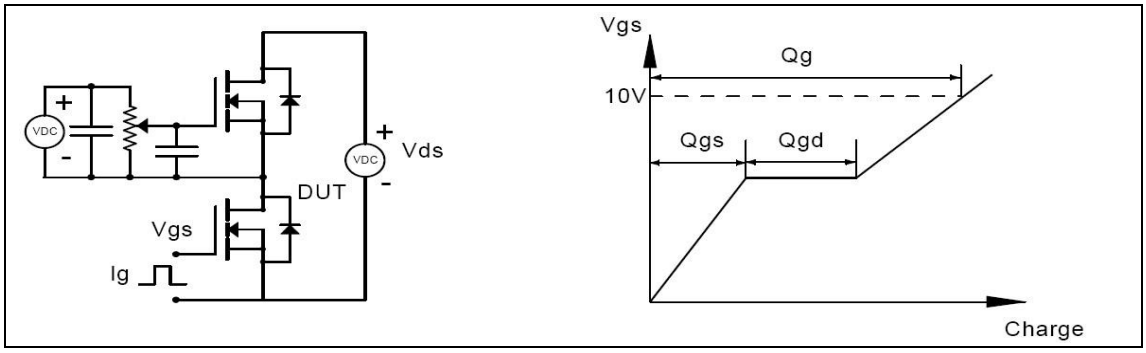


Figure 1, Gate charge test circuit & waveform

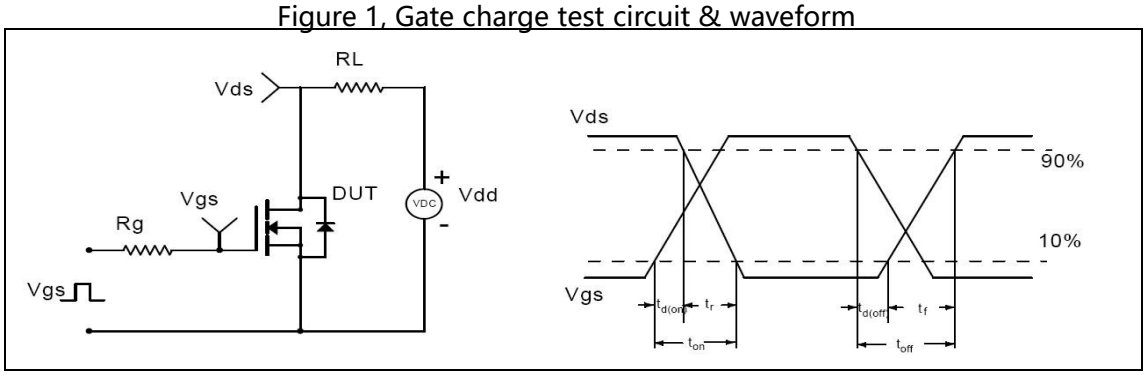


Figure 2, Switching time test circuit & waveforms

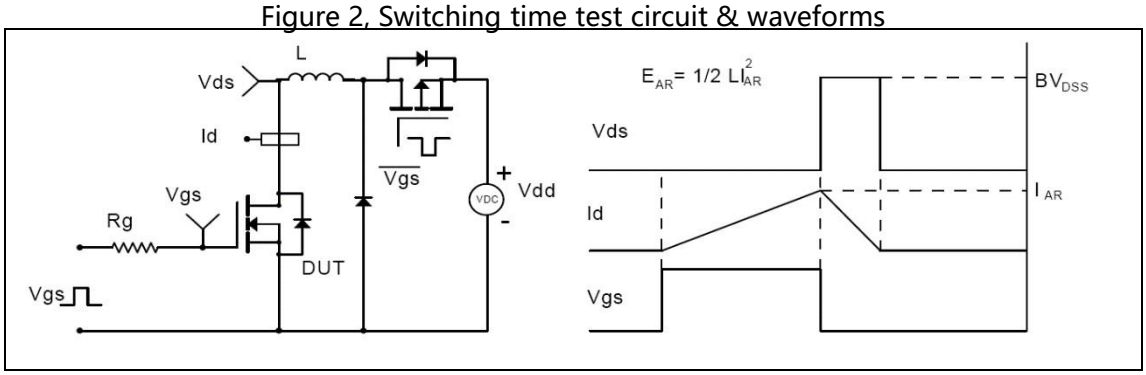


Figure 3, Unclamped inductive switching (UIS) test circuit & waveforms

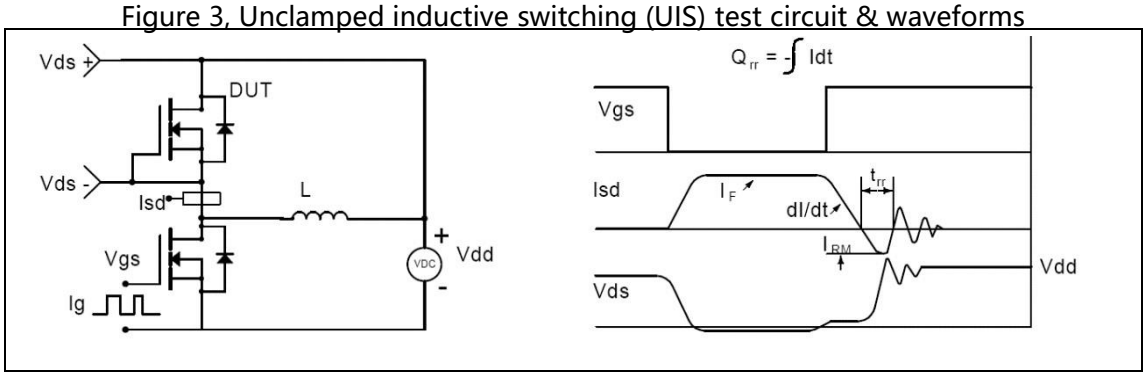
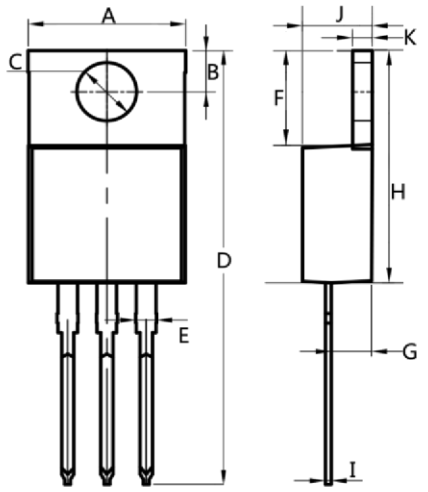


Figure 4, Diode reverse recovery test circuit & waveforms

APJ15N70F

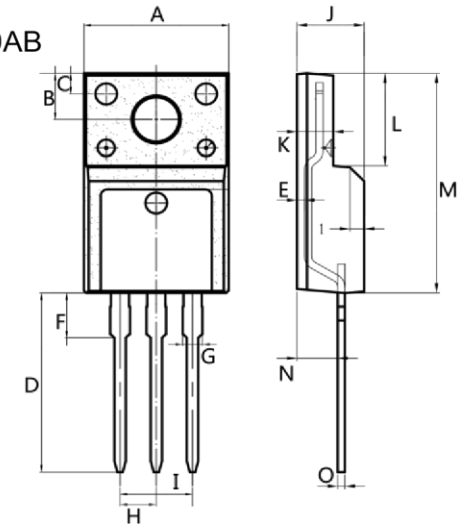
650V N-SJ Enhancement Mode MOSFET

TO-220AB



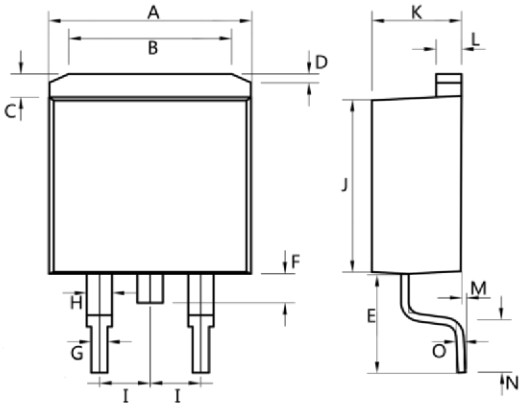
Dim.	Min.	Max.
A	10.0	10.4
B	2.5	3.0
C	3.5	4.0
D	28.0	30.0
E	1.1	1.5
F	6.2	6.6
G	2.9	3.3
H	15.0	16.0
I	0.35	0.45
J	4.3	4.7
K	1.2	1.4
All Dimensions in millimeter		

ITO-220AB



Dim.	Min.	Max.
A	9.9	10.3
B	2.9	3.5
C	1.15	1.45
D	12.75	13.25
E	0.55	0.75
F	3.1	3.5
G	1.25	1.45
H	Typ 2.54	
I	Typ 5.08	
J	4.55	4.75
K	2.4	2. 7
L	6.35	6.75
M	15.0	16.0
N	2.75	3.15
O	0.45	0.60
All Dimensions in millimeter		

TO-263



Dim.	Min.	Max.
A	10.0	10. 5
B	7.25	7.75
C	1.3	1.5
D	0.55	0.75
E	5.0	6.0
F	1.4	1.6
G	0.75	0.95
H	1.15	1.35
I	Typ 2.54	
J	8.4	8.6
K	4.4	4.6
L	1.25	1.45
M	0.02	0.1
N	2.4	2.8
O	0.35	0.45
All Dimensions in millimeter		