



650, 12A, 0.65Ω N-Channel MOSFETs

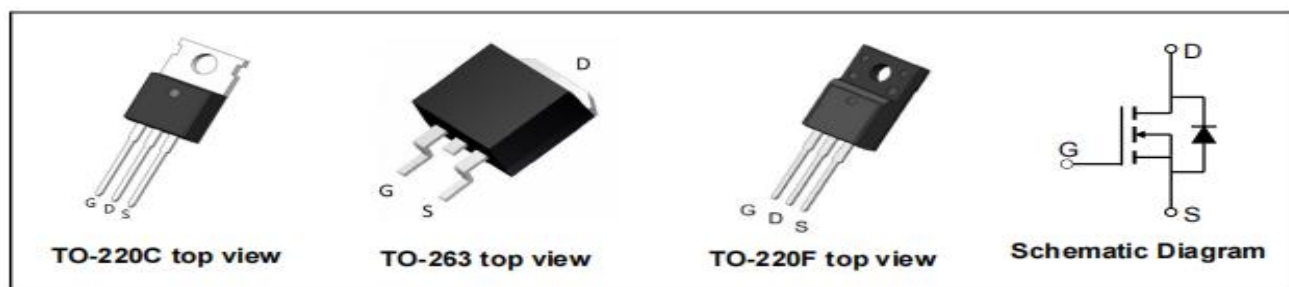
Features

- Low Gate Charge
- Excellent $R_{DS(ON)}$
- Great current Capability
- Green product RoHS compliant

Product Summary

RoHS

V_{DS}	650	V
$V_{GS(th_Typ)}$	2.9	V
$R_{DS(ON_Typ)} (@ V_{GS} = 10V)$	0.65	Ω
$I_D (at V_{GS} = 10V)^{(1)}$	12	A



Type	Package	Marking	Outline	Media	Quantity(pcs)
10N65	TO-220C	-	-	Tube	50
10N65	TO-263	-	Tape	13"Reel	800
10N65	TO-220F	-	-	Tube	50

Absolute Maximum Ratings($T_J=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	SDM4N65AC/ Y	SDM4N65AF	Unit
Drain-Source Voltage	V_{DS}	650		V
Gate-Source Voltage	V_{GS}	± 30		V
Continuous Drain Current ⁽¹⁾	$T_C=25^{\circ}C$	12	12*	A
	$T_C=100^{\circ}C$	7.5	7.5*	A
Pulsed Drain Current ⁽²⁾	I_{DM}	48		A
Avalanche Energy ⁽³⁾	E_{AS}	499		mJ
Power Dissipation ⁽⁴⁾	$T_C=25^{\circ}C$	313	62.5	W
	$T_C=100^{\circ}C$	125	25	
Body-Diode Continuous Current	I_S	12		A
Avalanche Current ⁽³⁾	I_{AS}	10		A
Junction and Storage Temperature Range	T_{STG}, T_J	-55 to 150		$^{\circ}C$
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	55	54	$^{\circ}C/W$
Thermal Resistance Junction-Case	$R_{\theta JC}$	0.4	2.0	$^{\circ}C/W$



Electrical Characteristics($T_J=25^{\circ}\text{C}$ unless otherwise noted)

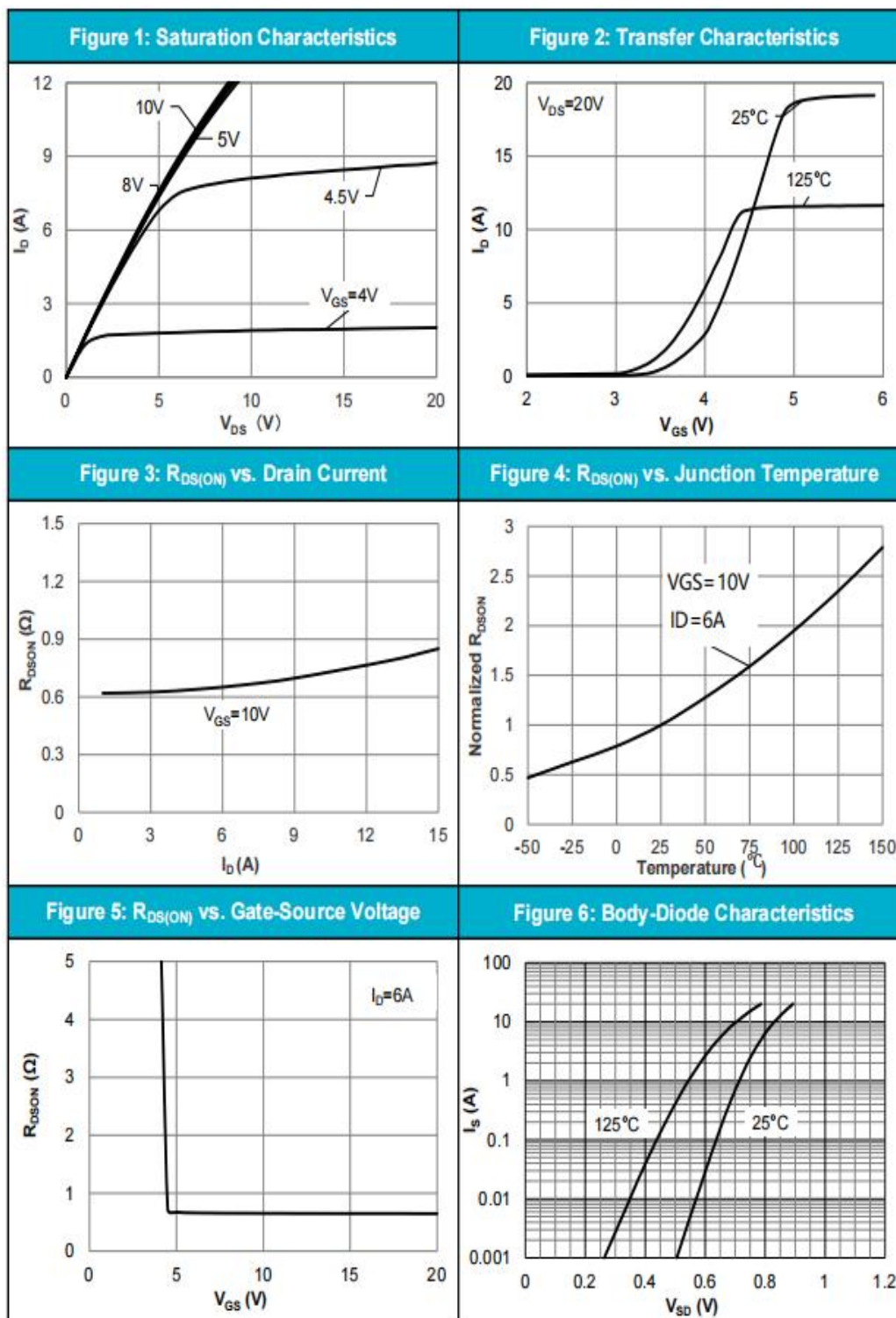
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	650	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	-	-	1	μA
		$V_{DS}=650V, V_{GS}=0V, T_J=55^{\circ}\text{C}$	-	-	5	
Gate Body Leakage Current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	2.9	4	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=6A$	-	0.65	0.8	Ω
Forward Trans conductance ⁴	g_{fs}	$V_{DS}=5V, I_D=6A$	-	9	-	S
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=25V, f=1.0\text{MHz}$	-	2124	-	pF
Output Capacitance	C_{oss}		-	149	-	
Reverse Transfer Capacitance	C_{rss}		-	9	-	
Gate Resistance	R_g	$V_{GS}=0V, V_{DS}=0V, f=1.0\text{MHz}$	-	1.3	-	Ω
Total Gate Charge	Q_g	$V_{DS}=520V, I_D=10A, V_{GS}=10V$	-	42	-	nC
Gate-Source Charge	Q_{gs}		-	11	-	
Gate-Drain Charge	Q_{gd}		-	13	-	
Turn-on Delay Time	$T_{d(on)}$	$R_G=25\Omega, V_{DS}=325V, I_D=12A$	-	33	-	nS
Turn-on Rise Time	t_r		-	29	-	
Turn-Off Delay Time	$T_{d(off)}$		-	63	-	
Turn-Off Fall Time	T_f		-	49	-	
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=12A$	-	0.8	1.2	V
Body Diode Reverse Recovery Time	T_{rr}	$V_R=400V, I_F=12A, di/dt=100A/\mu s$	-	871	-	Ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	9.7	-	μC

Note :

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous depends on the thermal & electro mechanical application board design.
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
3. This single-pulse measurement was taken under the following condition [$L=10\text{mH}, V_{GS}=10V, V_{DS}=50V$] while its value is limited by $T_{J_Max}=150^{\circ}\text{C}$.
4. The power dissipation P_D is based on $T_{J_Max}=150^{\circ}\text{C}$.
5. This value is guaranteed by design hence it is not included in the production test.

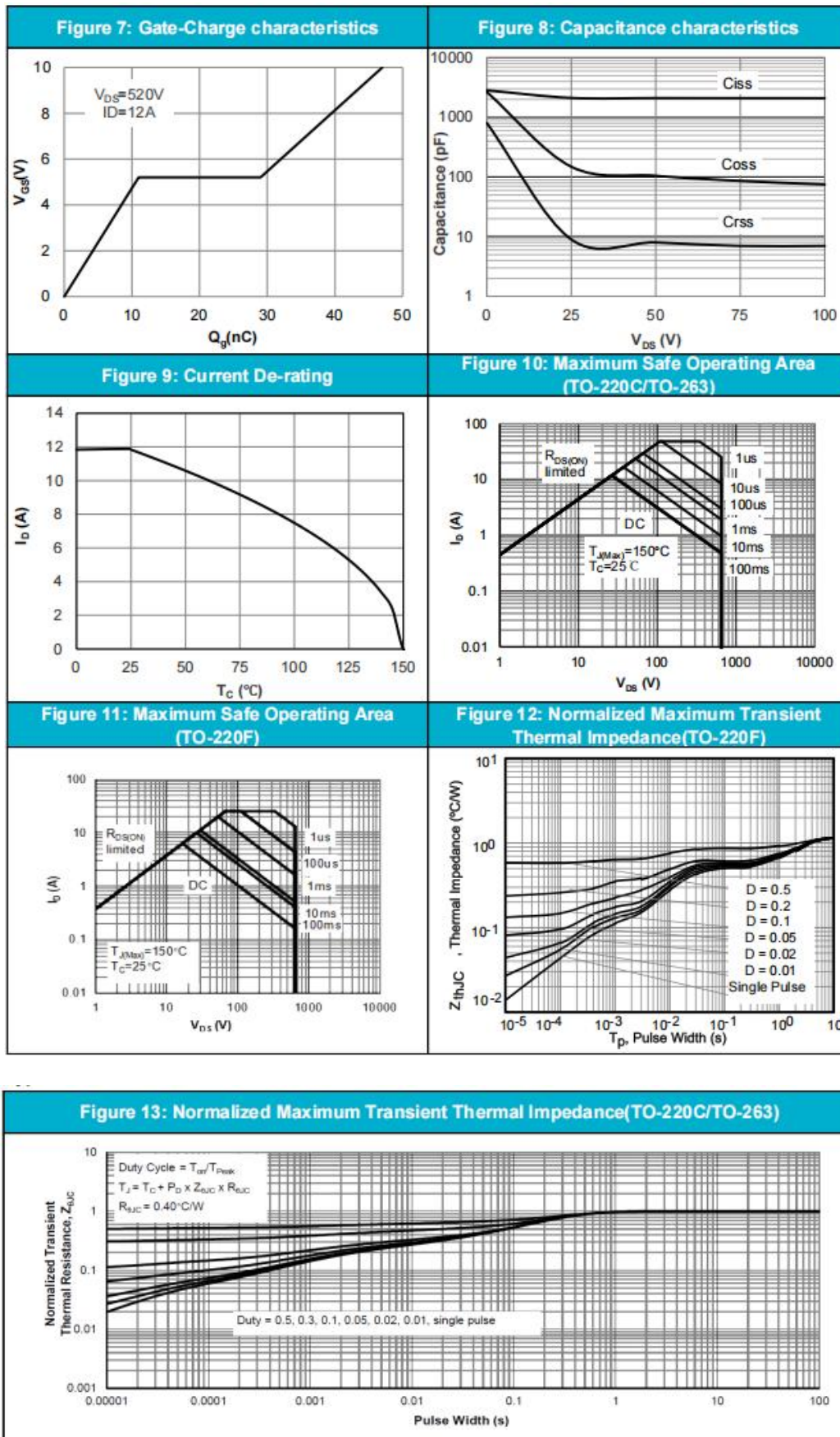


Typical Electrical and Thermal Characteristics



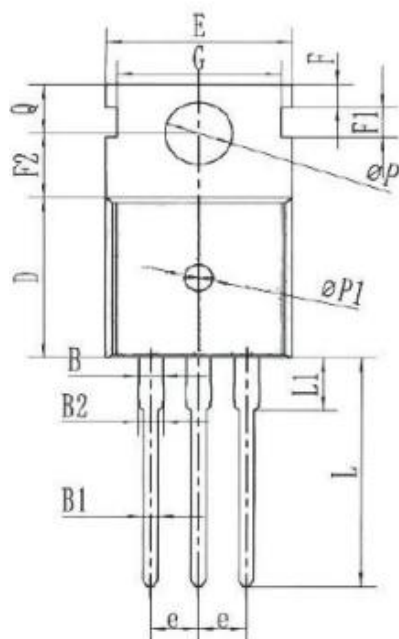


Typical Electrical and Thermal Characteristics

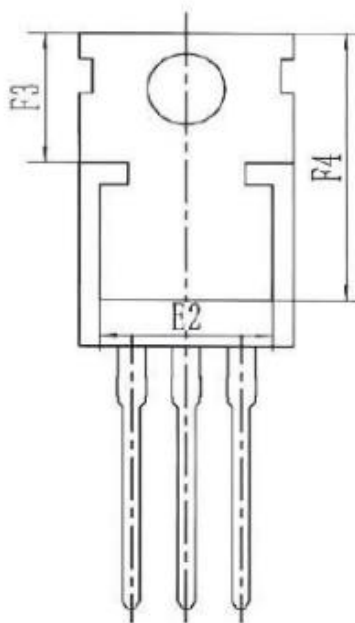




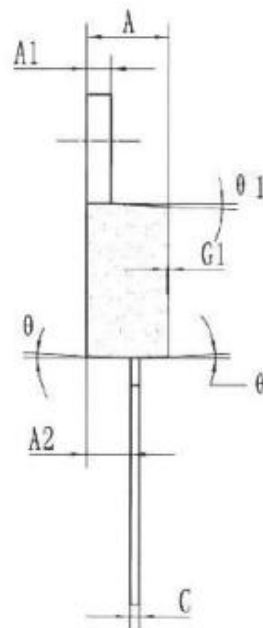
TO-220C Package Information



TOP VIEW



BOTTOM VIEW

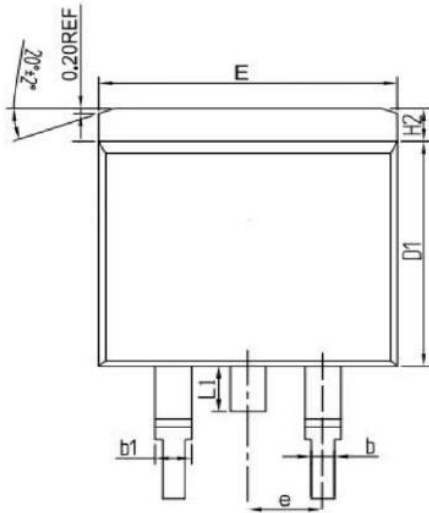


SIDE VIEW

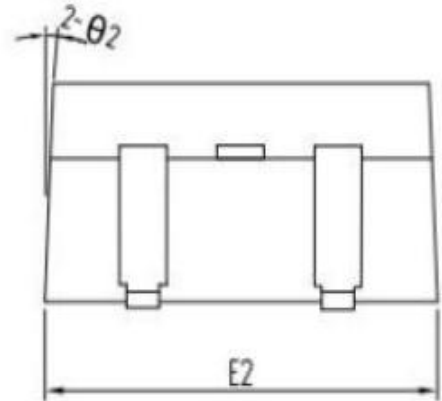
SYMBOL	MILLIMETER		
	MIN	TYP.	MAX
A	4.40	4.50	4.60
A1	1.25	1.30	1.35
A2	2.30	2.40	2.50
B	1.22	1.27	1.32
B1	0.70	0.80	0.90
B2	1.32	1.37	1.42
C	0.45	0.50	0.55
D	9.10	9.20	9.30
E	9.70	9.90	10.1
E1	9.90	10.00	10.10
E2	7.80	8.00	8.20
e	2.54 BSC		
F	1.22	1.30	1.38
F1	1.60	1.70	1.80
F2	3.60	3.70	3.80
F3	6.30	6.50	6.70
F4	13.10	13.40	13.70
G	8.60	8.70	8.80
G1	0.05	0.10	0.15
L	12.80	13.10	13.40
L1	2.80	3.00	3.20
phi P	3.50	3.60	3.70
Q	2.70	2.80	2.90



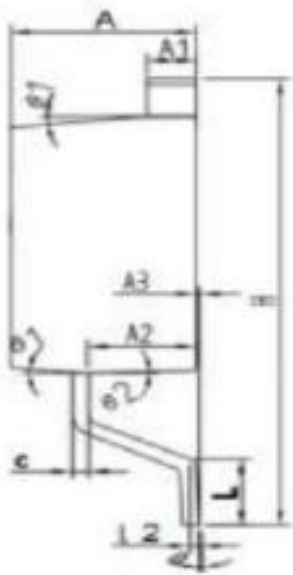
TO-263 Package Information



TOP VIEW



SIDE VIEW

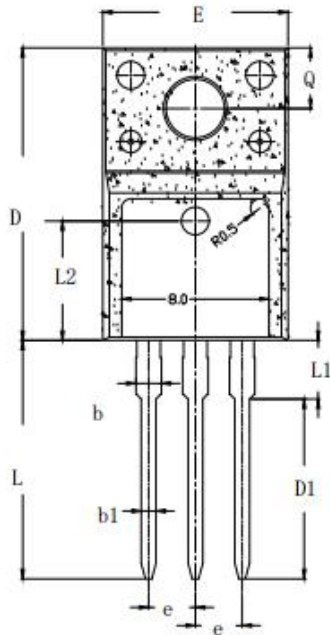


SIDE VIEW

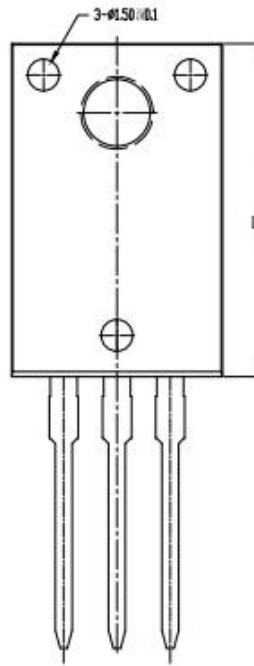
SYMBOL	MILLIMETER		
	MIN	TYP.	MAX
A	4.40	4.57	4.70
A1	1.22	1.27	1.32
A3	0.00	-	0.10
b	0.74	0.78	0.87
c	0.34	0.38	0.47
E	9.93	10.03	10.13
e	2.54BSC		
H	14.7	15.1	15.5
L	2.00	2.3	2.6



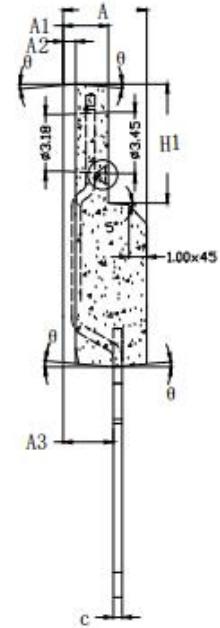
TO-220F Package Information



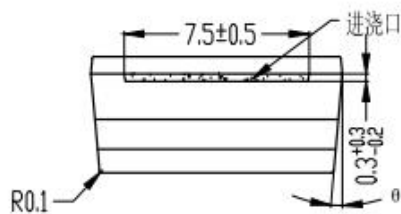
TOP VIEW



BOTTOM VIEW



SIDE VIEW



SIDE VIEW

SYMBOL	MILLIMETER		
	MIN	TYP.	MAX
A	4.60	4.70	4.80
A1	2.39	2.54	2.69
A2	0.60	0.70	0.80
A3	2.81	2.82	2.83
b	1.61	1.62	1.63
b1	-	0.80	-
c	-	0.50	-
D	15.72	15.87	16.02
D1	-	9.75	-
E	9.91	10.06	10.21
e	2.54 BSC		
H1	6.67	6.68	6.69
L	12.90	12.93	12.96
L1	-	3.18	-
L2	6.47 REF		
Q	-	3.30	-
Ø1	1°	3°	5°