快捷芯
KUAIJIEXIN

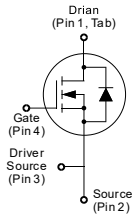
KJSC20R120P4

Silicon Carbide Power Mosfet

1. Product Information

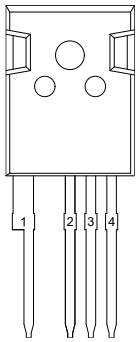
Features

- 1200 V, 20 mΩ, 89 A, SiC MOS
- High speed switching with low R_G and low capacitances
- High blocking voltage with low $R_{DS(ON)}$
- Flexible gate voltage range (V_{GS}=15V to 18V)
- Low reverse recovery diode (Qrr)



Applications

- EV chargers
- Solar inverters
- Switch mode power supplies
- Motor Drives
- DC/AC inverters
- High voltage DC/DC converters



TO247-4L

Package Marking and Ordering Information

Product Name	Package	Marking	Form	Quantity (pcs)
KJSC20R120P4	TO247-4L	KJSC20R120P4	Tube	600

2. Absolute Maximum Ratings (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Values	Unit
V_{DS}	Drain-Source Voltage	1200	V
I_D	Continuous Drain Current, T_C=25℃	89	A
	Continuous Drain Current, T_C=100℃	63	A
I_{DM}	Peak Drain Current, Pulse width t_p limited by T_{jmax}	200	A
$V_{GS, max}$	Gate-Source Voltage (Maximum)	-8/+20	V
$V_{GS, OP, TRANS}$	Gate-Source Voltage (Max Transient, t_{pulse}<1 μs, f >1Hz)	-8/+22	V
$V_{GS, OP}$	Gate-Source Voltage (Recommended Operating)	-5/+18	V
P_D	Power Dissipation	348	W
E_{AS}	Single Pulsed Avalanche Energy, L=5 mH, I_{AS}=22 A, R_G=10 Ω	1210	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 to 175	℃
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.43	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	40	℃/W

3. Electrical Characteristics (T_J=25℃, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Type	Max	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0 V, I_D=250 μA	1200	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=1200 V, V_{GS}=0 V	-	-	100	μA
I_{GSS}	Gate-Source Leakage Current	V_{DS}=0 V, V_{GS}=-5 to 15 V,	-	-	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=27 mA	2.0	2.8	4.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=15 V, I_D=27 A	-	20	28	mΩ
		V_{GS}=15 V, I_D=27 A, T_J=175℃	-	33	-	mΩ
		V_{GS}=18 V, I_D=27 A	-	18	26	mΩ
		V_{GS}=18 V, I_D=27 A, T_J=175℃	-	33	-	mΩ
g_{FS}	Forward Transconductance	V_{DS}=20 V, I_D=27 A	-	23	-	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=800 V, V_{GS}=0 V, f=1 MHz	-	5182	-	pF
C_{oss}	Output Capacitance		-	210	-	pF
C_{rss}	Reverse Transfer Capacitance		-	18	-	pF
E_{oss}	Coss Stored Energy		-	88	-	μJ
R_G	Gate Resistance	f=1 MHz	-	1.2	-	Ω
Switching Characteristics						
Q_g	Total Gate Charge	V_{DS}=800 V, I_D=30 A, V_{GS}=-5/+15 V	-	166	-	nC
Q_{gs}	Gate-Source Charge		-	55	-	nC
Q_{gd}	Gate-Drain Charge		-	39	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=800 V, I_D=30 A, V_{GS}=-5/+15 V, R_G=2 Ω, L=30 μH	-	15	-	ns
t_r	Turn-on Rise Time		-	13	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	22	-	ns
t_f	Turn-off Fall Time		-	13	-	ns
E_{ON}	Turn-on Energy		-	276	-	mJ
E_{OFF}	Turn-off Fall Time Energy		-	84	-	mJ
Source-Drain Diode Characteristics						
V_{SD}	Diode Forward Voltage	V_{GS}=-5 V, I_S=27 A	-	4.3	5	V
T_{rr}	Reverse Recovery Time	V_{GS}=-5 V, I_F=30 A, V_R=800 V, di_F/dt=1500 A/μs	-	17	-	ns
I_{rrm}	Peak Reverse Recovery Current		-	25	-	A
Q_{rr}	Reverse Recovery Charge		-	225	-	nC

4. Typical Characteristics

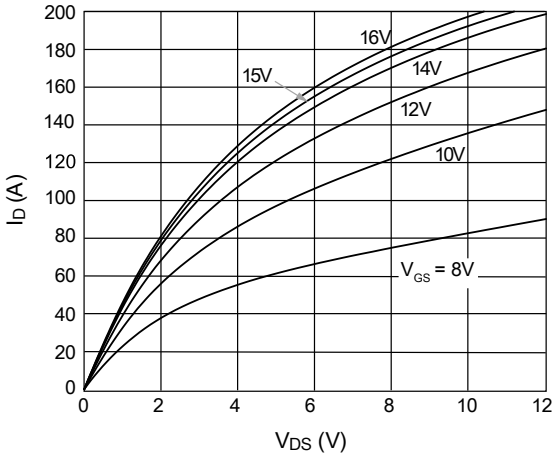


Figure 1. On-Region Characteristics Tj=25°C

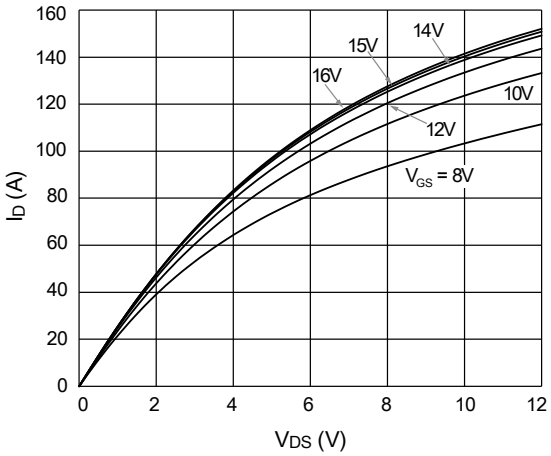


Figure 1. On-Region Characteristics Tj=175°C

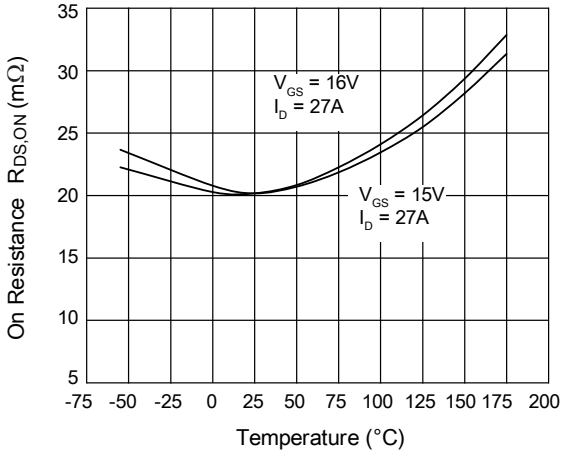


Figure 3. On Resistance vs. Junction Temperature

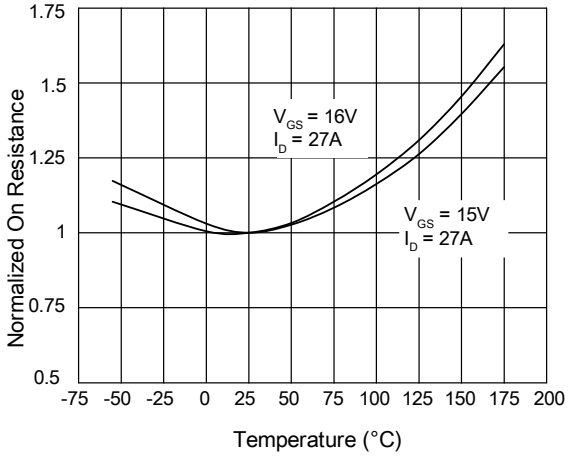


Figure 4. Normalized On Resistance vs. Junctio Temperature

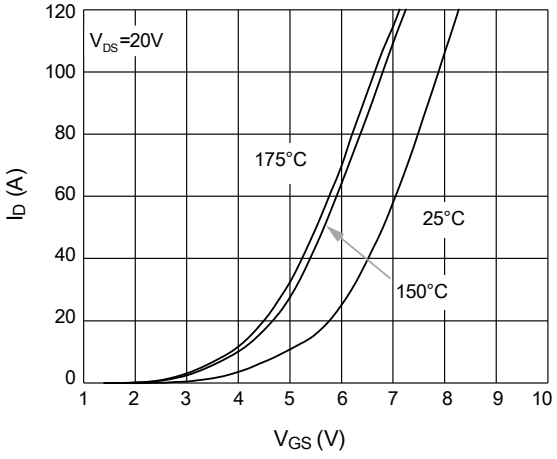


Figure 5. Transfer Characteristics

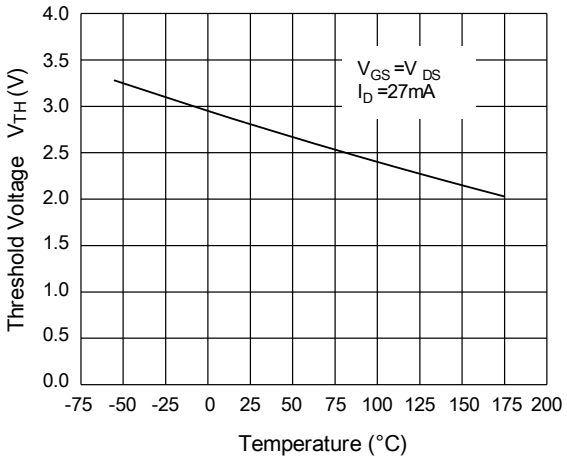


Figure 6. Threshold Voltage vs. Junction Temperature

4. Typical Characteristics(cont.)

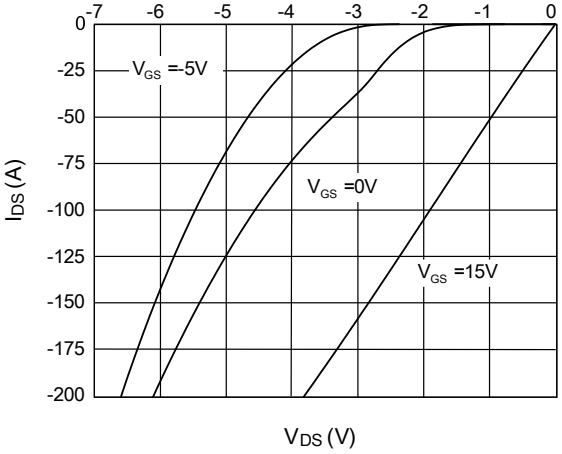


Figure 7. Body-diode Characteristics at 25°C

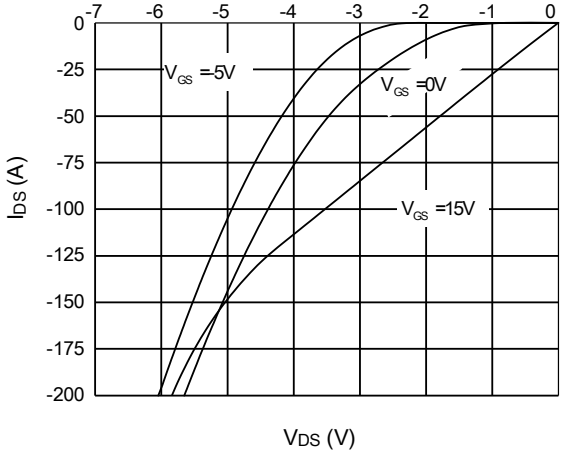


Figure 8. Body-diode Characteristics at 175°C

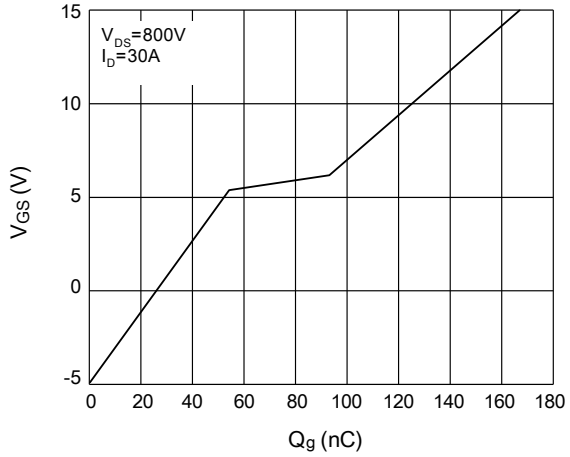


Figure 9. Gate-charge Characteristics

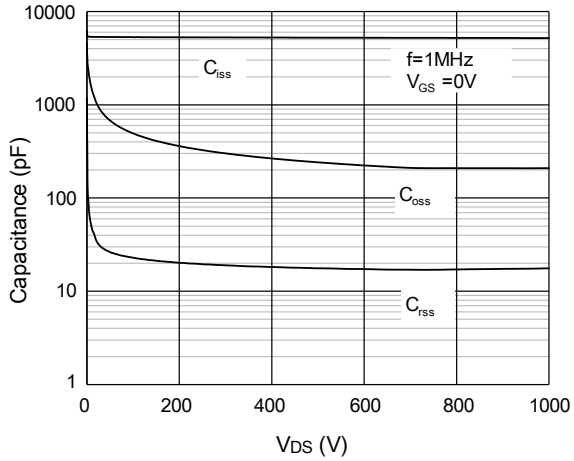


Figure 10. Capacitance Characteristics

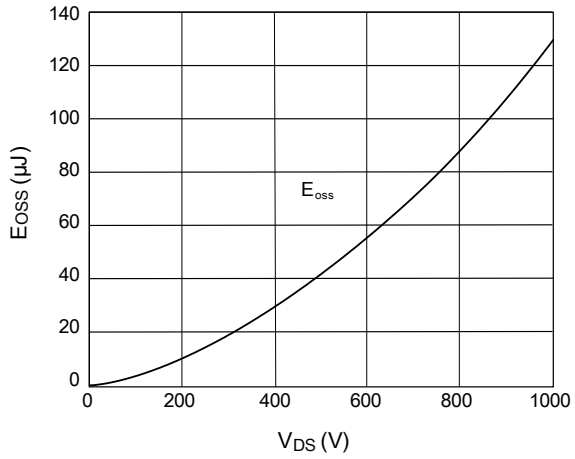


Figure 11. Coss Stored Energy

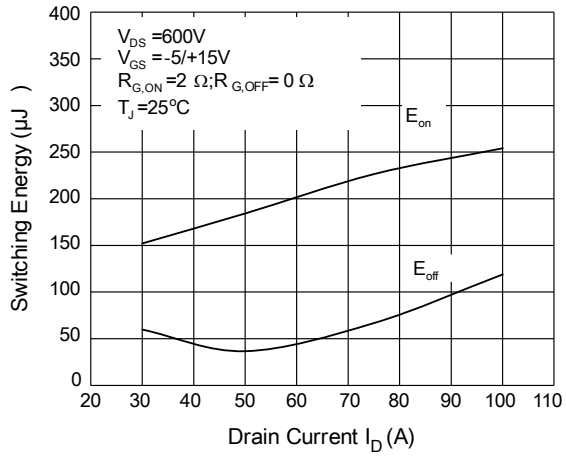


Figure 12. Switching Energy vs. Drain Current

4. Typical Characteristics(cont.)

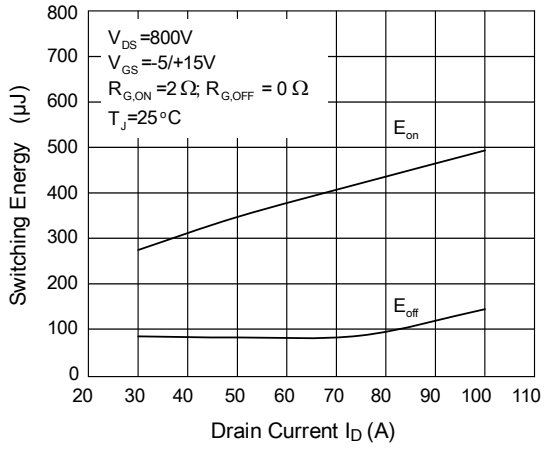


Figure 13. Switching Energy vs. Drain Current

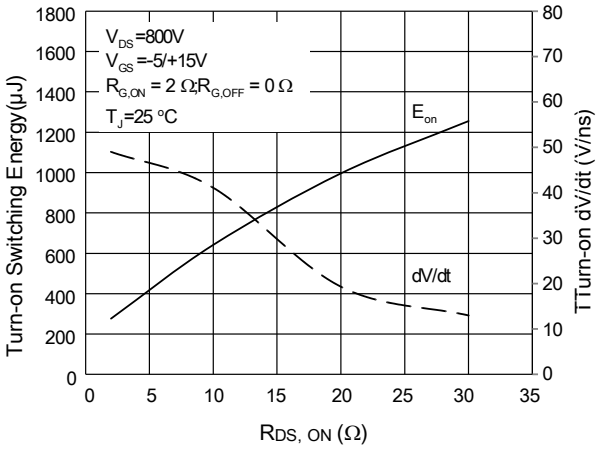


Figure 14. Turn-on Energy and dV/dt vs. External Gate Resistance

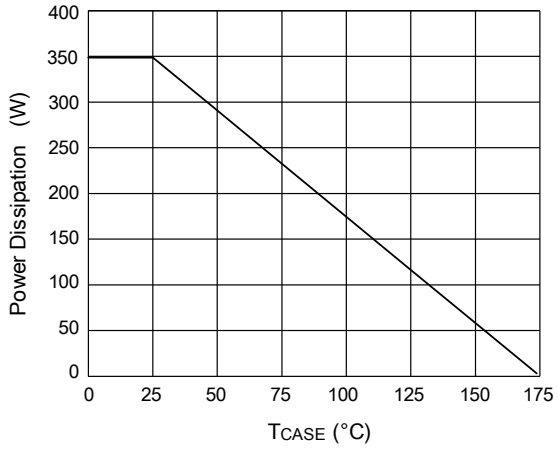


Figure 15. Power De-rating

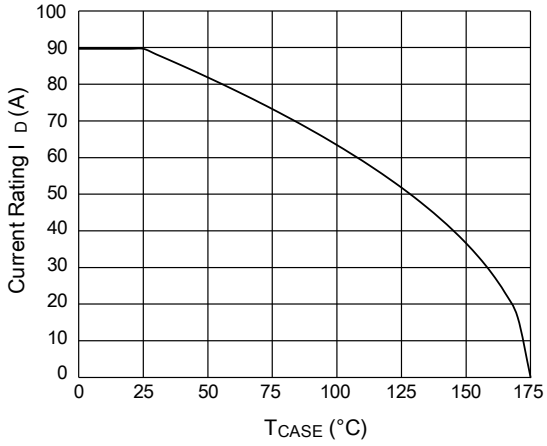


Figure 16. Current De-rating

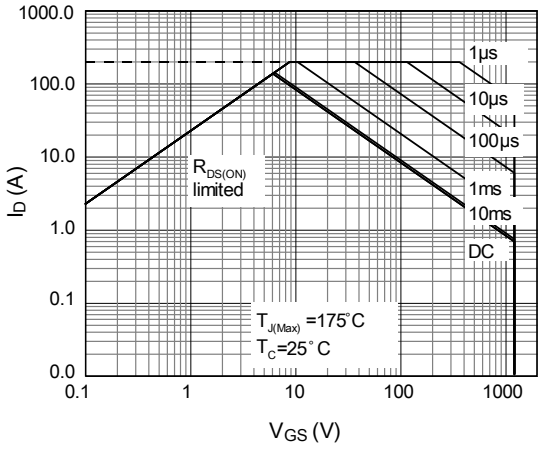


Figure 17. Maximum Forward Biased Safe Operating Area

5. Typical Characteristics(cont.)

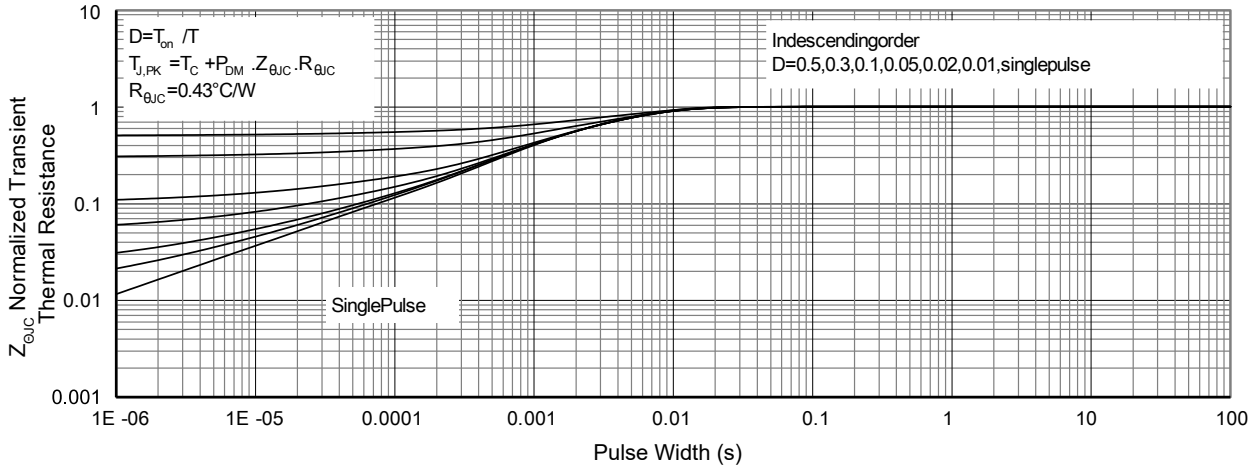
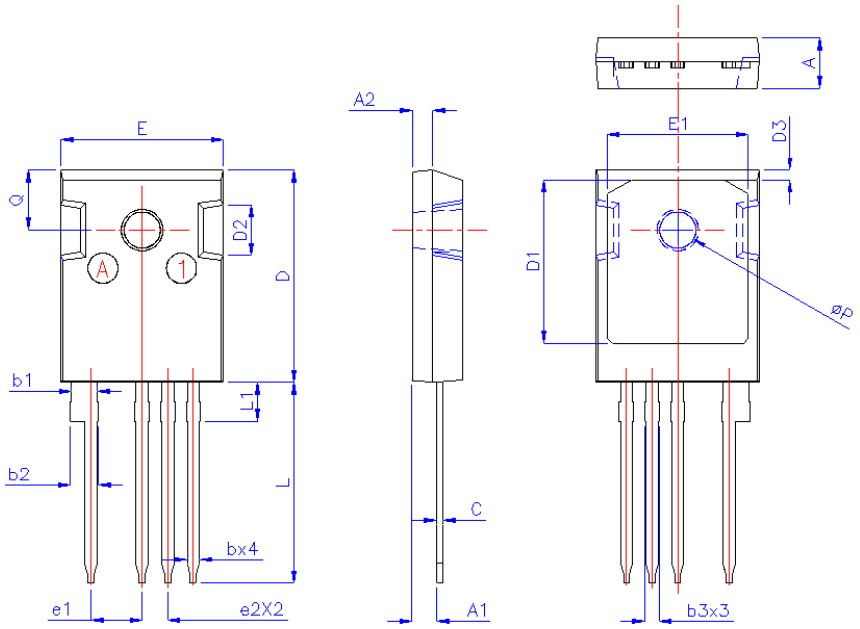


Figure 18. Normalized Maximum Transient Thermal Impedance

6. Package Mechanical Data

TO247-4L Package



SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	2.31	2.42	2.52
A2	1.90	2.00	2.10
b	1.16	1.22	1.27
b1	1.15	1.20	1.25
b2	2.61	2.76	2.91
b3	1.36	1.42	1.47
C	0.59	0.62	0.66
D	20.9	21.0	21.1
D1	15.94	16.24	16.54
D2		5.00	
D3	0.80	0.95	1.10
e	5.08 BSC		
e1	2.54 BSC		
E	16.05	16.15	16.25
E1	13.82	14.02	14.26
L	19.75	19.95	20.15
L1	——	——	3.87
Q	5.95 BSC		
ØP	3.45	3.60	3.75