



JX4S0150R330M

3300V N-Channel MOSFET

Description

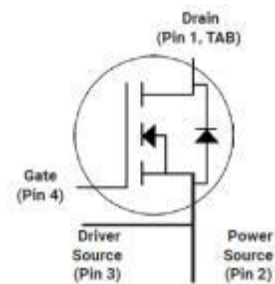
Silicon Carbide (SiC) MOSFET use a completely new technology that provide superior switching performance and higher reliability compared to Silicon. In addition, the low ON resistance and compact chip size ensure low capacitance and gate charge. Consequently, system benefits include highest efficiency, faster operating frequency, increased power density, reduced EMI, and reduced system size.

Features

- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low RDS(on)
- Optimized package with separated driver source pin
- Easy to parallel and simple to drive
- ROHS Compliant, Halogen free

Application

- EV Charging
- Energy Storage
- Switch Mode Power Supplies
- Pulsed Power
- Solid State Circuit Breakers
- Solar String Inverters



Ordering Information

Part Number	Marking	Package	Packaging
JX4S0150R330M	JX4S0150R330M	TO-247	Tube



JX4S0150R330M

Absolute Maximum Ratings(Tc=25°C)

Symbol	Parameter	Value	Unit
V _{DS}	Drain-Source Voltage	3300	V
I _D	Drain Current(continuous)at Tc=25°C	35	A
I _D	Drain Current(continuous)at Tc=100°C	20	A
I _{DM}	Drain Current (pulsed)	96	A
V _{GS}	Gate-Source Voltage	-10/+25	V
P _D	Power Dissipation Tc = 25°C	357	W
T _J , T _{stg}	Junction and Storage Temperature Range	-55 to +175	°C

Electrical Characteristics(T_J = 25°C unless otherwise specified)

Typical Performance-Static

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV _{DS}	Drain-source Breakdown Voltage	I _D =250uA, V _{GS} =0V	3300			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =3300V, V _{GS} =0V, T _J =25°C			100	μA
I _{GSS}	Gate-body Leakage Current	V _{DS} =0 V ; V _{GS} =-10 to 25V		10	250	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =5mA	2	3.2	4	V
V _{GSon}	Recommended turn-on Voltage	Static		20		V
V _{GSoff}	Recommended turn-off Voltage			-5		V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} =20V, I _D =15A		150	180	mΩ
		V _{GS} =20V, I _D =15A T _J =175°C		258		mΩ



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Typical Performance-Dynamic

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	$V_{DS}=1000V, f=1MHz,$ $V_{AC}=25mV$		3088		pF
C_{oss}	Output Capacitance			55		pF
C_{rss}	Reverse Transfer Capacitance			4.9		pF
E_{OSS}	Coss Stored Energy	$V_{DS}=1000V, f=1MHz$		32		μJ
E_{ON}	Turn-On Energy (Body Diode)	$V_{DS}=1700V, V_{GS}=-5/20V,$ $I_D=15A, L=150\mu H, T_J=25^\circ C$		433		μJ
E_{OFF}	Turn-Off Energy (Body Diode)			132		μJ
Q_g	Total Gate Charge	$V_{DS}=1000V, V_{GS}=-5V/20V, I_D=15A$		128		nC
Q_{gs}	Gate-source Charge			39		nC
Q_{gd}	Gate-Drain Charge			42		nC
$R_{G(int)}$	Internal Gate Resistance	$f=1MHz, V_{AC}=25mV$		2		Ω
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=1700V, V_{GS}=-5V/20V, I_D=15A, L=150\mu H, R_{ext}=8\Omega$		79		ns
t_r	Rise Time			27		ns
$t_{d(off)}$	Turn-off Delay Time			31		ns
t_f	Fall Time			19		ns

Typical Performance-Reverse Diode($T_J = 25^\circ C$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{FSD}	Forward Voltage	$V_{GS}=0V, I_F=7.5A, T_J=25^\circ C$		4.2	6	V
		$V_{GS}=0V, I_F=7.5A, T_J=175^\circ C$		3.6	6	V
I_S	Continuous Diode Forward Current	$V_{GS}=0V, T_C=25^\circ C$		27		A
t_{rr}	Reverse Recovery Time	$V_{GS}=-5V, I_F=15A,$ $V_R=1700V, T_J=25^\circ C$ $di/dt=500A/\mu s$		75		ns
Q_{rr}	Reverse Recovery Charge			332		nC
I_{rrm}	Peak Reverse Recovery Current			7		A

Thermal Characteristics

Symbol	Parameter	Value.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.42	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	1.45	$^\circ C/W$

The values are based on the junction-to case thermal impedance which is measured with the device mounted to a large heat sink assuming maximum junction temperature of $T_J(max)=175^\circ C$

Electrical Characteristics

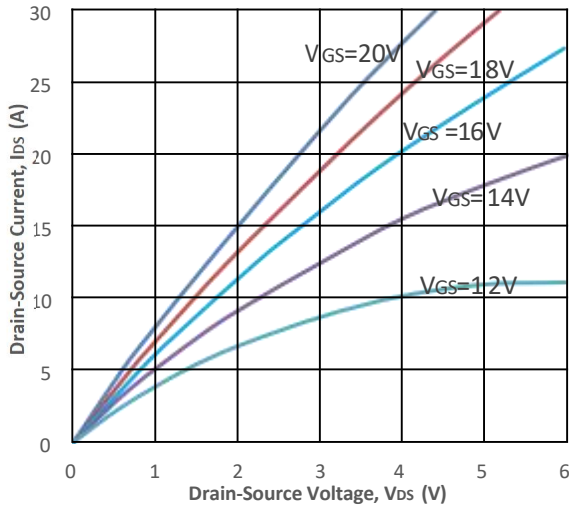
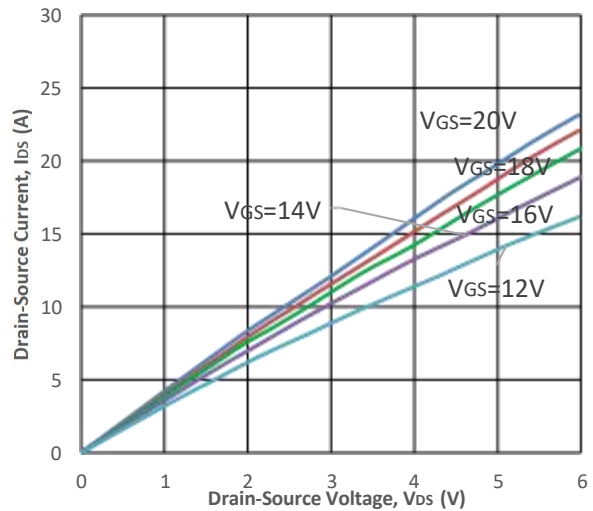
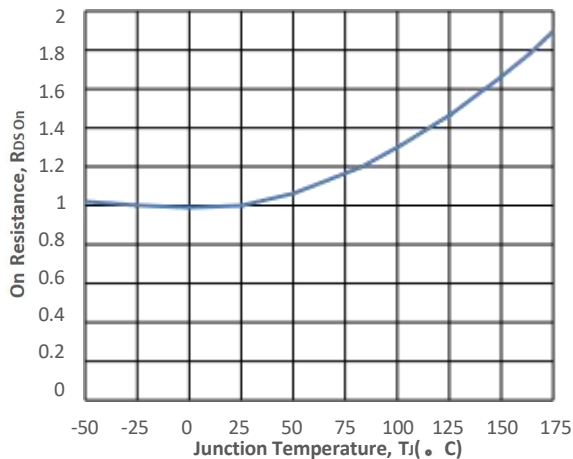
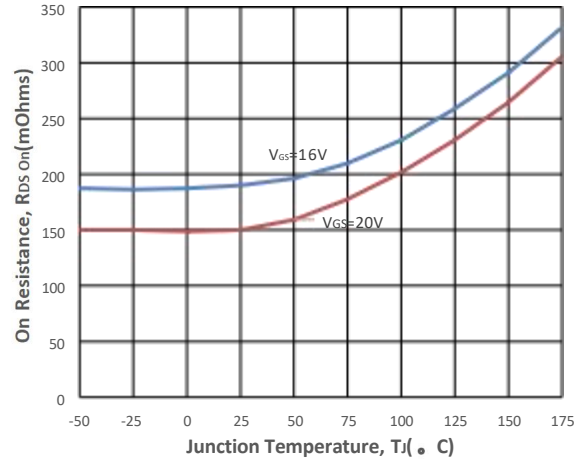
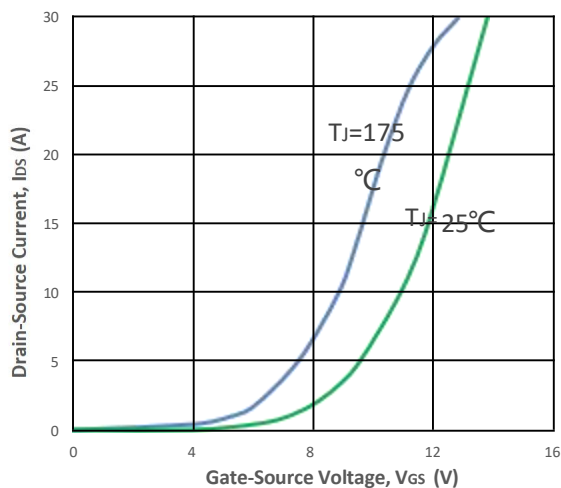
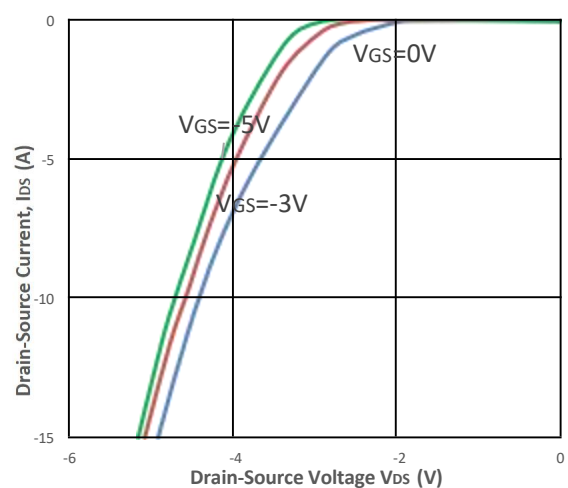
Fig1. Output characteristics ($T_J = 25^\circ\text{C}$)

Fig2. Output characteristics ($T_J = 175^\circ\text{C}$)

Fig3. Normalized On-Resistance vs. Temperature

Fig4. On-Resistance vs. Temperature

Fig5. Transfer Characteristic

Fig6. Body Diode Characteristic at 25°C


Fig7. Threshold Voltage vs. Temperature

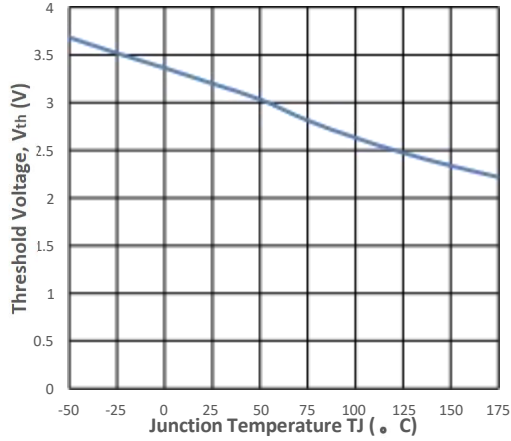


Fig8. Gate Charge Characteristics

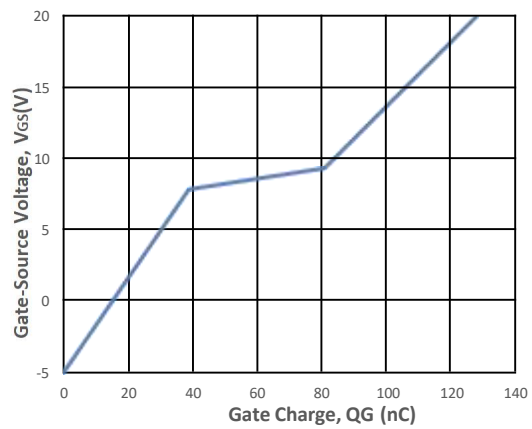


Fig9. 3rd Quadrant Characteristic at 25 $^{\circ}C$

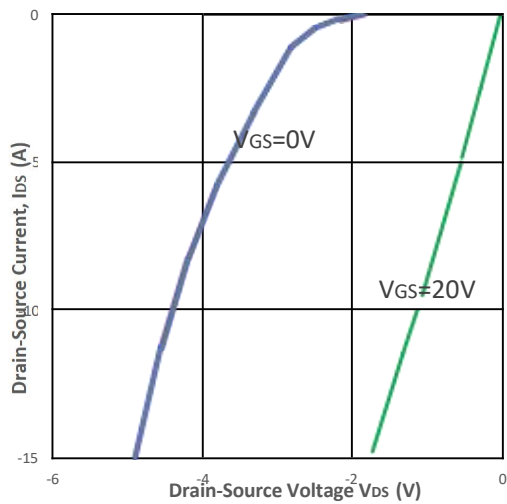


Fig10. Output Capacitor Stored Energy

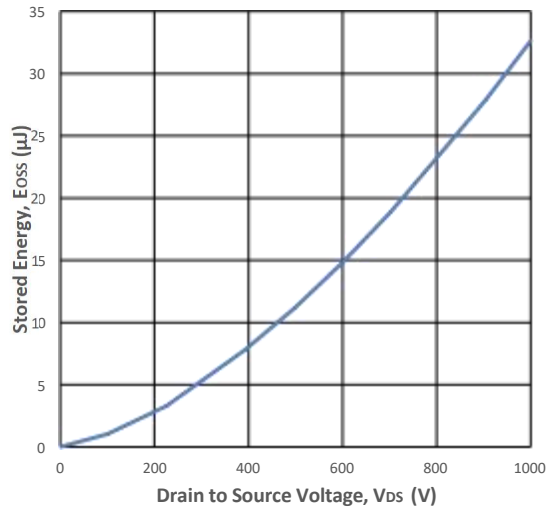


Fig11. Capacitances vs. Drain-Source

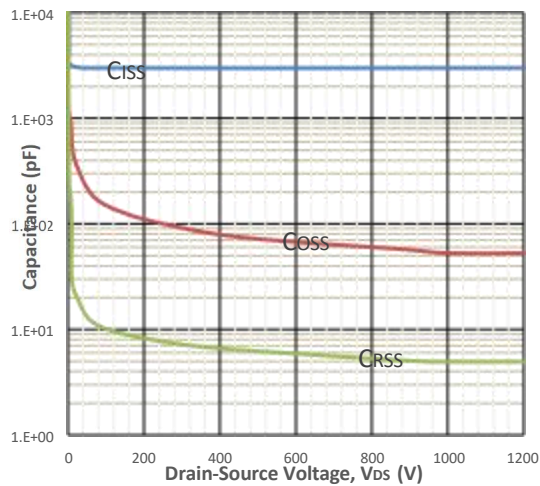


Fig12. Max Power Dissipation Derating Vs T_c

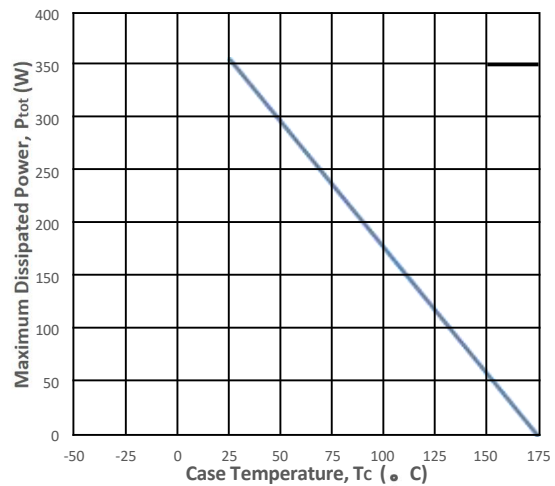


Fig13. Switching Energy vs. Drain Current

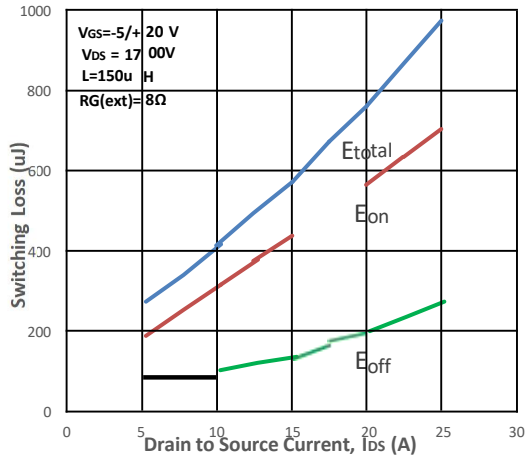


Fig14. Switching Energy vs. $R_{G(ext)}$

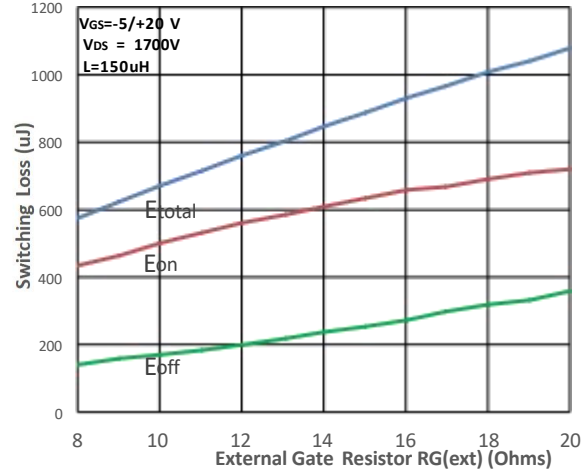


Fig15. Switching Energy vs. Temperature

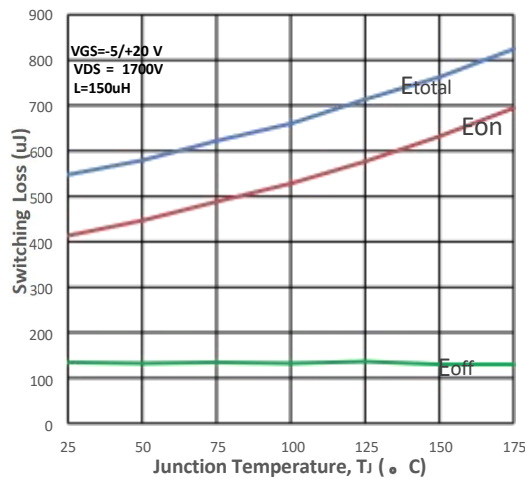


Fig16. Switching Times vs. $R_{G(ext)}$

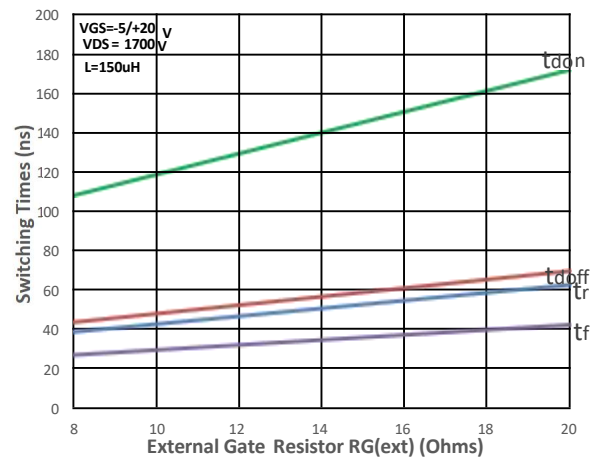


Fig17. Transient Thermal Impedance

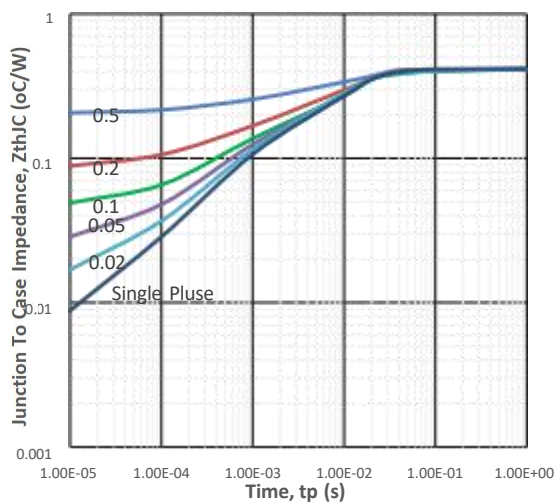
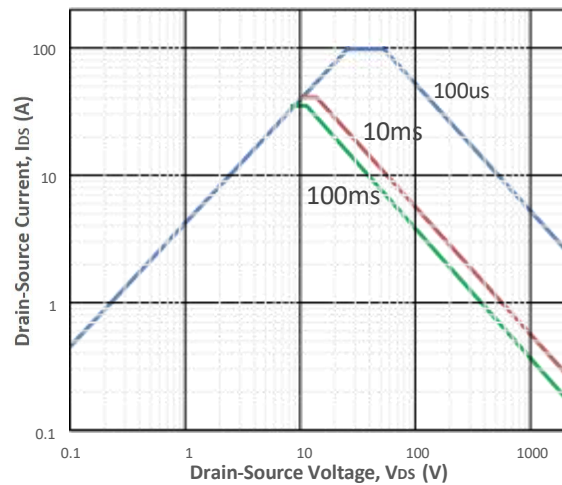
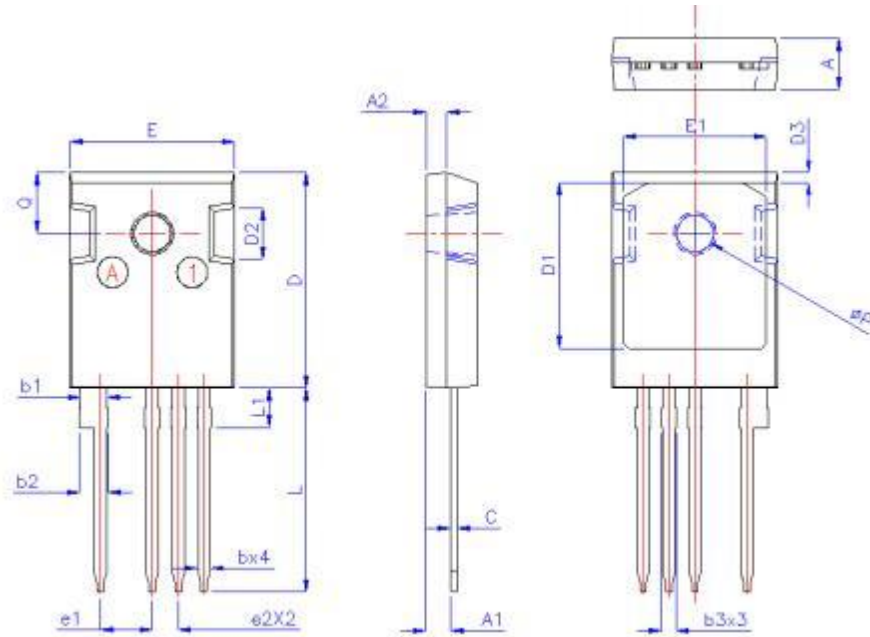


Fig18. Safe Operating Area



Package Drawing:

Dimensions (UNIT: mm)

SYMBDLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.9	5	5.1	0.193	0.197	0.201
A1	2.31	2.42	2.52	0.091	0.095	0.099
A2	1.9	2	2.1	0.075	0.079	0.083
b	1.16	1.22	1.27	0.046	0.048	0.050
b1	1.15	1.2	1.25	0.045	0.047	0.049
b2	2.61	2.76	2.91	0.103	0.109	0.115
b3	1.36	1.42	1.47	0.054	0.056	0.058
C	0.59	0.62	0.66	0.023	0.024	0.026
D	20.9	21	21.1	0.823	0.827	0.831
D1	15.94	16.24	16.54	0.628	0.639	0.651
D2		5		0.197 TYP		
D3	0.8	0.95	1.1	0.031	0.037	0.043
e	5.08 BSC				0.200 BSC	
e1	2.54 BSC				0.100BSC	
E	16.05	16.15	16.25	0.632	0.636	0.640
E1	13.82	14.02	14.26	0.544	0.552	0.561
L	19.75	19.95	20.15	0.778	0.785	0.793
L1	—	—	3.87	—	—	0.152
Q	5.95 BSC			0.234BSC		
ØP	3.45	3.6	3.75	0.136	0.142	0.148