ACM220R900TE

N-Channel Silicon Carbide Power MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D@25℃
2200V	900mΩ@18V	8.7A
	800mΩ@20V	

Feature

- Wide bandgap SiC MOSFET technology
- Low On-Resistance with high blocking voltage
- Low capacitances with High-Speed switching
- Low reverse recovery(Qrr)

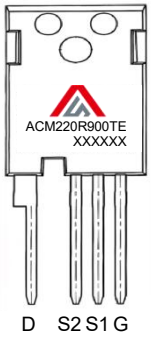
Application

- Switch mode power supplies
- Auxiliary power supplies
- High voltage capacitive loads

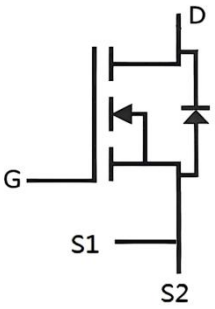
Package

TO-247-4L

Marking



Circuit diagram



Absolute maximum ratings (T_C=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Value	Unit
Drain-Source Voltage	V_{DSmax}	V_{GS} =0V, I_D =100μA	2200	V
Gate-Source Voltage	V_{GSmax}	AC (f >1Hz)	-10/+25	V
Gate-Source Voltage	V_{GSOP}	Static	-4/+18	V
Continuous Drain Current	I_D	V_{GS} =18V	8.7	A
	I_D	V_{GS} =18V, T_C =100℃	6	A
Pulsed Drain Current	$I_{D,pulse}$	Pulse with t_p limited by T_{jmax} at 1 ms	9	A
		Pulse with t_p limited by T_{jmax} at 100 μs	16	A
Power Dissipation	P_D	T_J =175℃	94	W
Thermal Resistance（Typ）	$R_{\theta JC}$	Junction-to-Case	1.6	℃/W
Junction Temperature	T_J		-55~ +175	℃
Storage Temperature	T_{STG}		-55~ +175	℃

Electrical characteristics (T_J=25℃, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} =0V, I_D =100μA	2200			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =2200V, V_{GS} =0V			50	μA
Gate-Source leakage current	I_{GSS}	V_{DS} =0V, V_{GS} =18V			250	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =0.5mA		2.8		V
		V_{DS} =V_{GS}, I_D =0.5mA, T_J =175℃		2		
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =18V, I_D =2A		0.9	1.4	Ω
		V_{GS} =20V, I_D =2A		0.8		
		V_{GS} =18V, I_D =2A, T_J =175℃		2.05		
		V_{GS} =20V, I_D =2A, T_J =175℃		2		
Transconductance	g_{fs}	V_{GS} =18V, I_D =2A		1		S
		V_{GS} =18V, I_D =2A, T_J =175℃		0.8		
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =1000V, V_{GS} =0V V_{AC} =25mV, f =1MHz		168		pF
Output Capacitance	C_{oss}			13		
Reverse Transfer Capacitance	C_{rss}			2.7		
Total Gate Charge	Q_g	V_{DS} =1200V, V_{GS} =-4V/18V I_D =2A		15		nC
Gate-Source Charge	Q_{gs}			1.7		
Gate-Drain Charge	Q_{gd}			9		
Internal Gate Resistance	$R_{G(int)}$	V_{AC} =25mV, f =1MHz		6		Ω
Source-Drain Diode characteristics						
Diode Forward Current	I_S	V_{GS} =-4V, T_C =25℃		8		A
Diode Forward voltage	V_{SD}	V_{GS} =-4V, I_{SD} =1A		3.7		V
		V_{GS} =-4V, I_{SD} =1A, T_J =175℃		3.3		

Typical Characteristics

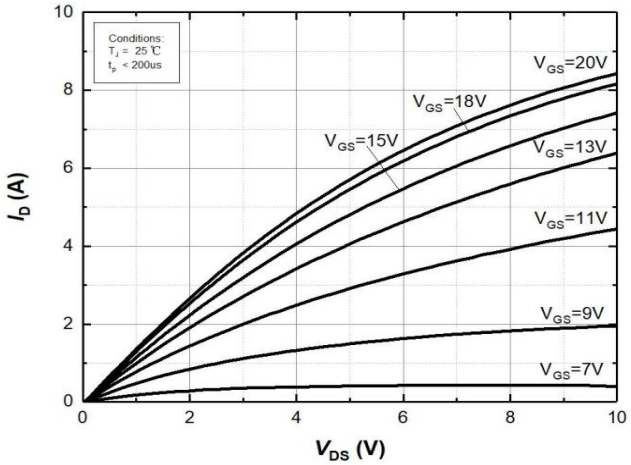


Figure 1. Output characteristics at Tj=25°C

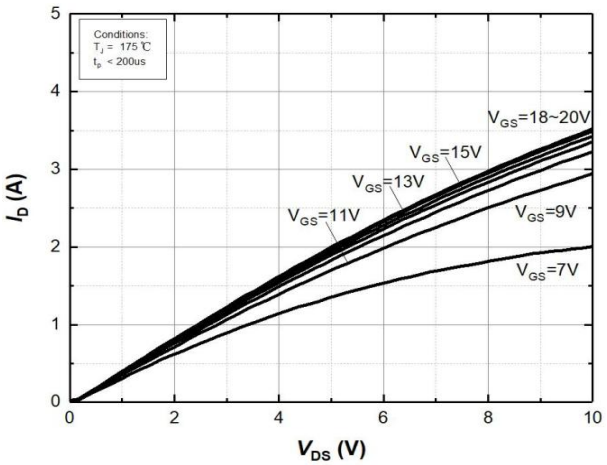


Figure 2. Output characteristics at Tj=175°C

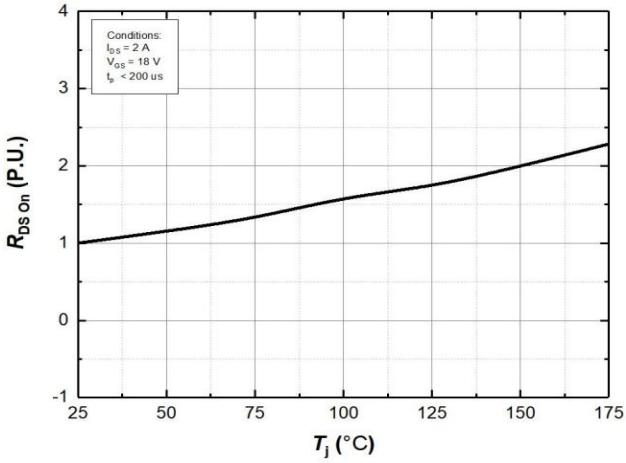


Figure 3. Normalized On-Resistance vs. Temperature

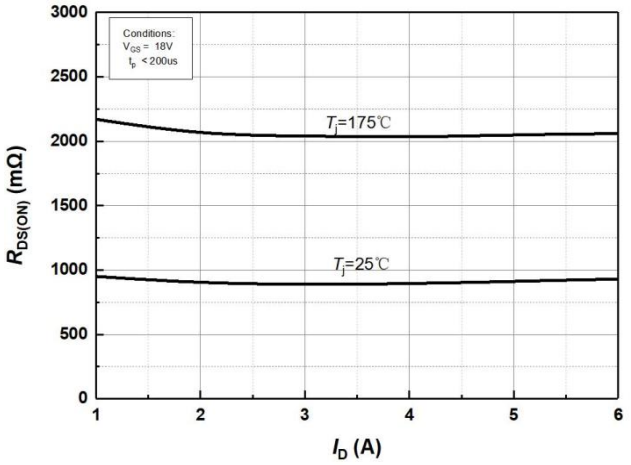


Figure 4. On-Resistance vs. Drain current for Various Temperature

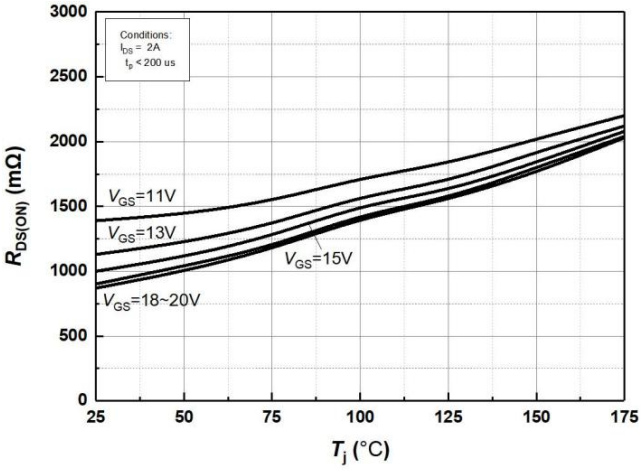


Figure 5. On-Resistance vs. Temperature for Various Gate Voltage

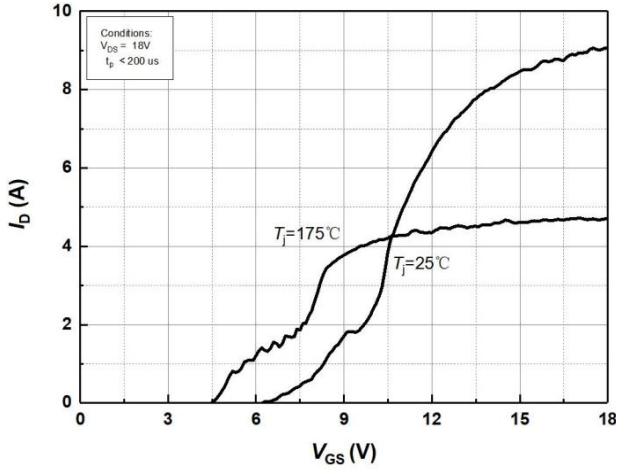


Figure 6. Transfer Characteristics for Various Junction Temperatures

Typical Characteristics

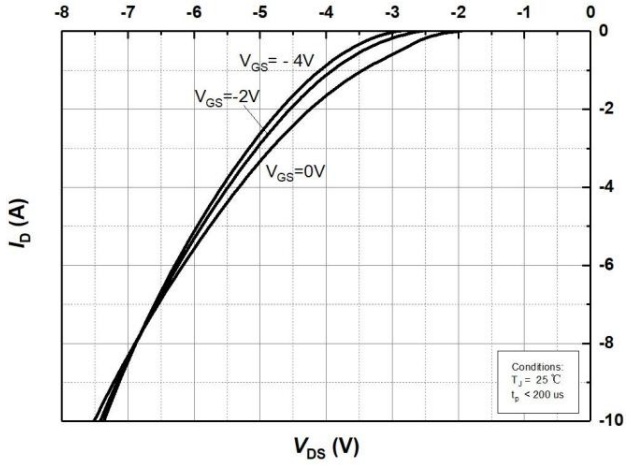


Figure 7. Body Diode Characteristics at Tj=25°C

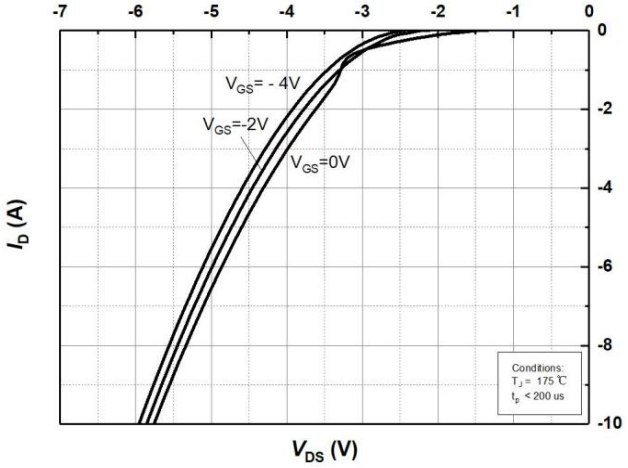


Figure 8. Body Diode Characteristics at Tj=175°C

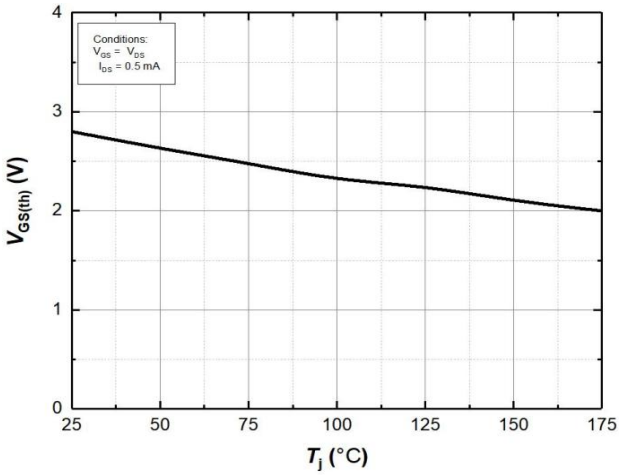


Figure 9. Threshold Voltage vs. Temperature

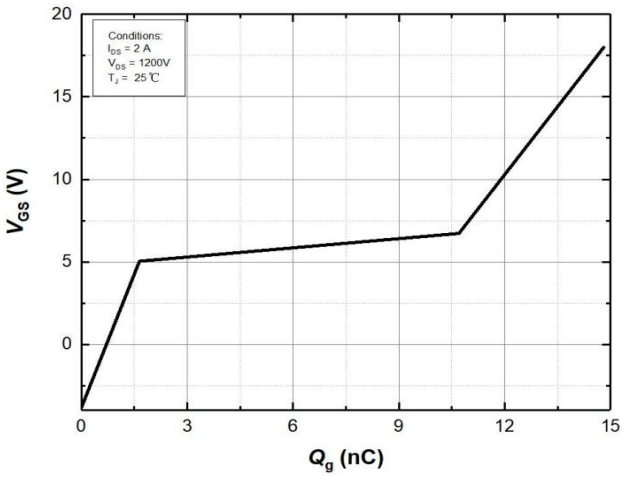


Figure 10 Gate Charge Characteristics

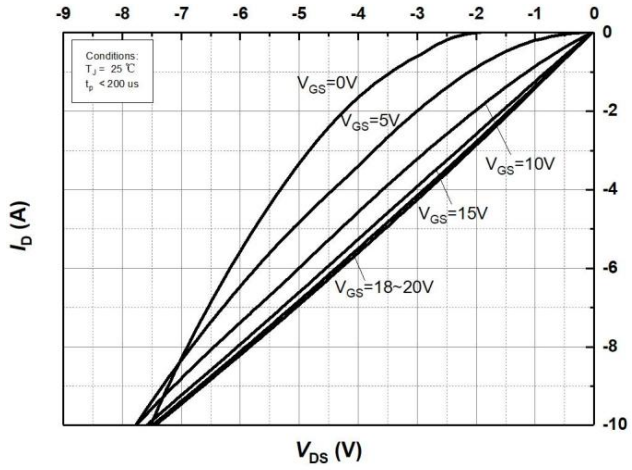


Figure 11. 3rd Quadrant Characteristic at Tj=25°C

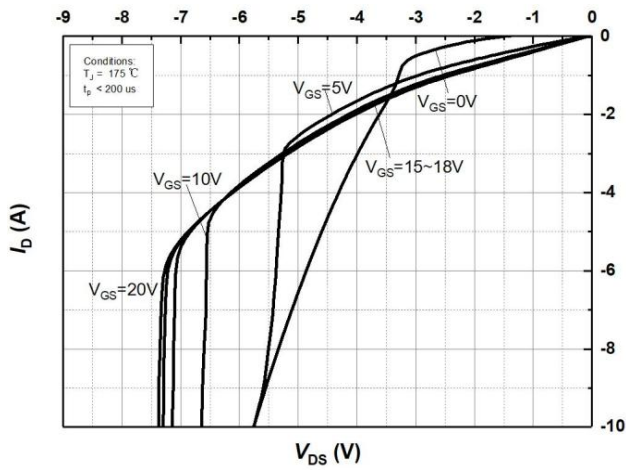


Figure 12. 3rd Quadrant Characteristic at Tj=175°C

Typical Characteristics

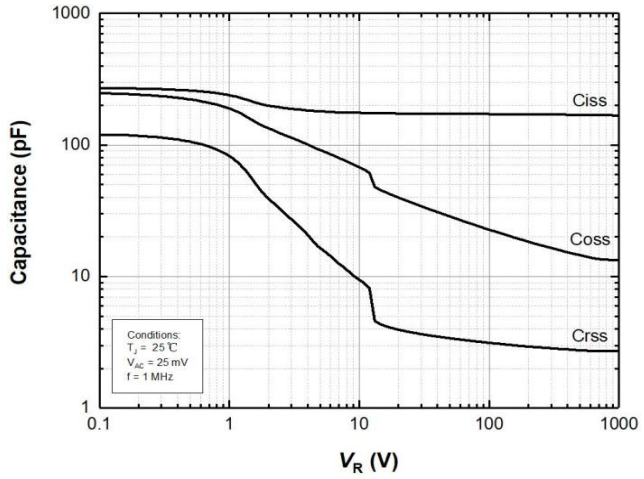


Figure 13. Capacitances vs. Drain-Source Voltage (0 – 1000V)

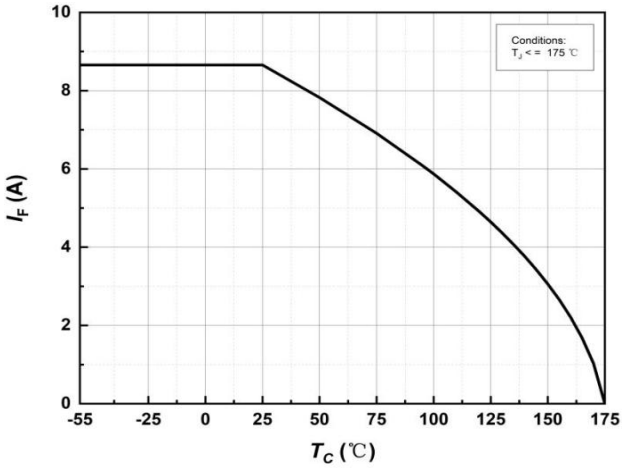


Figure 14. Continuous Drain Current Derating vs Case Temperature

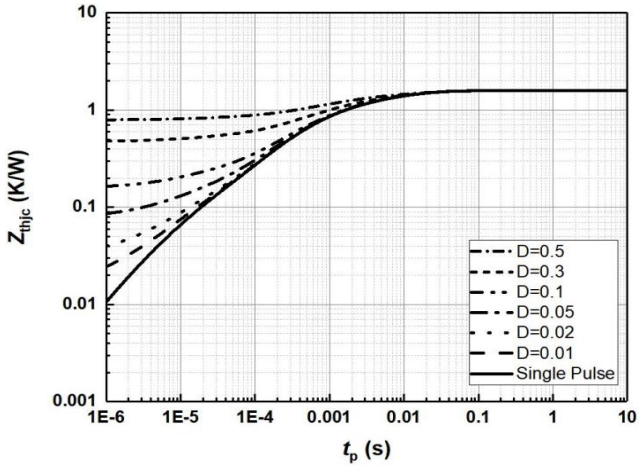


Figure 15.Transient Thermal Impedance (Junction – Case)

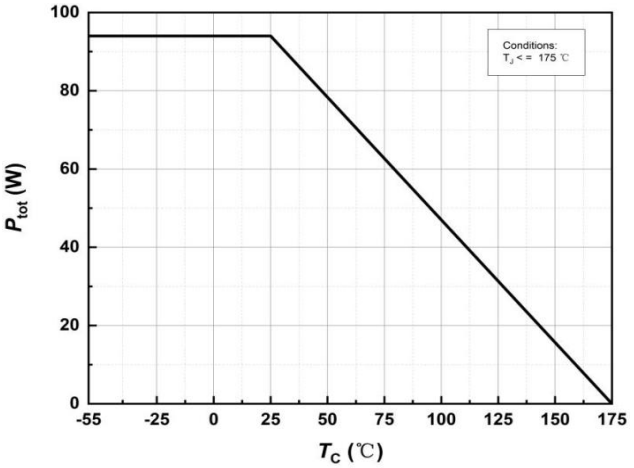


Figure 16. Maximum Power Dissipation Derating vs. Case Temperature

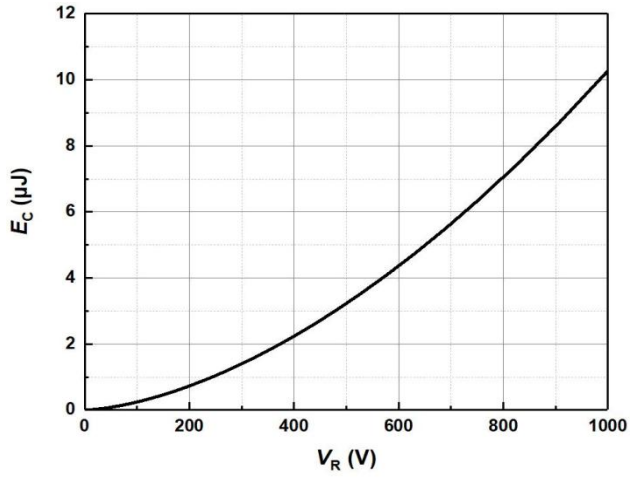


Figure 17. Output Capacitor Stored Energy

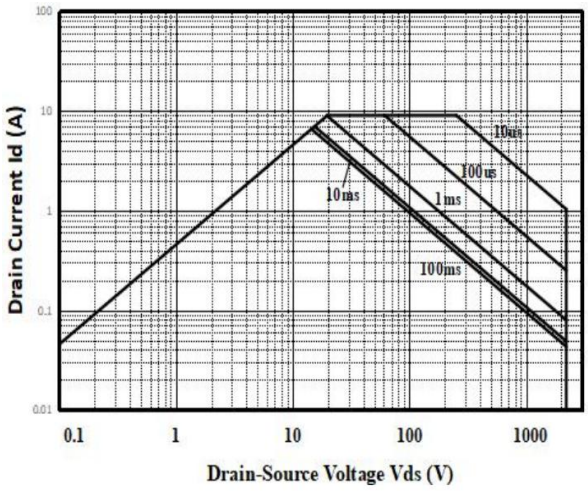
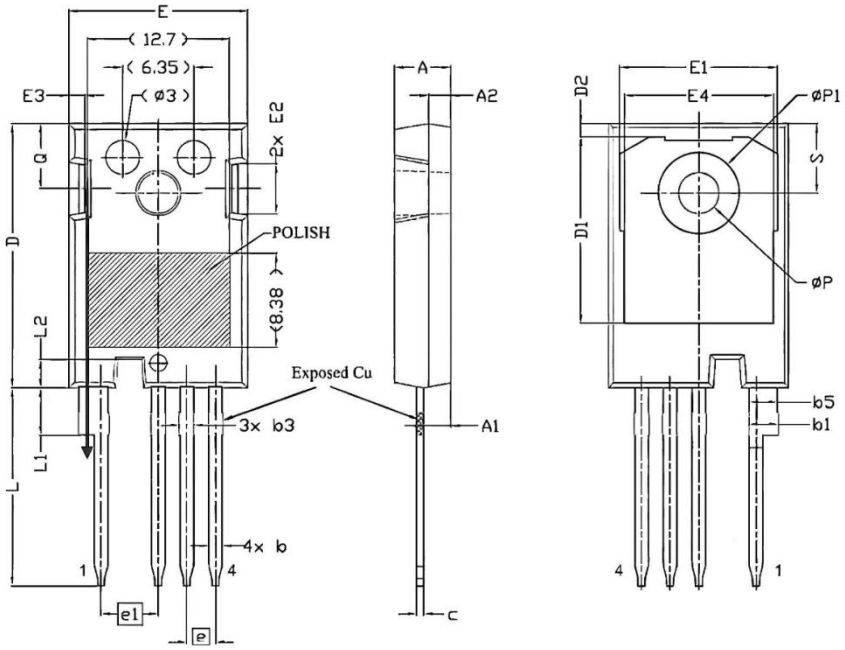


Figure 18. Safe Operating Area

TO-247-4L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.800	5.210	0.189	0.205
A1	2.290	2.540	0.090	0.100
A2	1.910	2.160	0.075	0.085
b	1.070	1.330	0.042	0.052
b1	2.390	2.940	0.094	0.116
b3	1.070	1.600	0.042	0.063
b5	2.390	2.690	0.094	0.106
c	0.550	0.680	0.022	0.027
D	23.300	23.600	0.917	0.929
D1	16.250	17.650	0.640	0.695
D2	0.950	1.250	0.037	0.049
E	15.750	16.130	0.620	0.635
E1	13.100	14.150	0.516	0.557
E2	3.680	5.100	0.145	0.201
E3	1.000	1.900	0.039	0.075
E4	12.380	13.430	0.487	0.529
e	2.540 BSC.		0.100 BSC.	
e1	5.080 BSC.		0.200 BSC.	
L	17.310	17.820	0.681	0.702
L1	3.970	4.370	0.156	0.172
L2	2.350	2.650	0.093	0.104
ΦP	3.510	3.650	0.138	0.144
ΦP1	7.190 REF.		0.283 REF.	
Q	5.490	6.000	0.216	0.236
S	6.040	6.300	0.238	0.248