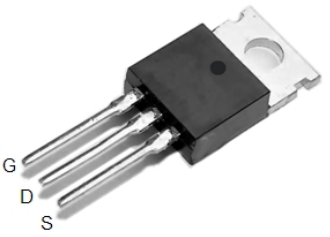
RU4H10R

N-Channel Advanced Power MOSFET

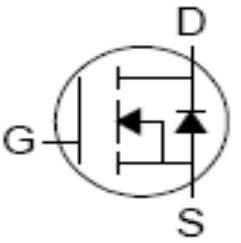
Features

- 400V/10A,
  $R_{DS\,(ON)}$ =0.45Ω (Typ.) @ V_{GS}=10V
- Gate charge minimized
- Low Crss(Typ. 23pF)
- Extremely high dv/dt capability
- 100% avalanche tested
- Lead Free and Green Available

Pin Description



TO-220



N-Channel MOSFET

Applications

- High efficiency switch mode power supplies
- Lighting

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		400	V
V_{GSS}	Gate-Source Voltage		±30	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C
I_S	Diode Continuous Forward Current	T_C=25°C	10	A
Mounted on Large Heat Sink				
I_{DP}	300μs Pulse Drain Current Tested	T_C=25°C	40①	A
I_D	Continuous Drain Current(V_{GS}=10V)	T_C=25°C	10①	A
		T_C=100°C	6.4①	
P_D	Maximum Power Dissipation	T_C=25°C	114	W
		T_C=100°C	45	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		1.1	°C/W
Drain-Source Avalanche Ratings				
E_{AS}②	Avalanche Energy, Single Pulsed		98	mJ

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Electrical Characteristics (T_C=25°C Unless Otherwise Noted)

Symbol	Parameter	Test Condition	RU4H10R			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	400			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}= 400V, V_{GS}=0V			1	μA
		T_J=85°C			30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	2	3	4	V
I_{GSS}	Gate Leakage Current	V_{GS}=±30V, V_{DS}=0V			±100	nA
$R_{DS(ON)}$ ③	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=5A		0.45	0.55	Ω
Diode Characteristics						
V_{SD} ③	Diode Forward Voltage	I_{SD}=10A, V_{GS}=0V			1.2	V
t_{rr}	Reverse Recovery Time	I_{SD}=10A, dI_{SD}/dt=100A/μs		250		ns
Q_{rr}	Reverse Recovery Charge			2.3		μC
Dynamic Characteristics ④						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz		10		Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}= 200V, Frequency=1.0MHz		1060		pF
C_{oss}	Output Capacitance			175		
C_{rss}	Reverse Transfer Capacitance			23		
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=200V, R_L=20Ω, I_{DS}=10A, V_{GEN}= 10V, R_G=25Ω		15		ns
t_r	Turn-on Rise Time			22		
$t_{d(OFF)}$	Turn-off Delay Time			55		
t_f	Turn-off Fall Time			22		
Gate Charge Characteristics ④						
Q_g	Total Gate Charge	V_{DS}=320V, V_{GS}= 10V, I_{DS}=10A		23		nC
Q_{gs}	Gate-Source Charge			3.5		
Q_{gd}	Gate-Drain Charge			9		

Notes: ①Current limited by maximum junction temperature.
②Limited by T_{Jmax}, I_{AS} =14A, V_{DD} = 100V, R_G = 50Ω , Starting T_J = 25°C.
③Pulse test ; Pulse width≤300μs, duty cycle≤2%.
④Guaranteed by design, not subject to production testing.

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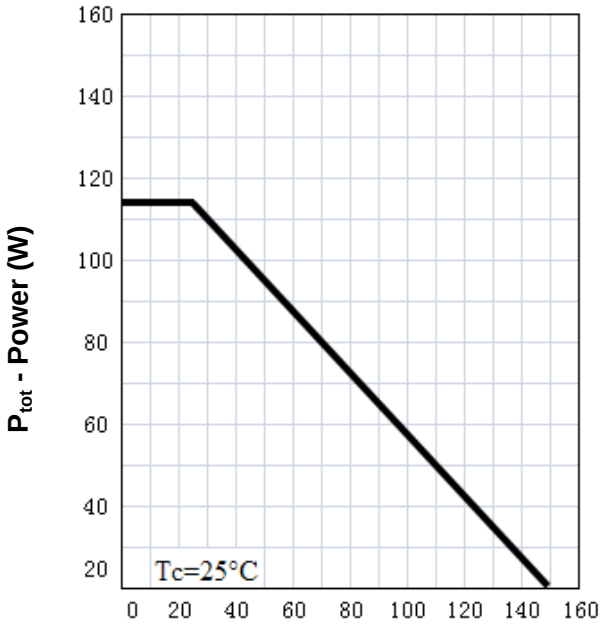
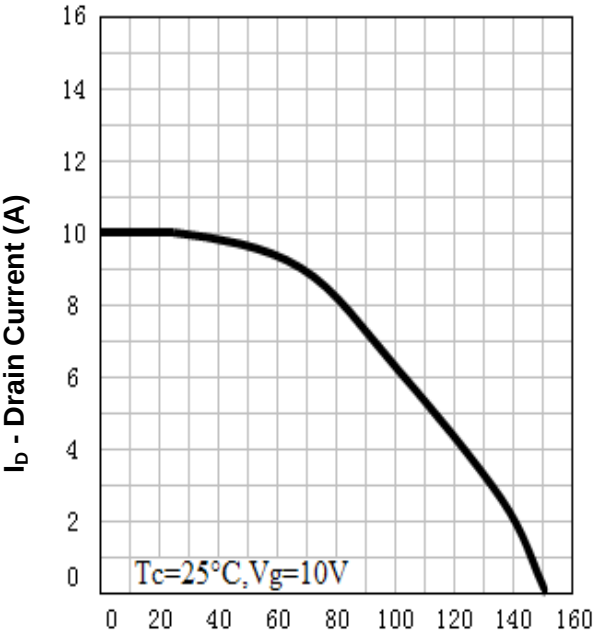
Typical Characteristics

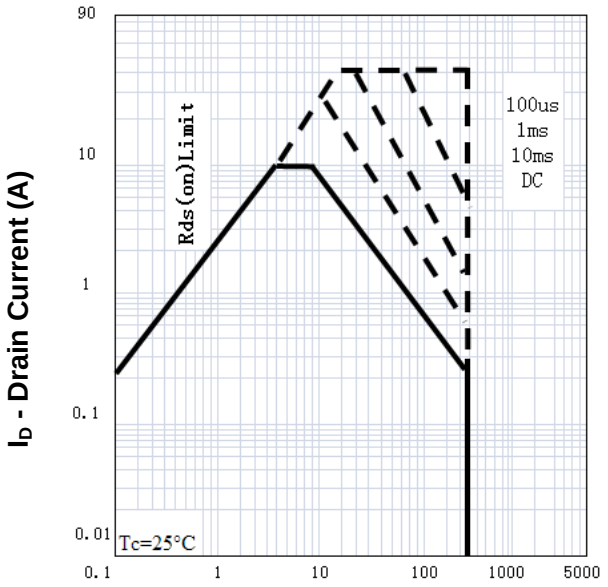
Power Dissipation



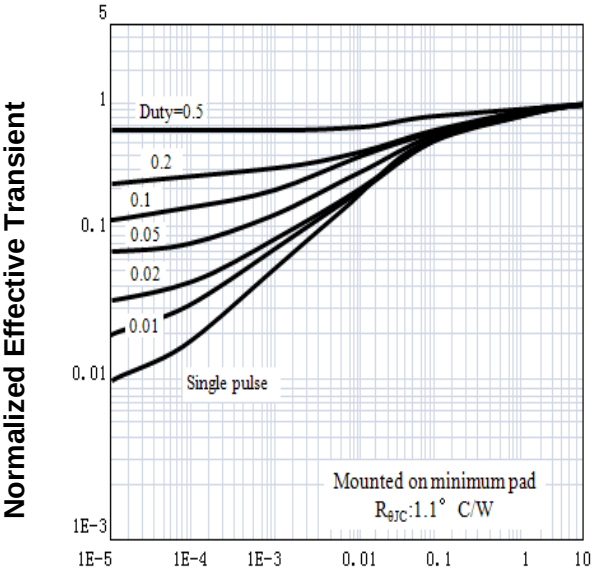
Drain Current



Safe Operation Area

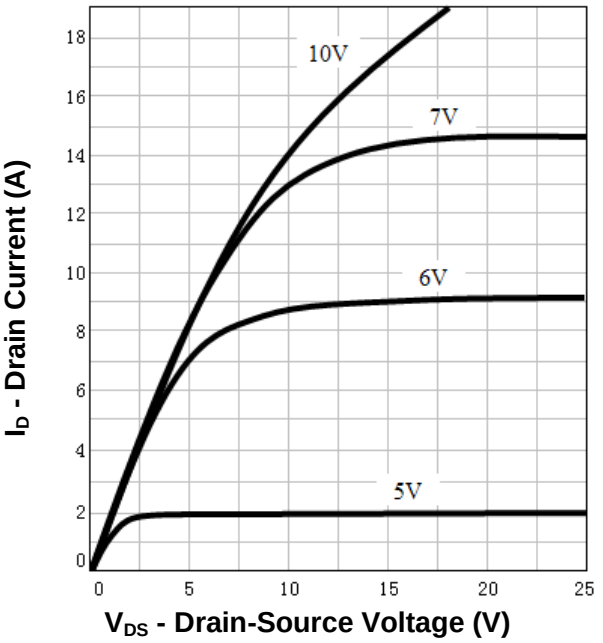


Thermal Transient Impedance

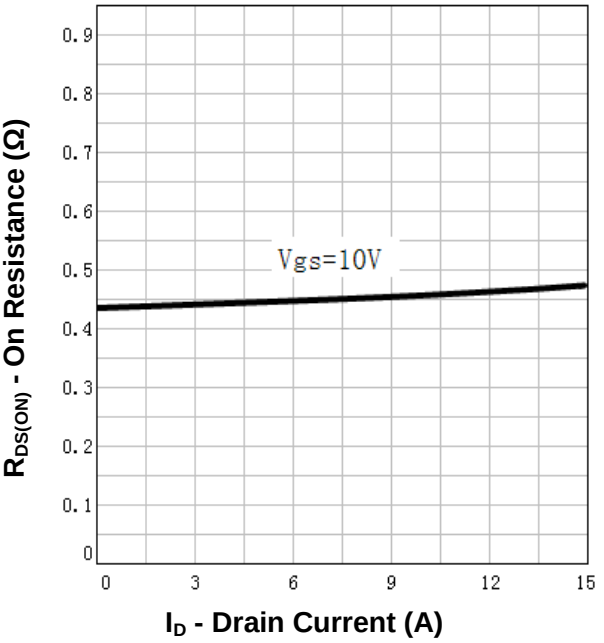


Typical Characteristics

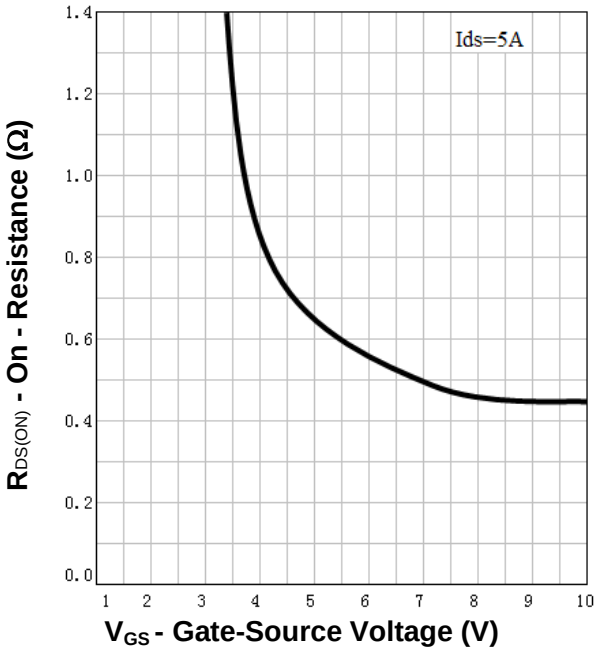
Output Characteristics



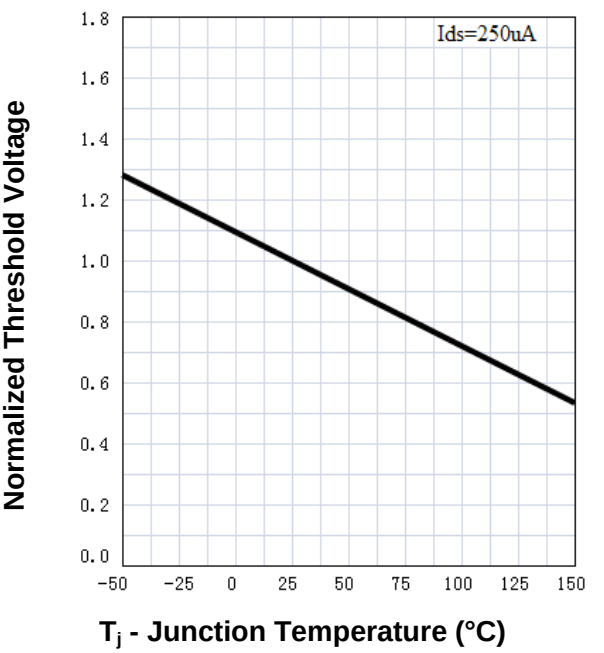
Drain-Source On Resistance



Drain-Source On Resistance

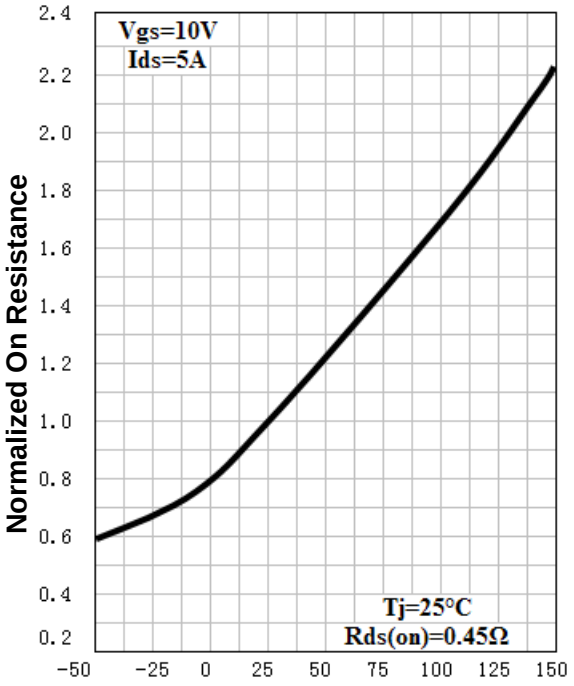


Gate Threshold Voltage



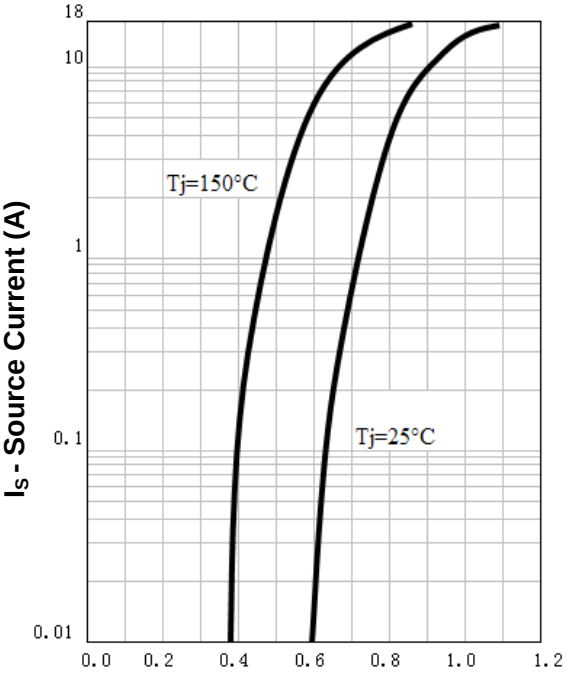
Typical Characteristics

Drain-Source On Resistance



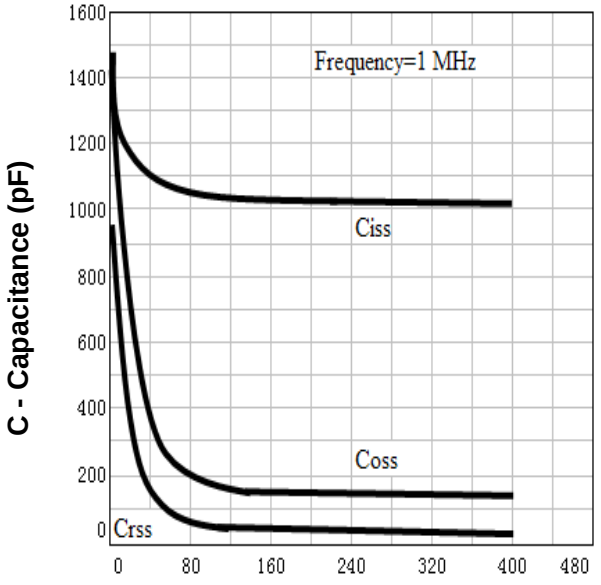
T_j - Junction Temperature (°C)

Source-Drain Diode Forward



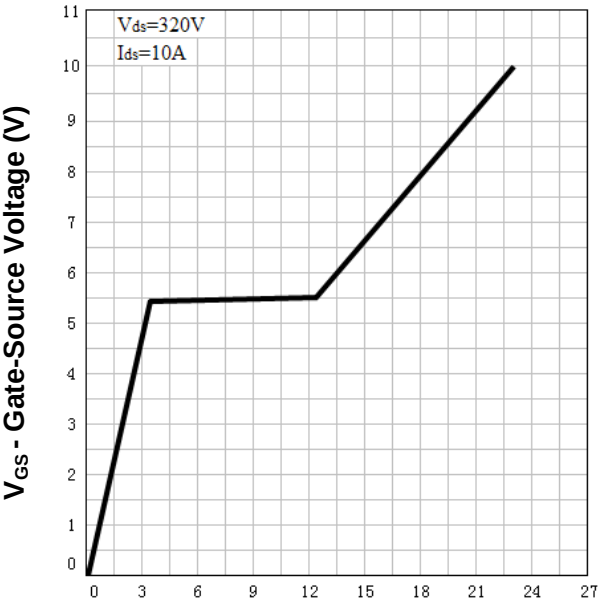
V_{SD} - Source-Drain Voltage (V)

Capacitance



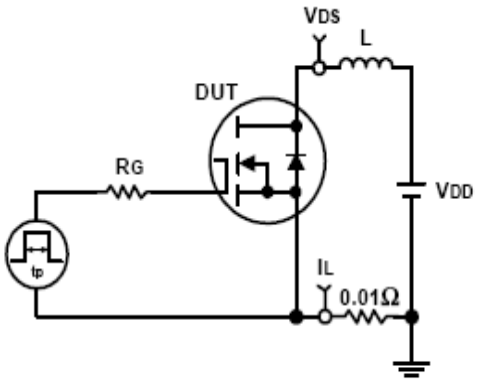
V_{DS} - Drain-Source Voltage (V)

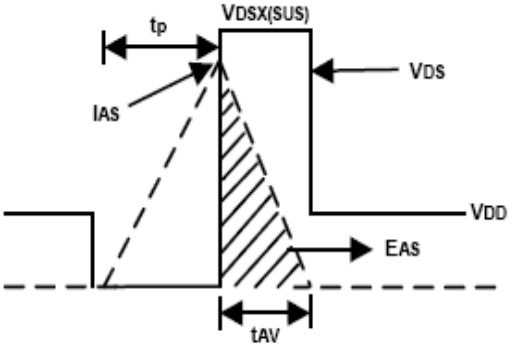
Gate Charge



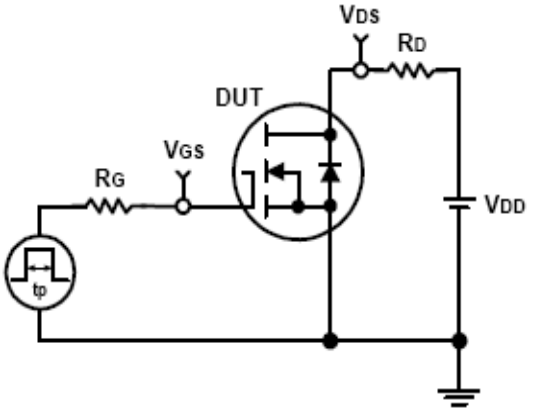
Q_G - Gate Charge (nC)

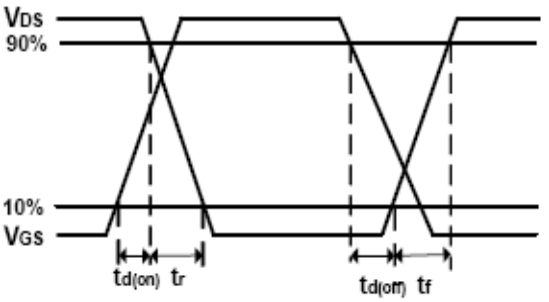
Avalanche Test Circuit and Waveforms





Switching Time Test Circuit and Waveforms



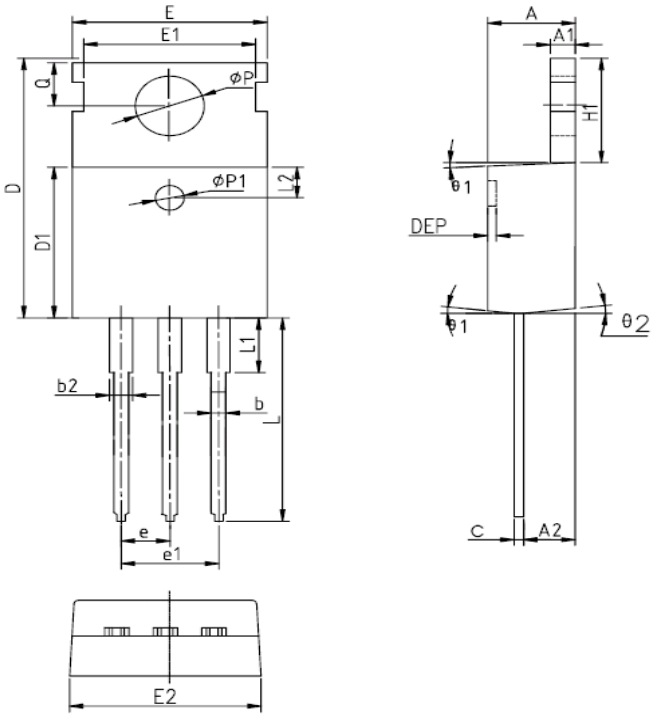


Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RU4H10R	RU4H10R	TO-220	Tube	50	-	-

Package Information

TO-220FB-3L



SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
E	9.96	10.16	10.36	0.392	0.400	0.408	Øp3	-	3.450	-	-	0.136	-
A	4.50	4.70	4.90	0.177	0.185	0.193	θ 1	5°	7°	9°	5°	7°	9°
A1	2.34	2.54	2.74	0.092	0.100	0.108	θ 2	-	45°	-	-	45°	-
A2	0.95	1.05	1.15	0.037	0.041	0.045	DEP	0.05	0.10	0.15	0.002	0.004	0.006
A3	0.42	0.52	0.62	0.017	0.020	0.024	F1	1.90	2.00	2.10	0.075	0.079	0.083
A4	2.65	2.75	2.85	0.104	0.108	0.112	F2	13.61	13.81	14.01	0.536	0.544	0.552
c	-	0.50	-	-	0.020	-	F3	3.20	3.30	3.40	0.126	0.130	0.134
D	15.67	15.87	16.07	0.617	0.625	0.633	G	3.25	3.45	3.65	0.128	0.136	0.144
Q	8.80	9.00	9.20	0.346	0.354	0.362	G1	5.90	6.00	6.10	0.232	0.236	0.240
H1	6.48	6.68	6.88	0.255	0.263	0.271	G2	6.90	7.00	7.10	0.272	0.276	0.280
e	2.54BSC			0.1BSC			b1	1.17	1.20	1.24	0.046	0.047	0.048
Øp	-	3.183	-	-	0.125	-	b2	0.77	0.8	0.85	0.030	0.031	0.033
L	12.78	12.98	13.18	0.503	0.511	0.519	b3	1.10	1.30	1.50	0.043	0.051	0.059
D1	8.99	9.19	9.39	0.354	0.362	0.370	E1	9.8	10.00	10.20	0.386	0.394	0.412
Øp1	1.40	1.50	1.60	0.055	0.059	0.063	K1	0.75	0.8	0.85	0.030	0.031	0.033
Øp2	1.15	1.20	1.25	0.045	0.047	0.049							

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