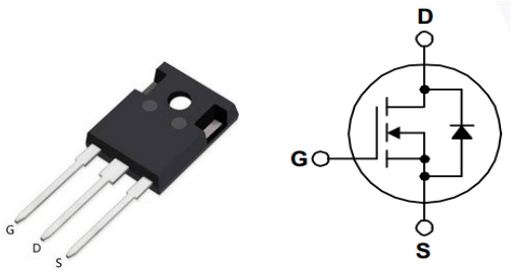
TH23N50PK

500V 23A 189mΩ Silicon N-Channel Planar Power MOSFET

Features of this MOSFET are 150℃ operating junction temperature and high repetitive peak current capability. These features combine to make this MOSFET a highly efficient, robust and reliable device for PDP driving applications.



Package view and circuit symbol

General Features

- V_{DS}=500V,I_D=23A
- Low ON Resistance,$R_{DS(on)}$,typ.=189mΩ@V_{GS}=10V,I_D=11.5A
- Low reverse transfer capacitance
- Low Qg for fast response
- Short fall & rise times for fast switching
- 100% single pulse avalanche energy Test

Applications

- Power switching application
- Digital amplifier
- Adapter and charger

Key Performance Parameters

Parameter	Value	Unit
V_{DSS}, min @ $T_{J = 25\ °C}$	**500**	V
T_J, maximum junction temperature	**150**	°C
I_D @ $T_{C = 25\ °C}$(Silicon Limit)	**23**	A
$I_{D,pulse}$ @ $T_{C = 25\ °C}$, tp limited by Tjmax.	**92**	A
$R_{DS(on)}$, typ. @ $T_{J = 25\ °C}$,$V_{GS = 10\ V}$	**189**	mΩ
E_{AS}, typ. @ $T_{J = 25\ °C}$	**1935**	mJ

RoHS SGS

Marking Information

Product Name	Package	Marking
TH23N50PK	TO-247	TH23N50PK

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Maximum Ratings (T_J = 25℃ unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain to Source Voltage		V_{DSS}	500	V
Gate to Source Voltage		V_{GSS}	±30	V
Drain Current(Silicon limit)	T_C=25℃	I_D	23	A
Pulsed Drain Current	T_C=25℃ tp limited by T_{vjmax}	I_{DM}	92	A
Avalanche energy, single pulse	L=10mH, R_g=25Ω	E_{AS}	1935	mJ
Power Dissipation	T_C=25℃	P_D	277	W
Operating Junction and Storage Temperature Range		T_J,T_{stg}	-55 To +150	℃
Lead Temperature for Soldering Purposes		T_L	270	

Thermal Characteristics

Parameter	Symbol	Max Value	Unit
Thermal Resistance, Junction−to−Case	R_{thJC}	0.45	℃/W
Thermal Resistance, Junction−to−Ambient	R_{thJA}	40	

Electerical Characteristics (T_J = 25℃ unless otherwise specified)

Parameter	Symbol	Test Condition		Value min.	Value typ.	Value max.	Unit
Drain-to-Source Breakdown Voltage	B_{VDSS}	V_{GS}=0V,I_D=250μA		500	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS}=0V V_{DS}=V_{DSS}	T_J=25℃	-	-	1	μA
		V_{GS}=0V V_{DS}=80%V_{DSS}	T_J=125℃	-	-	10	
Gate−to−Source leakage Current	I_{GSS}	V_{GS}=±30V,V_{DS}=0V		-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D=250uA	T_J=25℃	2.0	-	4.0	V
Drain-Source on-state resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=11.5A	T_J=25℃	-	189	227	mΩ
Gate resistance	Rg	V_{GS}=0V,V_{DS}=0V,f=1MHz		-	1.1	-	Ω
Transconductance	g_{fs}	V_{DS}=40V,I_D=11.5A		-	20	-	S
Input Capacitance	C_{ISS}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1 MHz		-	4260	-	pF
Output Capacitance	C_{OSS}			-	317	-	
Reverse Transfer Capacitance	C_{RSS}			-	2.4	-	
Total Gate Charge	Qg	V_{DS} = 400 V, V_{GS} = 0/10 V, I_D = 23 A		-	80	-	nC
Gate- Source charge	Qgs				24		
Gate-Drain charge	Qgd				28		
Turn−On Delay Time	td(on)	V_{DS} = 250 V V_{GS} = 10 V I_D = 23 A R_G = 25Ω T_J = 25℃		-	90	-	ns
Turn−Off Delay Time	td(off)			-	95	-	
Rise time	tr			-	365	-	
Fall time	tf			-	85	-	

Diode Characteristics (T_J = 25℃ unless otherwise specified)

Parameter	Symbol	Test Condition		Value min.	Value typ.	Value max.	Unit
Diode Continous Forward Current	I_S	T_C=25℃		-	-	23	A
Pulsed Diode Forward Current	I_{SM}			-	-	92	
Diode Forward Voltage	V_{SD}	I_S = 23A	T_J = 25℃	-	-	1.5	V
Reverse Recovery Time	trr	V_R = 400 V, I_S = 23 A, dI_S/dt = 100 A/μs,T_J = 25℃		-	450	-	ns
Reverse Recovery Charge	Qrr			-	5.4	-	uC

Typical Performance Characteristics

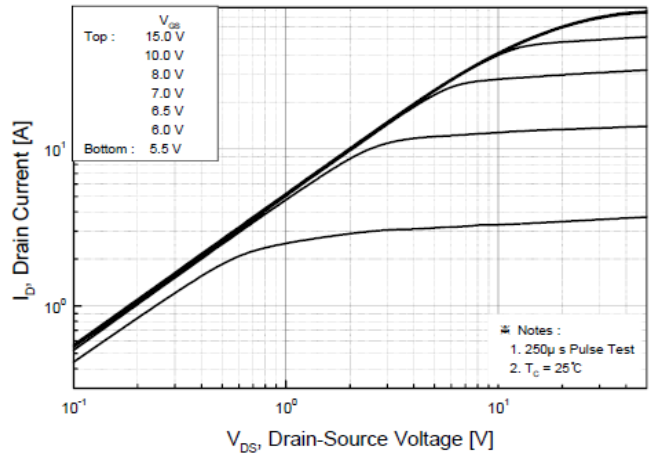


Fig 1. Typical output characteristic

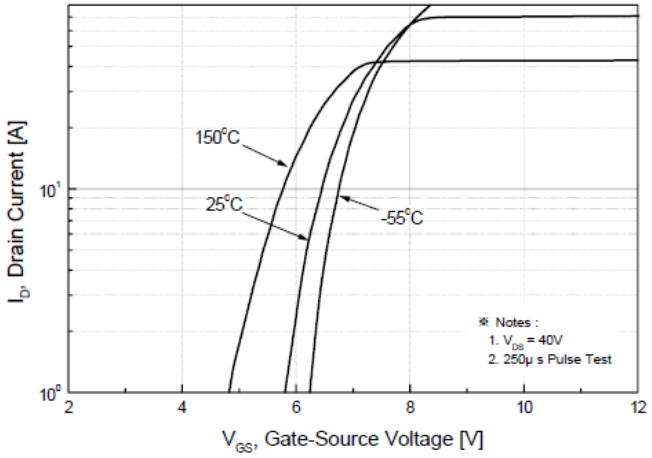


Fig 2. Typical transfer characteristic

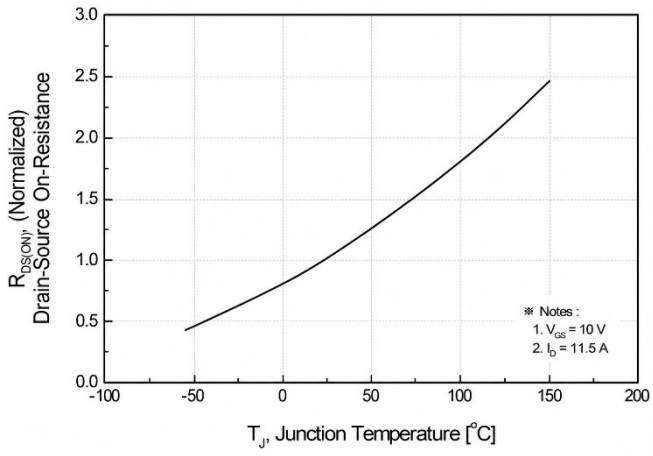


Fig 3. On-Resistance vs. Junction Temperature

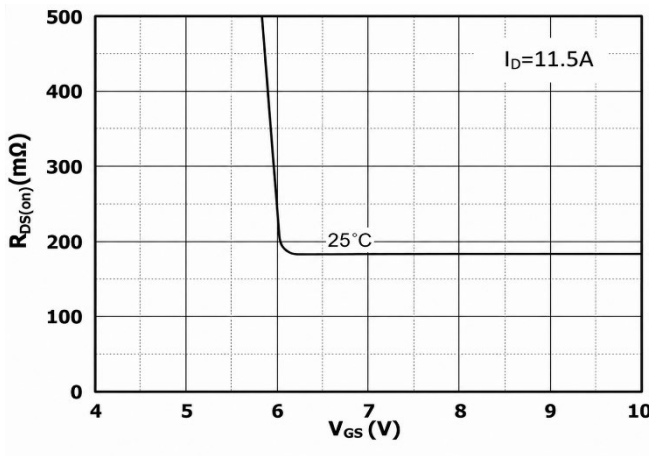


Fig 4. Rds(on) vs Gate Voltage

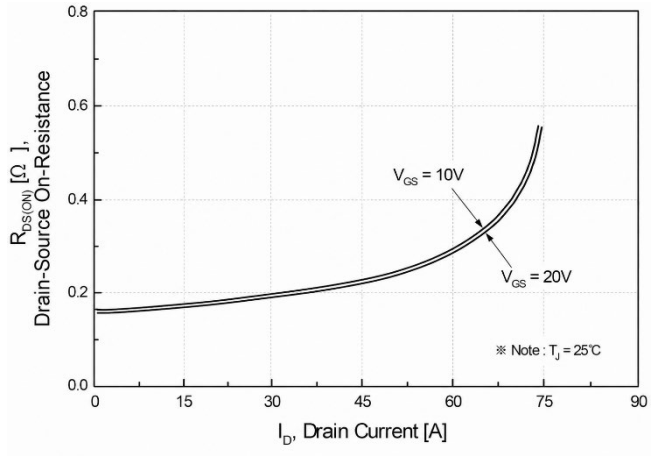


Fig 5. Rds(on) vs Drain Currentand Gate Voltage

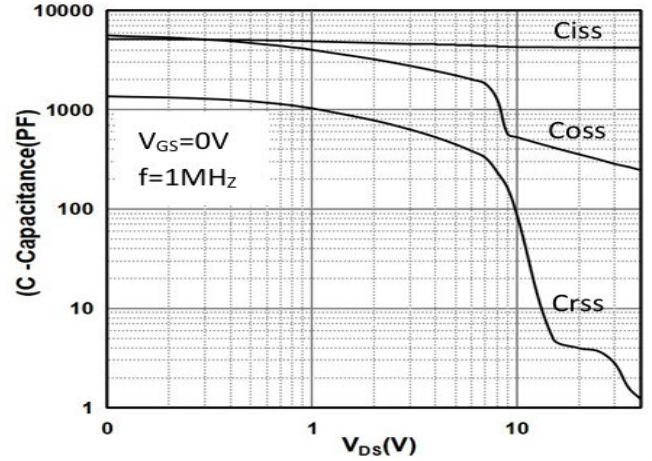


Fig 6. Capacitance Characteristics

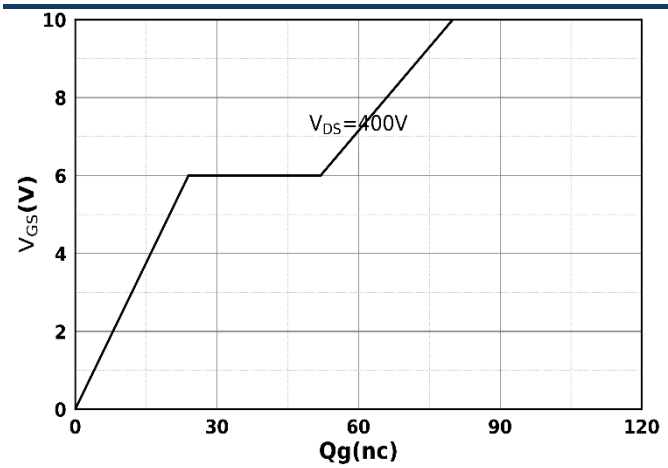


Fig 7. Gate Charge Characteristics

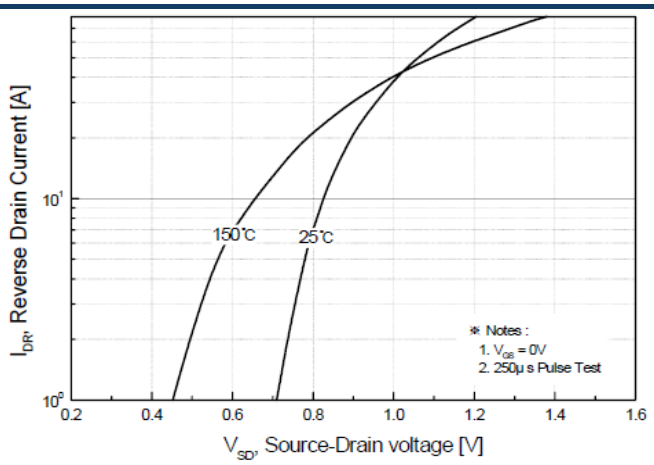


Fig 8. Body-diode Forward Characteristics

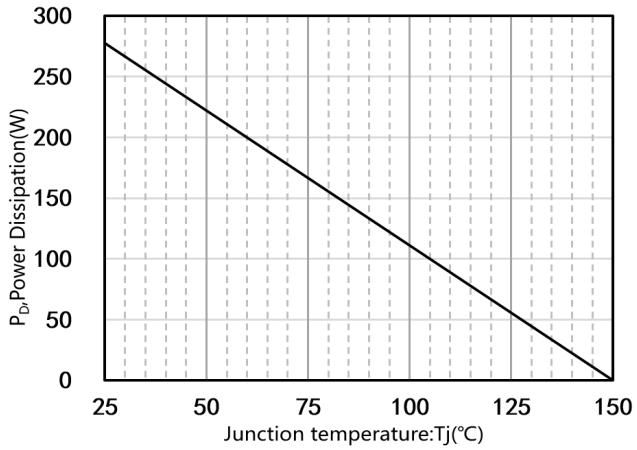


Fig 9. Power Dissipation

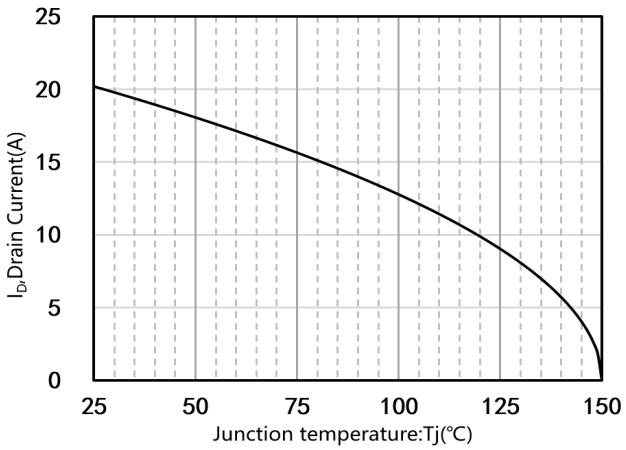


Fig 10. Drain Current Derating

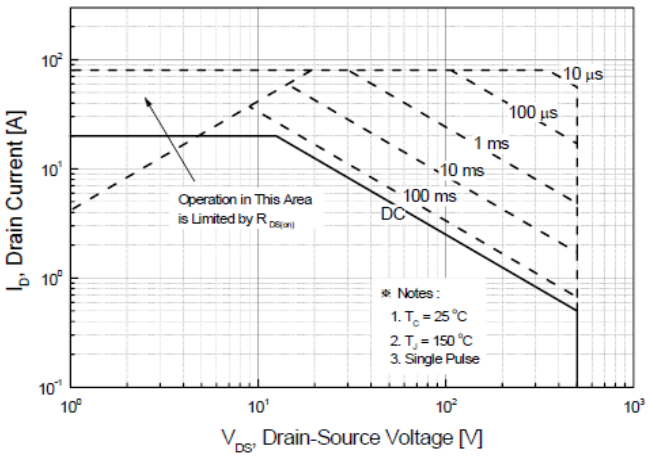


Fig 11. Safe Operating Area

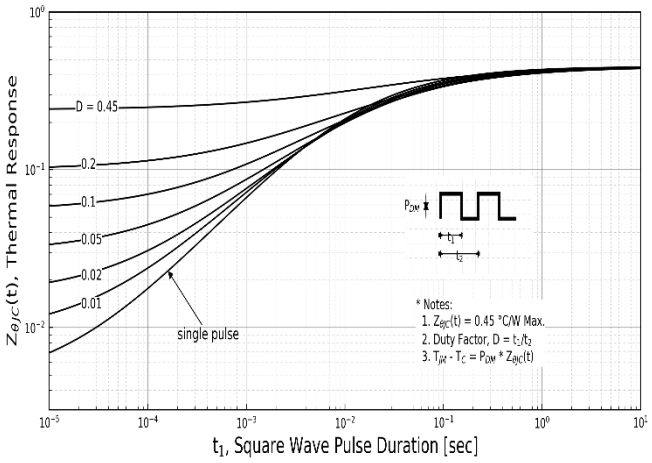
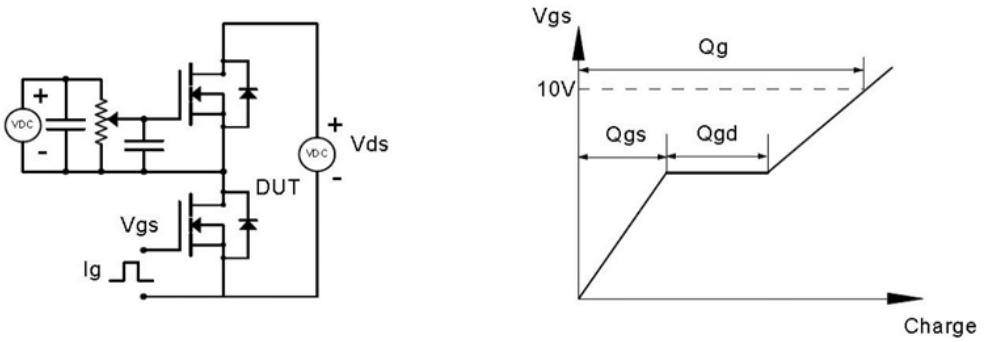
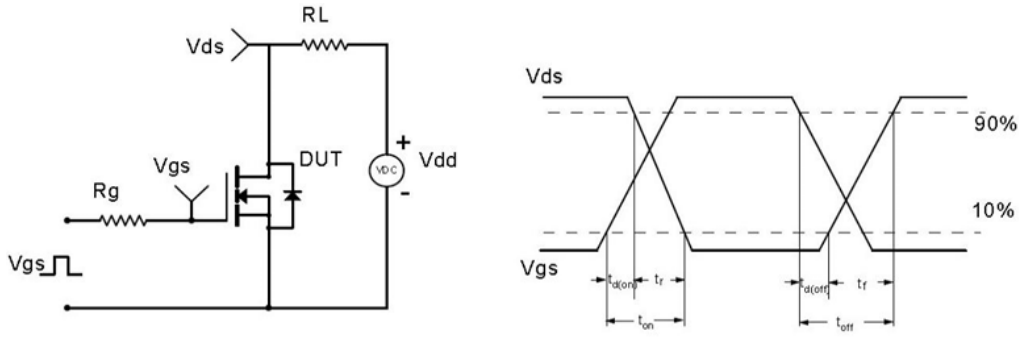


Fig 12. Transient Thermal Response Curve

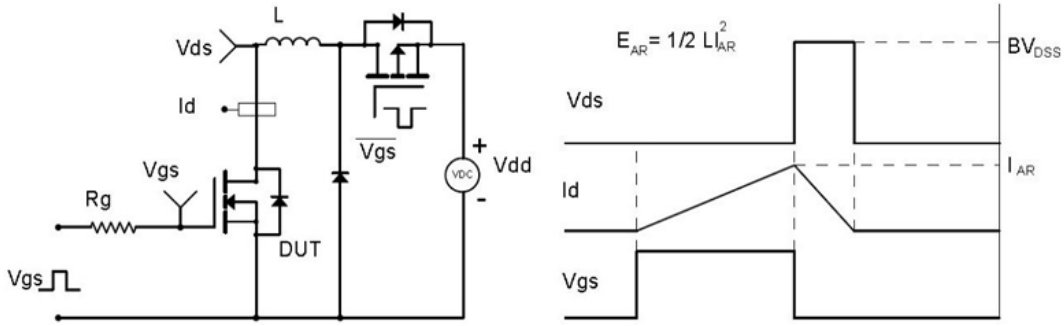
Test Circuit & Waveform



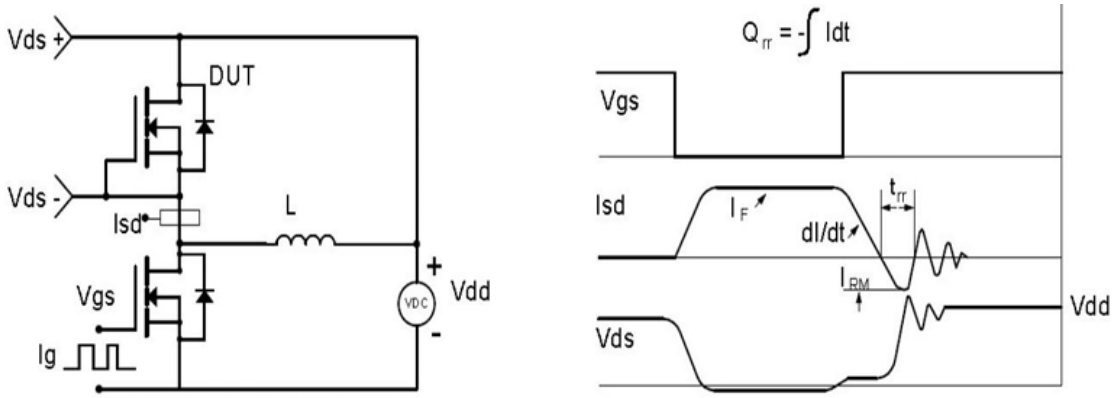
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

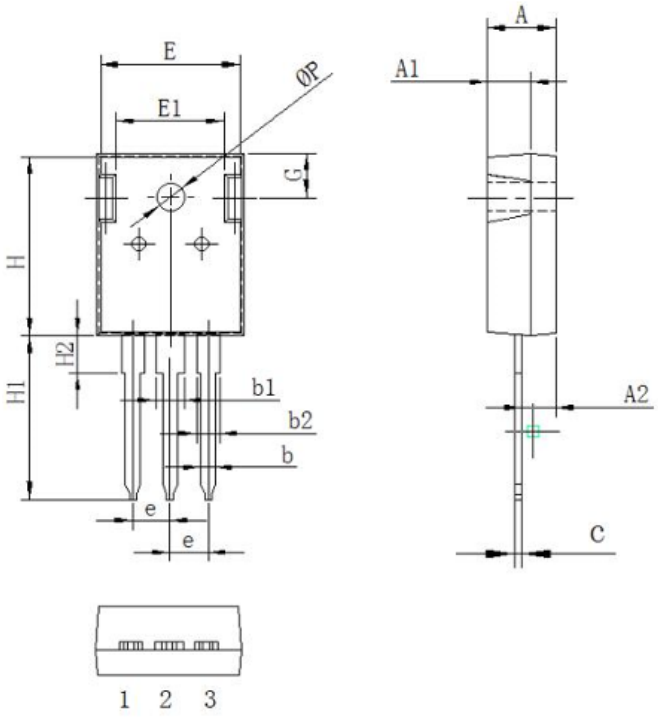


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

Package Information



基本尺寸

Symbol	单位 mm		
	Min	Nom	Max
A	4.8	5.00	5.20
A1	3.3	3.5	3.7
A2	2.20	2.40	2.60
b	1.00	1.2	1.40
b1	2.90	3.10	3.30
b2	1.90	2.10	2.30
c	0.50	0.60	0.70
e	5.25	5.45	5.65
E	15.2	15.7	16.2
E1	10.2	10.7	11.2
H	20.8	21	21.2
H1	19.5	20.0	20.5
H2	4.00	4.20	4.40
G	5.60	5.80	600
ΦP	3.50	3.70	3.90

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