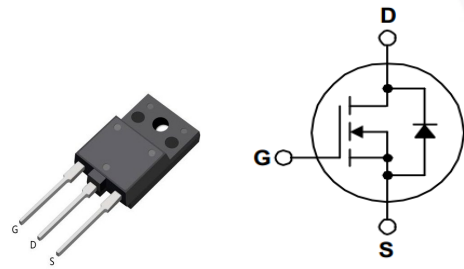


TH3N150PH

1500V 3A 5.5Ω Silicon N-Channel Planar Power MOSFET

Features of this MOSFET are 150°C 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

- $V_{DS}=1500V, I_D=3A$
- Low ON Resistance, $R_{DS(on), typ.}=5.5\Omega @ V_{GS}=10V, I_D=1.5A$
- 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
$V_{DSS}, \text{min} @ T_J = 25^\circ\text{C}$	1500	V
$T_J, \text{maximum junction temperature}$	150	°C
$I_D @ T_C = 25^\circ\text{C} (\text{Silicon Limit})$	3	A
$I_{D,pulse} @ T_C = 25^\circ\text{C}, t_p \text{ limited by } T_{Jmax.}$	12	A
$R_{DS(on)}, \text{typ.} @ T_J = 25^\circ\text{C}, V_{GS} = 10\text{V}$	5.5	Ω
$E_{AS}, \text{typ.} @ T_J = 25^\circ\text{C}$	600	mJ



Marking Information

Product Name	Package	Marking
TH3N150PH	TO-3PH	TH3N150PH

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Maximum Ratings ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain to Source Voltage		V_{DS}	1500	V
Gate to Source Voltage		V_{GS}	± 30	V
Drain Current _(Silicon limit)	$T_C = 25^\circ\text{C}$	I_D	3	A
Pulsed Drain Current	$T_C = 25^\circ\text{C}$ tp limited by T_{vjmax}	I_{DM}	12	A
Avalanche energy, single pulse	$L = 40\text{mH}$, $R_g = 25\Omega$	E_{AS}	600	mJ
Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	186	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 To +150	$^\circ\text{C}$
Lead Temperature for Soldering Purposes		T_L	270	

Thermal Characteristics

Parameter	Symbol	Max Value	Unit
Thermal Resistance, Junction-to-Case	R_{thJC}	0.67	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient	R_{thJA}	75	

Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Value			Unit
			min.	typ.	max.	
Drain-to-Source Breakdown Voltage	$B_{V_{DS}}$	$V_{GS}=0V, I_D=250\mu A$	1500	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0V$ $V_{DS}=V_{DSS}$ $T_J=25^\circ\text{C}$	-	-	1	μA
		$V_{GS}=0V$ $V_{DS}=80\%V_{DSS}$ $T_J=125^\circ\text{C}$	-	-	10	
Gate-to-Source leakage Current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}$, $I_D=250\mu A$ $T_J=25^\circ\text{C}$	2.5	-	4.5	V
Drain-Source on-state resistance	$R_{DS(on)}$	$V_{GS}=10V$, $I_D=1.5A$ $T_J=25^\circ\text{C}$	-	5.5	6.8	Ω
Gate resistance	R_g	$V_{GS}=0V, V_{DS}=0V, f=1\text{MHz}$	-	1.4	-	Ω
Transconductance	g_{fs}	$V_{DS}=15V, I_D=1.5A$	-	3	-	S
Input Capacitance	C_{iss}	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1\text{ MHz}$	-	1250	-	pF
Output Capacitance	C_{oss}		-	115	-	
Reverse Transfer Capacitance	C_{rss}		-	15	-	
Total Gate Charge	Q_g	$V_{DS} = 1200\text{ V}, V_{GS} = 0/10\text{ V},$ $I_D = 3\text{ A}$	-	36	-	nC
Gate- Source charge	Q_{gs}			9		
Gate-Drain charge	Q_{gd}			12		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 750\text{ V}$	-	25	-	ns
Turn-Off Delay Time	$t_{d(off)}$	$V_{GS} = 10\text{ V}$	-	57	-	
Rise time	t_r	$I_D = 3\text{ A}$ $R_G = 25\Omega$	-	48	-	
Fall time	t_f	$T_J = 25^\circ\text{C}$	-	52	-	

Diode Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Value			Unit
			min.	typ.	max.	
Diode Continuous Forward Current	I_S	$T_C=25^\circ\text{C}$	-	-	3	A
Pulsed Diode Forward Current	I_{SM}		-	-	12	
Diode Forward Voltage	V_{SD}	$I_S = 3A$ $T_J = 25^\circ\text{C}$	-	-	1.5	V
Reverse Recovery Time	t_{rr}	$V_R = 750\text{ V}, I_S = 3\text{ A},$	-	250	-	ns
Reverse Recovery Charge	Q_{rr}	$di/dt = 100\text{ A}/\mu\text{s}, T_J = 25^\circ\text{C}$	-	1.1	-	μC

Typical Performance Characteristics

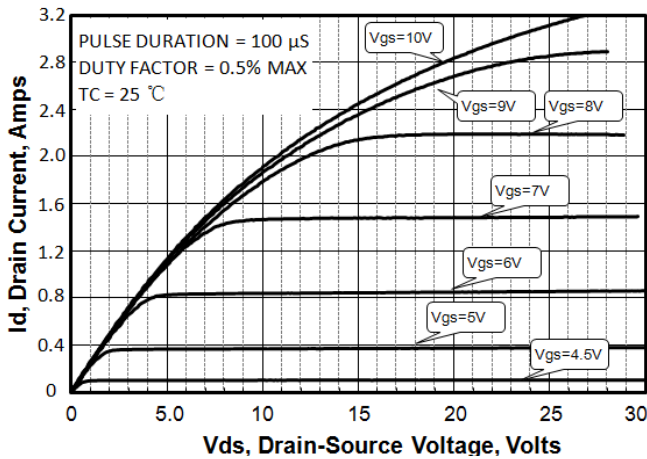


Fig 1. Typical output characteristic

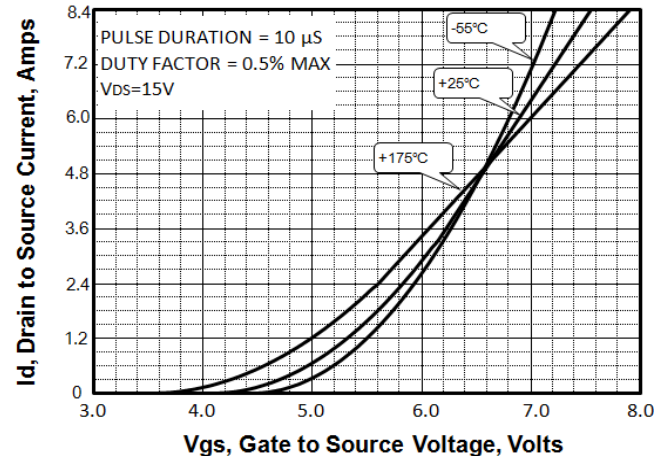


Fig 2. Typical transfer characteristic

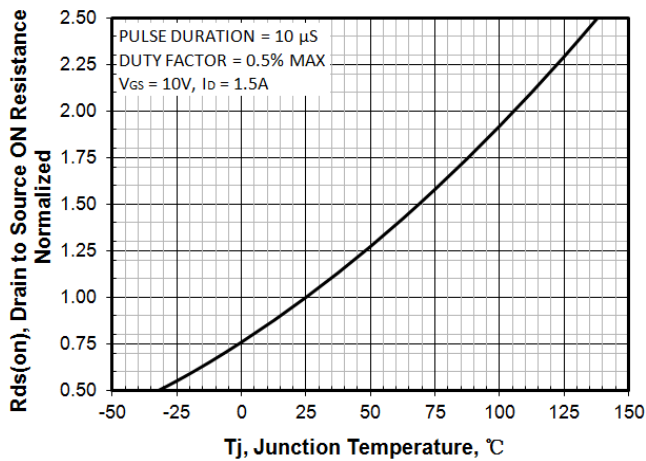


Fig 3. On-Resistance vs. Junction Temperature

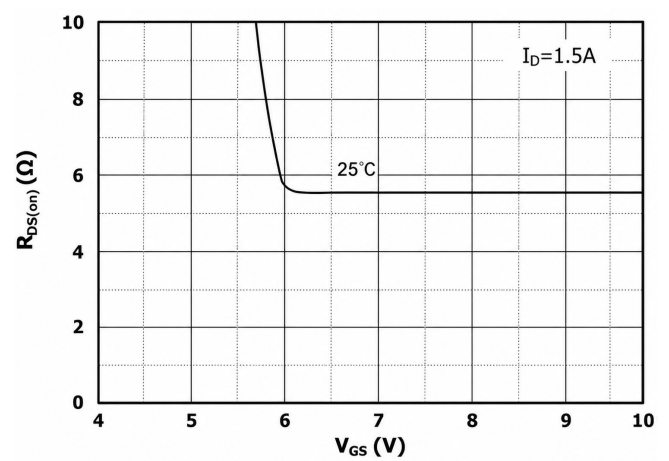


Fig 4. $R_{ds(on)}$ vs Gate Voltage

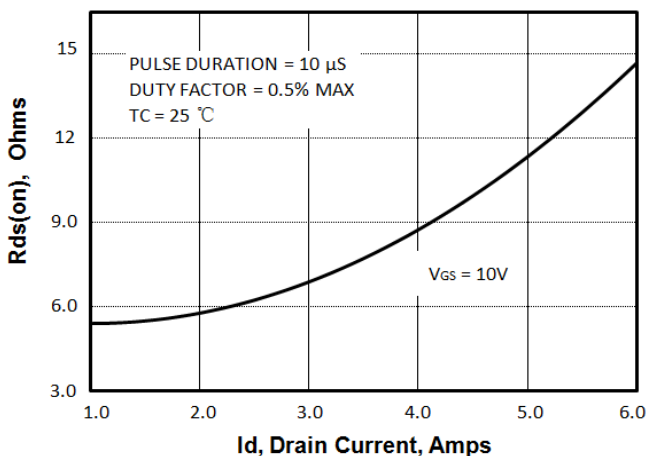


Fig 5. $R_{ds(on)}$ vs Drain Current and Gate Voltage

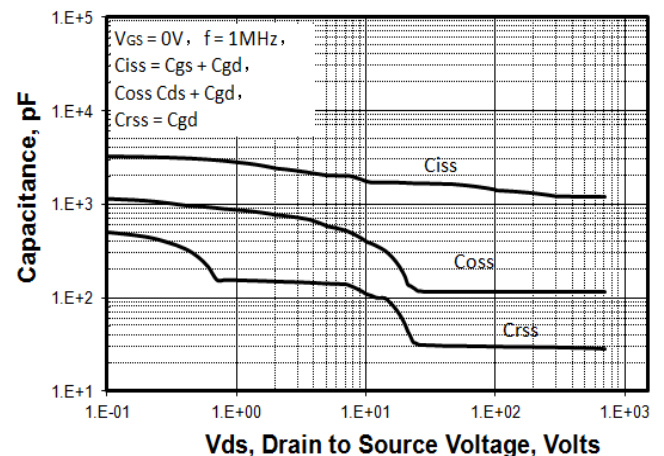


Fig 6. Capacitance Characteristics

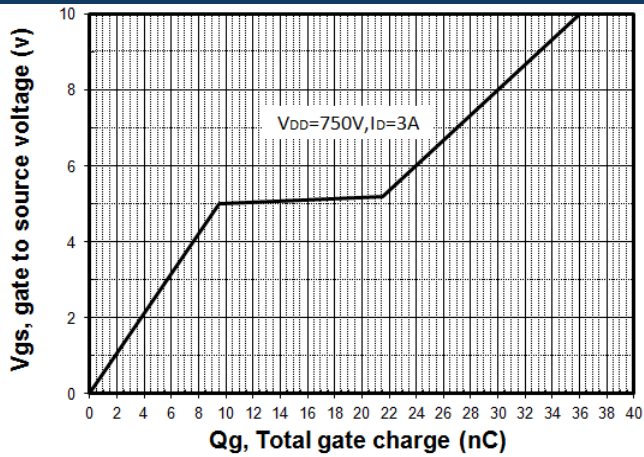


Fig 7. Gate Charge Characteristics

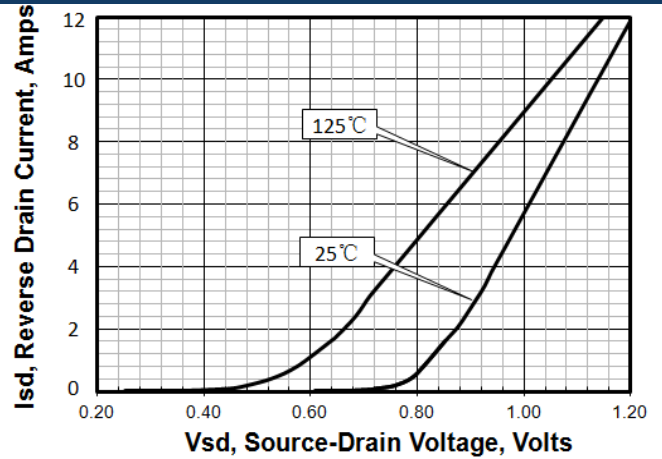


Fig 8. Body-diode Forward Characteristics

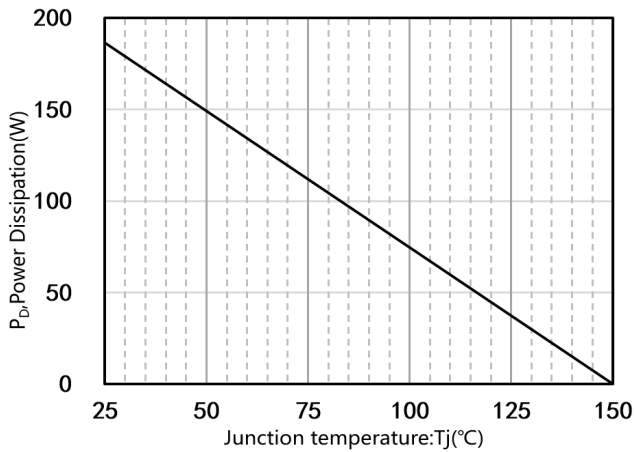


Fig 9. Power Dissipation

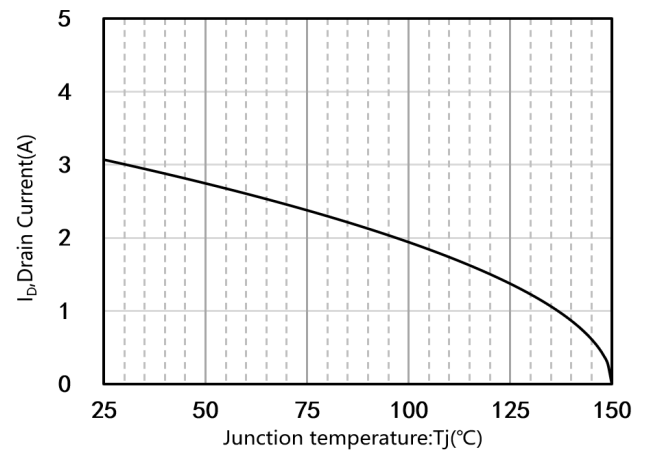


Fig 10. Drain Current Derating

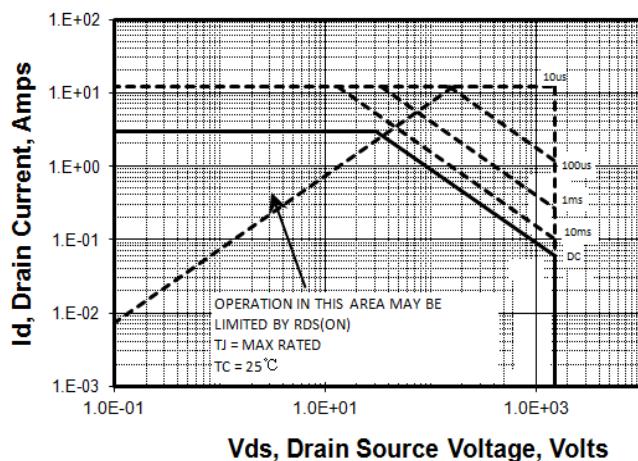


Fig 11. Safe Operating Area

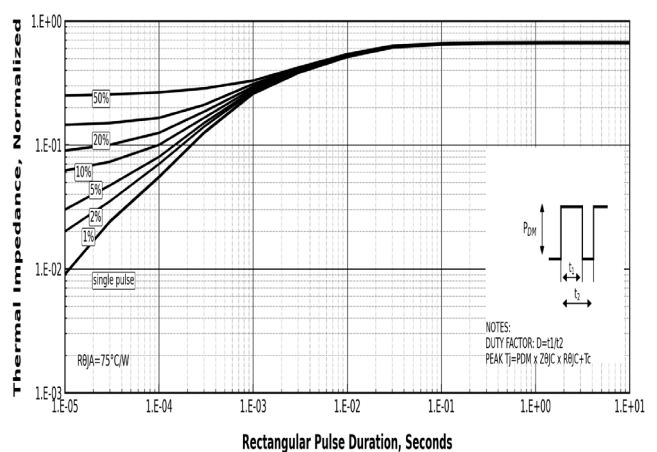
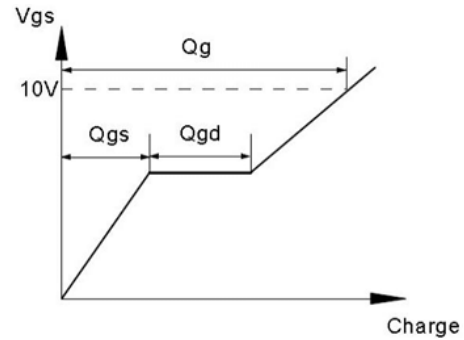
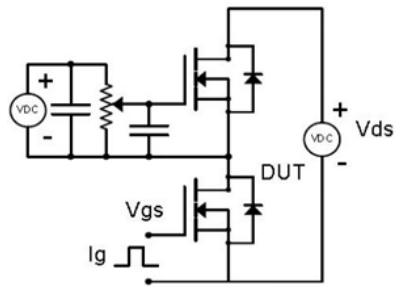
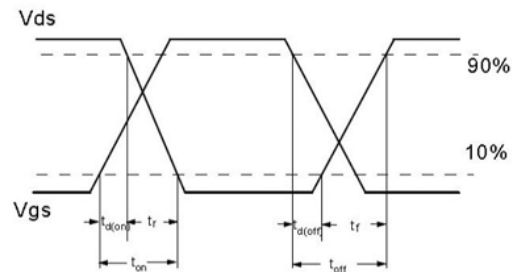
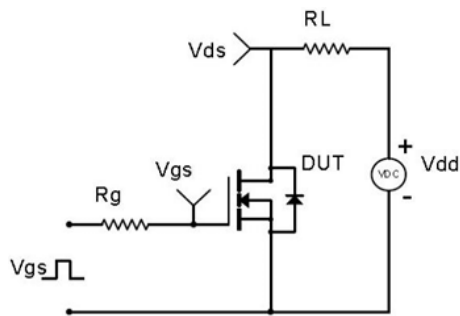


Fig 12. Transient Thermal Response Curve

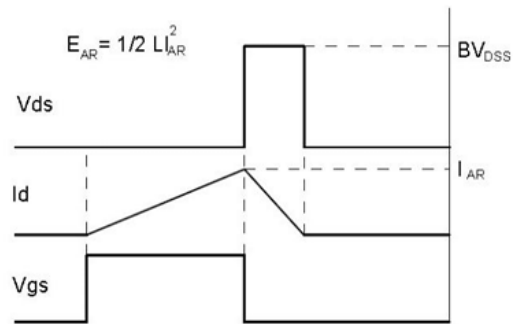
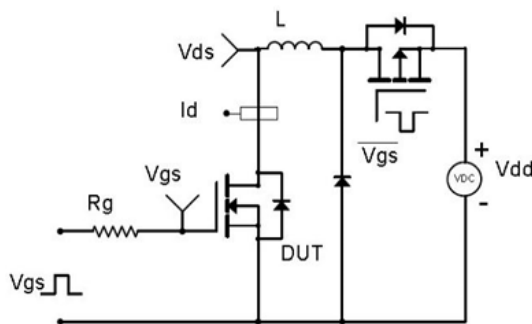
Test Circuit & Waveform



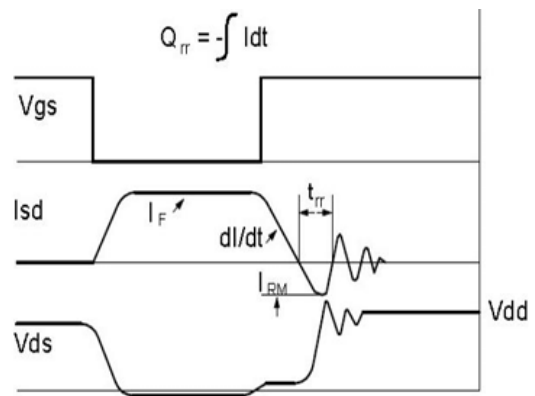
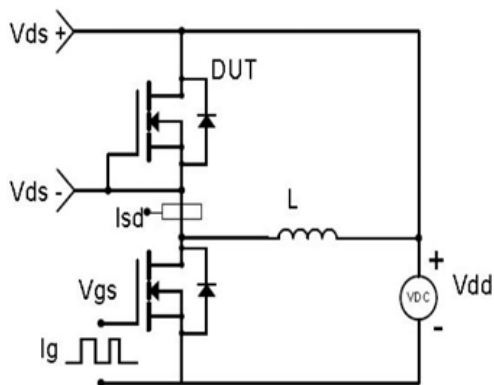
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



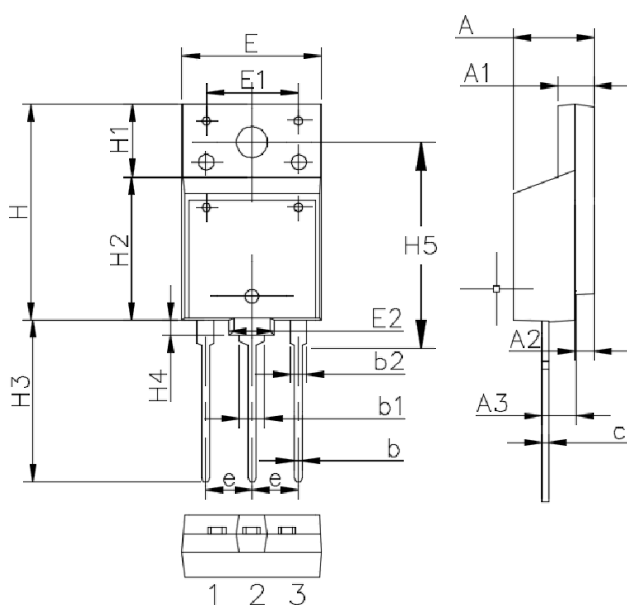
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

Package Information

基本尺寸



Symbol	单位 mm		
	Min	Nom	Max
A	5.35	5.55	5.75
A1	2.80	3.00	3.20
A2	1.90	2.10	2.30
A3	1.00	1.20	1.40
b	0.80	0.90	1.00
b1	1.80	2.00	2.20
b2	1.80	2.00	2.20
c	0.70	0.90	1.10
e	5.25	5.45	5.65
E	15.2	15.4	15.6
E1	9.80	10.0	10.2
E2	3.80	4.00	4.20
H	24.3	24.5	24.7
H1	9.80	10.0	10.2
H2	14.3	14.5	14.7
H3	18.5	19.0	19.5
H4	2.00	2.20	2.40
H5	24.0	24.5	25.0
G	4.3	4.5	4.7
ΦP	3.30	3.50	3.70

Notice

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