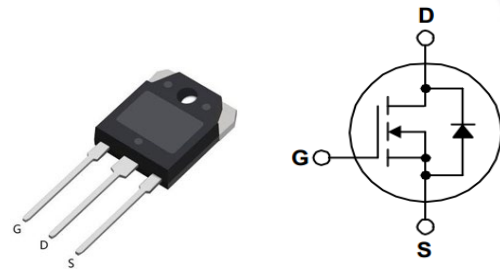


TH18N50PB

500V 18A 258mΩ 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

- $V_{DS}=500V, I_D=18A$
- Low ON Resistance, $R_{DS(on), typ.}=258m\Omega @ V_{GS}=10V, I_D=9A$
- 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
$V_{DSS}, \min @ T_J = 25^\circ C$	500	V
$T_J, \text{maximum junction temperature}$	150	°C
$I_D @ T_C = 25^\circ C (\text{Silicon Limit})$	18	A
$I_{D,pulse} @ T_C = 25^\circ C, t_p \text{ limited by } T_{Jmax}.$	72	A
$R_{DS(on), typ.} @ T_J = 25^\circ C, V_{GS} = 10 V$	258	mΩ
$E_{AS}, typ. @ T_J = 25^\circ C$	1390	mJ



Marking Information

Product Name	Package	Marking
TH18N50PB	TO-3PN	TH18N50PB

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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}	500	V
Gate to Source Voltage		V_{GS}	± 30	V
Drain Current _(Silicon limit)	$T_C = 25^\circ\text{C}$	I_D	18	A
Pulsed Drain Current	$T_C = 25^\circ\text{C}$ tp limited by T_{vjmax}	I_{DM}	72	A
Avalanche energy, single pulse	$L = 10\text{mH}$, $R_g = 25\Omega$	E_{AS}	1390	mJ
Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	211	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}	0.59	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient	R_{thJA}	40	

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	$B_{V_{DS}}$	$V_{GS}=0V, I_D=250\mu A$	500	-	-	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	$V_{GS(th)}$	$V_{GS}=V_{DS}$, $I_D=250\mu A$ $T_J=25^\circ\text{C}$	2.0	-	4.0	V
Drain-Source on-state resistance	$R_{DS(on)}$	$V_{GS}=10V$, $I_D=9A$ $T_J=25^\circ\text{C}$	-	258	310	m Ω
Gate resistance	R_g	$V_{GS}=0V, V_{DS}=0V, f=1\text{MHz}$	-	0.9	-	Ω
Transconductance	g_{fs}	$V_{DS}=40V, I_D=9A$	-	23	-	S
Input Capacitance	C_{iss}	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1\text{ MHz}$	-	3015	-	pF
Output Capacitance	C_{oss}		-	225	-	
Reverse Transfer Capacitance	C_{rss}		-	1.9	-	
Total Gate Charge	Q_g	$V_{DS} = 400\text{ V}, V_{GS} = 0/10\text{ V},$ $I_D = 18\text{ A}$	-	60	-	nC
Gate- Source charge	Q_{gs}			15		
Gate-Drain charge	Q_{gd}			22		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 250\text{ V}$	-	58	-	ns
Turn-Off Delay Time	$t_{d(off)}$	$V_{GS} = 10\text{ V}$	-	97	-	
Rise time	t_r	$I_D = 18\text{ A}$ $R_G = 25\Omega$	-	170	-	
Fall time	t_f	$T_J = 25^\circ\text{C}$	-	95	-	

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	$T_C=25^\circ\text{C}$	-	-	18	A
Pulsed Diode Forward Current	I_{SM}		-	-	72	
Diode Forward Voltage	V_{SD}	$I_S = 18A$ $T_J = 25^\circ\text{C}$	-	-	1.5	V
Reverse Recovery Time	t_{rr}	$V_R = 400\text{ V}, I_S = 18\text{ A},$	-	400	-	ns
Reverse Recovery Charge	Q_{rr}	$di/dt = 100\text{ A}/\mu\text{s}, T_J = 25^\circ\text{C}$	-	4.8	-	μC

Typical Performance Characteristics

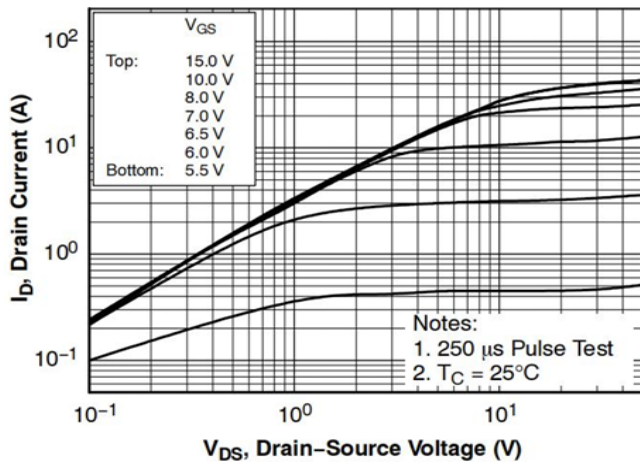


Fig 1. Typical output characteristic

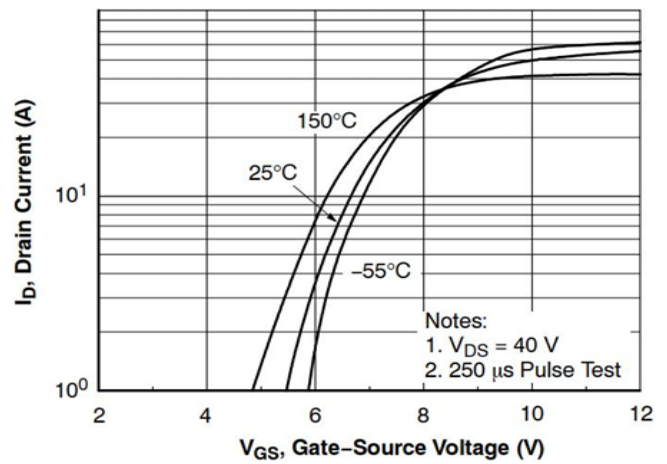


Fig 2. Typical transfer characteristic

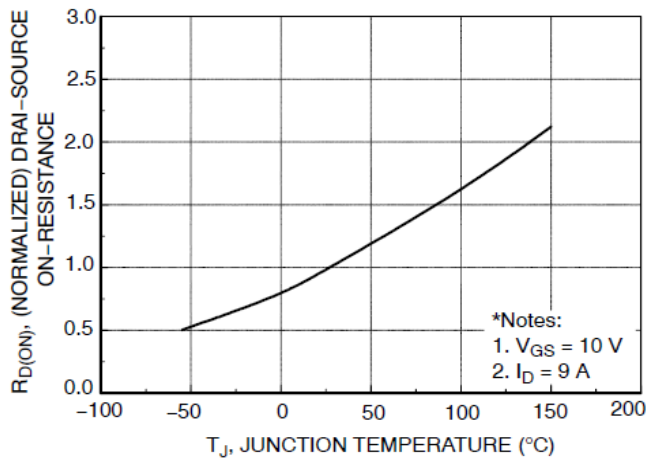


Fig 3. On-Resistance vs. Junction Temperature

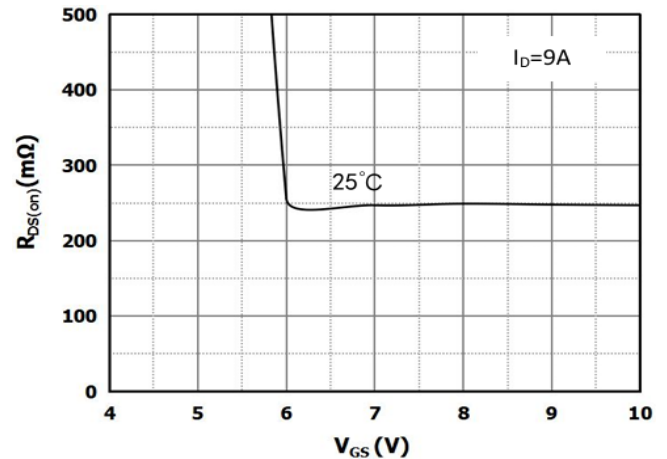


Fig 4. $R_{DS(on)}$ vs Gate Voltage

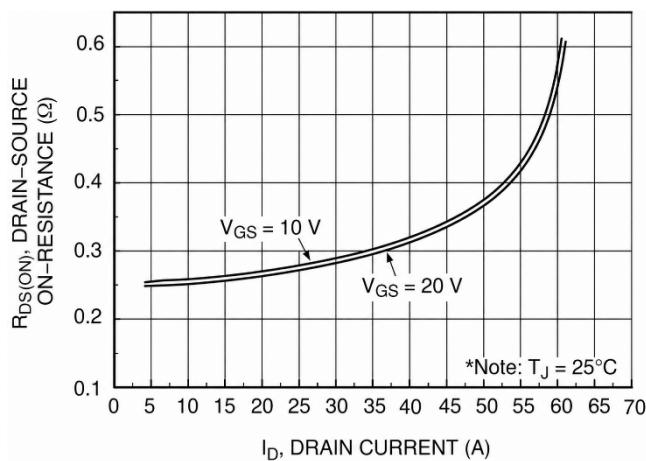


Fig 5. $R_{DS(on)}$ vs Drain Current and Gate Voltage

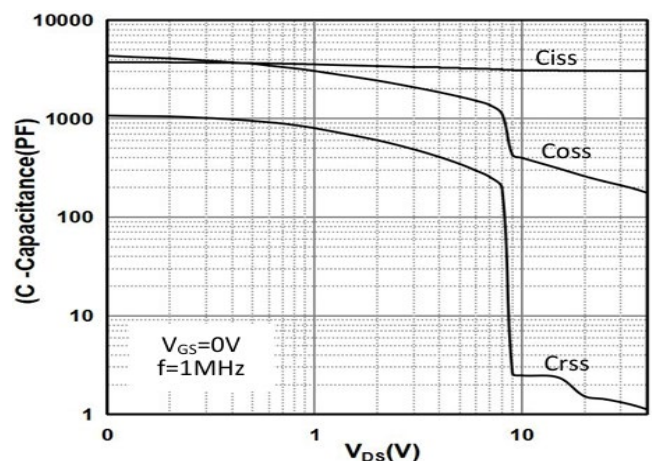


Fig 6. Capacitance Characteristics

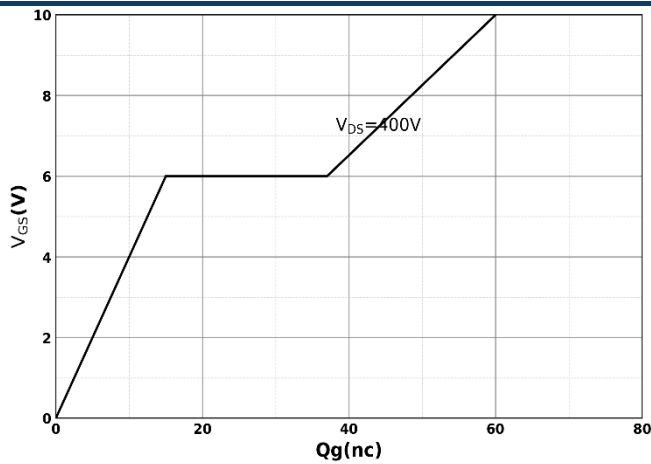


Fig 7. Gate Charge Characteristics

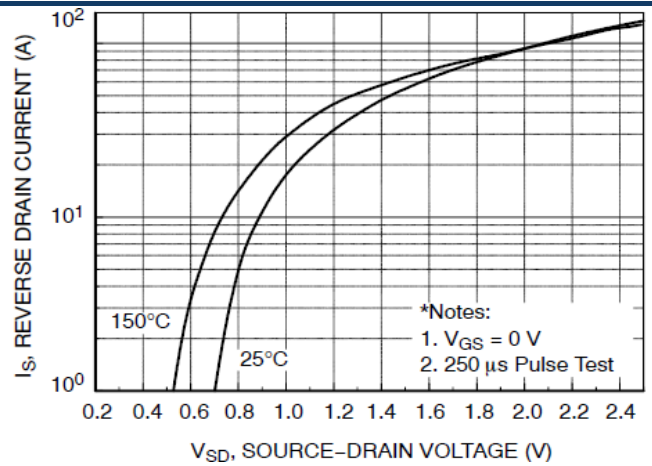


Fig 8. Body-diode Forward Characteristics

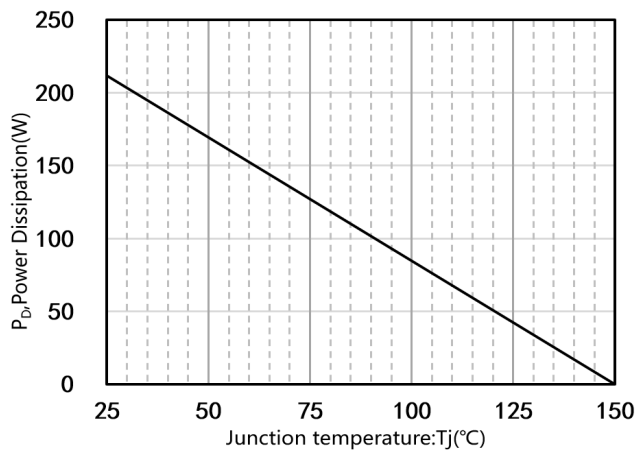


Fig 9. Power Dissipation

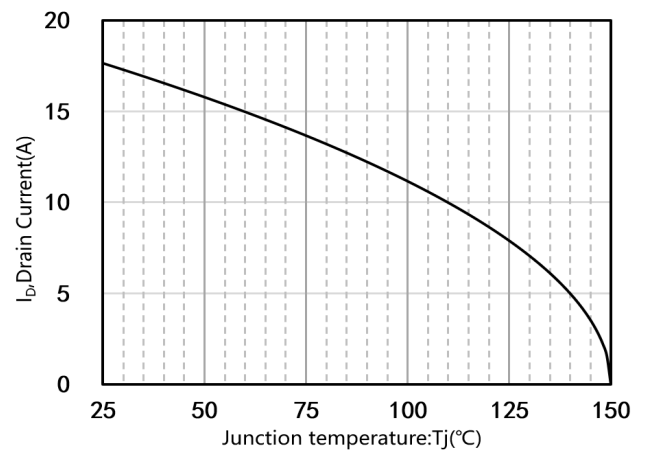


Fig 10. Drain Current Derating

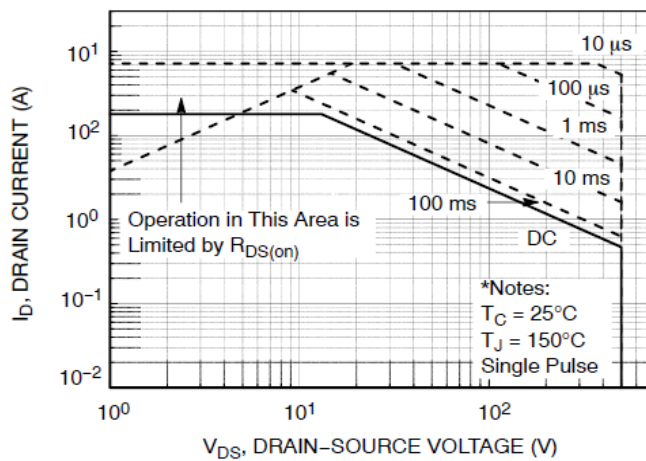


Fig 11. Safe Operating Area

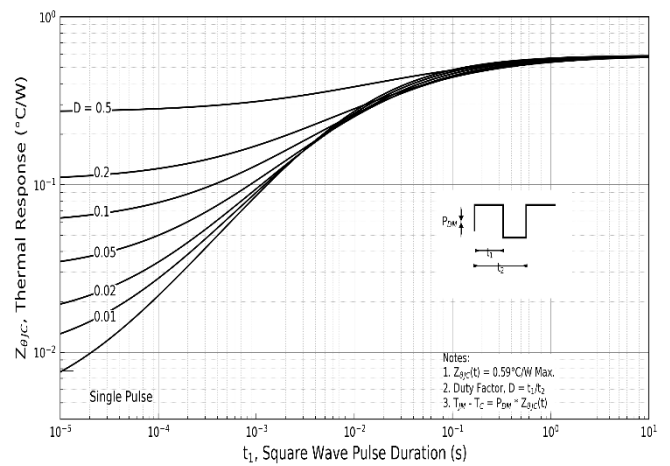
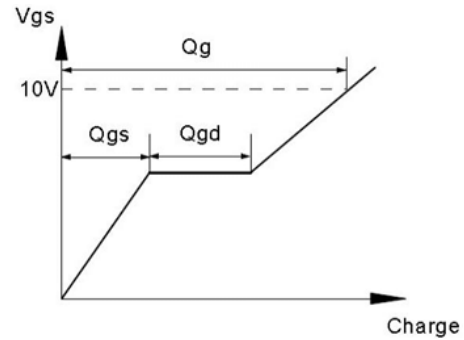
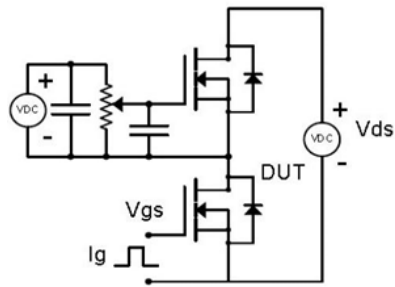
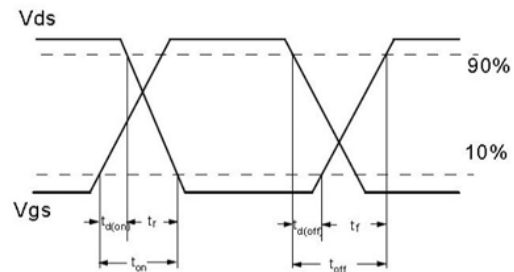
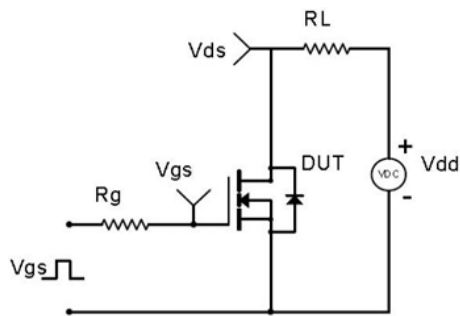


Fig 12. Transient Thermal Response Curve

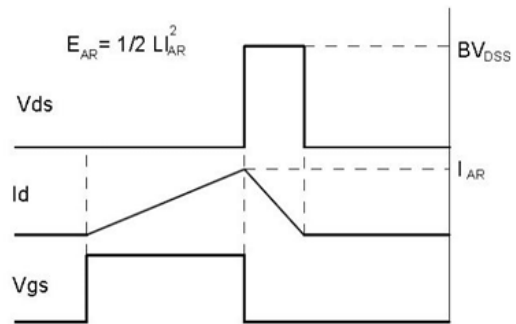
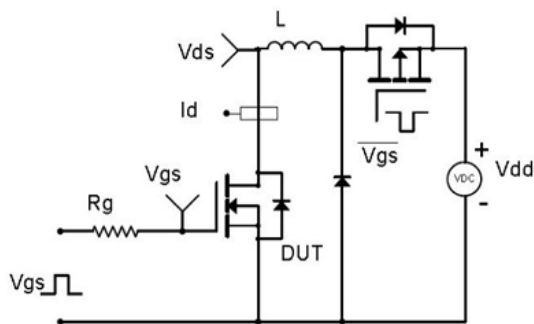
Test Circuit & Waveform



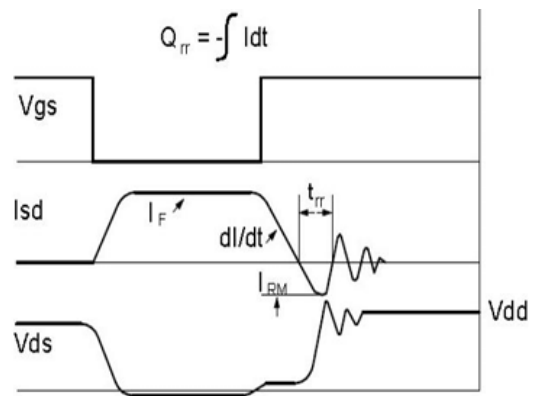
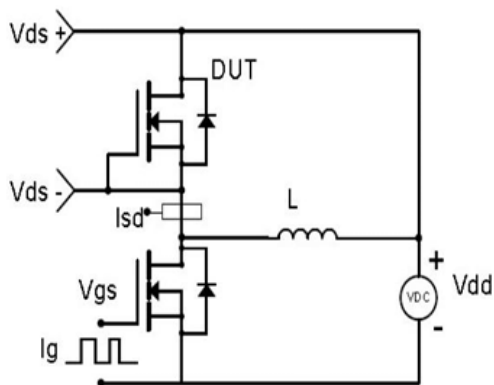
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

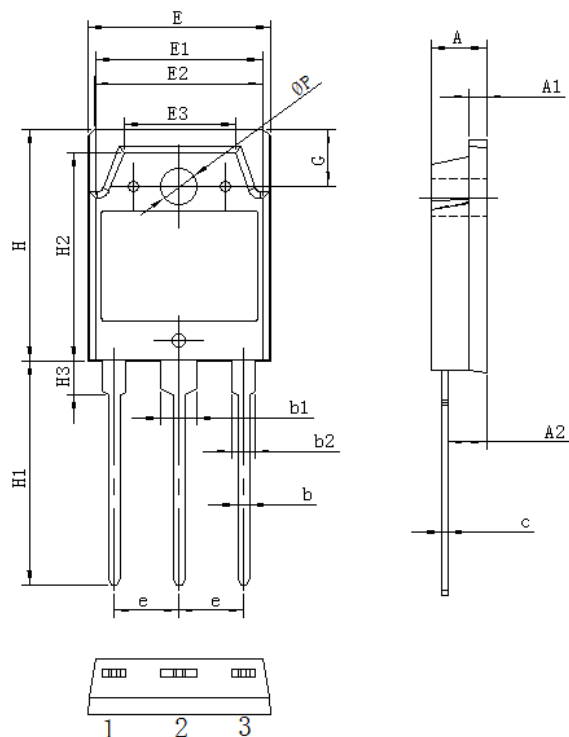


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

Package Information



Symbol	单位 mm		
	Min	Nom	Max
A	4.60	4.80	5.00
A1	1.3	1.5	1.7
A2	2.20	2.40	2.60
b	0.80	1.0	1.20
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	15.6	16.0
E1	13.2	13.4	13.6
E2	13.1	13.3	13.5
E3	9.1	9.3	9.5
H	19.8	20.0	20.2
H1	19.4	19.8	20.2
H2	18.5	18.7	18.9
H3	2.9	3.1	3.3
G	4.8	5.0	5.2
ΦP	3.00	3.20	3.40

Notice

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