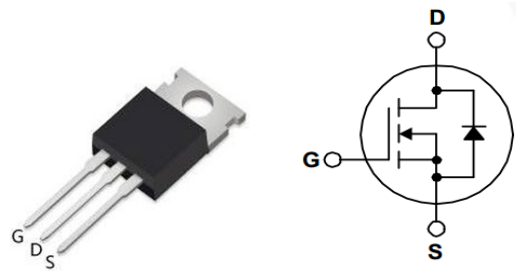


TH40N20PC

200V 40A 51mΩ 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

- $V_{DS}=200V, I_D=40A$
- Low ON Resistance, $R_{DS(on), typ.}=51m\Omega @ V_{GS}=10V, I_D=20A$
- 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
$V_{DSS}, \min @ T_J = 25^\circ C$	200	V
$T_J, \text{maximum junction temperature}$	150	°C
$I_D @ T_C = 25^\circ C (\text{Silicon Limit})$	40	A
$I_{D,pulse} @ T_C = 25^\circ C, t_p \text{ limited by } T_{Jmax.}$	160	A
$R_{DS(on), typ.} @ T_J = 25^\circ C, V_{GS} = 10V$	51	mΩ
$E_{AS}, typ. @ T_J = 25^\circ C$	1245	mJ



Marking Information

Product Name	Package	Marking
TH40N20PC	TO-220C	TH40N20PC

Table of contents

Key Performance Parameters	1
Marking Information	1
Maximum Ratings	3
Electrical Characteristics	4
Diode Characteristics	4
Typical Performance Characteristics	5
Test Circuit & Waveform	7
Package Information	8
Notice	9

Maximum Ratings (T_J = 25°C unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain to Source Voltage		V _{DSS}	200	V
Gate to Source Voltage		V _{GSS}	±30	V
Drain Current _(Silicon limit)	T _C =25°C	I _D	40	A
Pulsed Drain Current	T _C =25°C tp limited by T _{vjmax}	I _{DM}	160	A
Avalanche energy, single pulse	L=10mH, R _g =25Ω	E _{AS}	1245	mJ
Power Dissipation	T _C =25°C	P _D	312	W
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 To +150	°C
Lead Temperature for Soldering Purposes		T _L	270	

Thermal Characteristics

Parameter	Symbol	Max Value	Unit
Thermal Resistance, Junction-to-Case	R _{thJC}	0.4	°C/W
Thermal Resistance, Junction-to-Ambient	R _{thJA}	62	

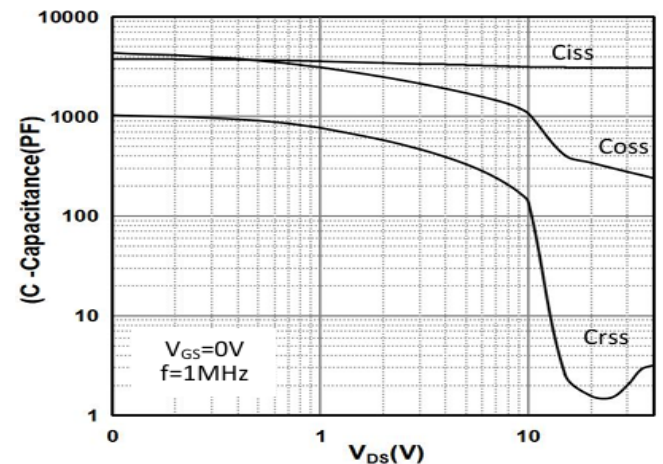
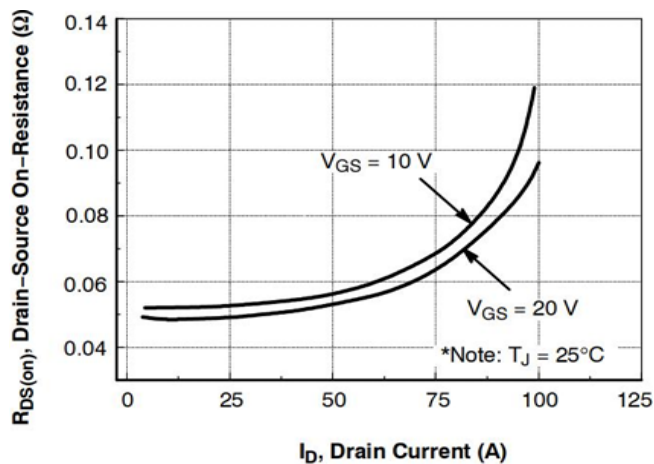
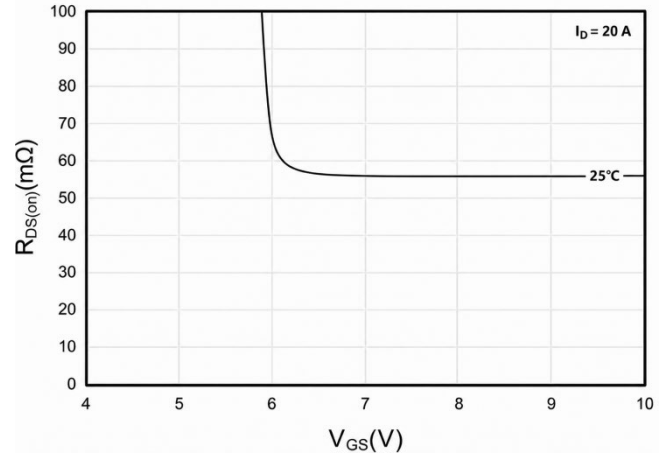
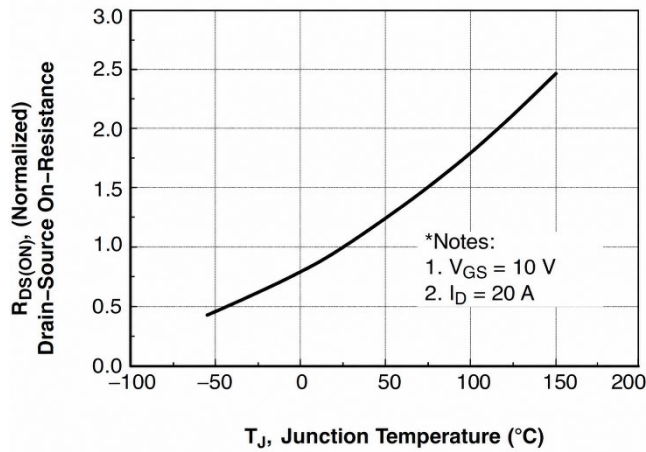
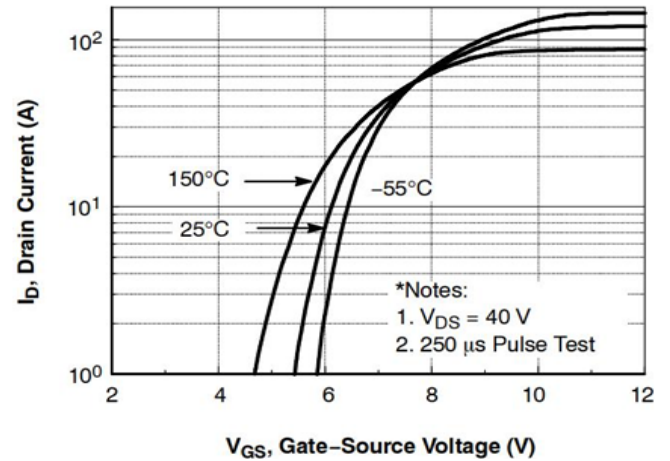
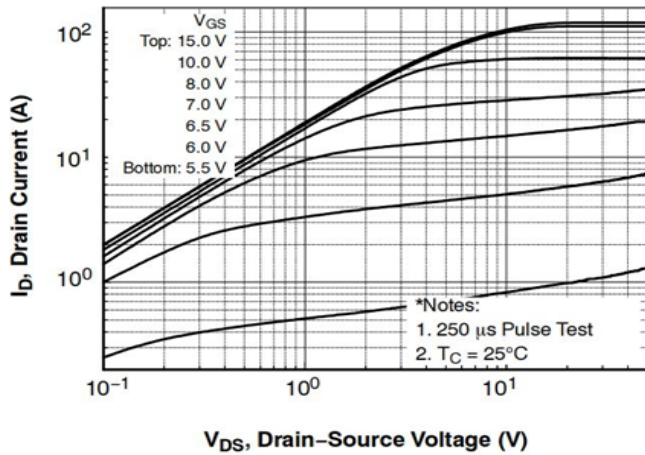
Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Value			Unit
			min.	typ.	max.	
Drain-to-Source Breakdown Voltage	B_{VDSS}	$V_{GS}=0V, I_D=250\mu A$	200	-	-	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	$R_{DS(on)}$	$V_{GS}=10V$, $I_D=20A$ $T_J=25^\circ\text{C}$	-	51	61	$m\Omega$
Gate resistance	R_g	$V_{GS}=0V, V_{DS}=0V, f=1\text{MHz}$	-	0.9	-	Ω
Transconductance	g_{fs}	$V_{DS}=40V, I_D=20A$	-	30	-	S
Input Capacitance	C_{iss}	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1\text{ MHz}$	-	3060	-	pF
Output Capacitance	C_{oss}		-	305	-	
Reverse Transfer Capacitance	C_{rss}		-	2.5	-	
Total Gate Charge	Q_g	$V_{DS} = 160\text{ V}, V_{GS} = 0/10\text{ V},$ $I_D = 40\text{ A}$	-	39	-	nC
Gate- Source charge	Q_{gs}			10		
Gate-Drain charge	Q_{gd}			18		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 100\text{ V}$	-	32	-	ns
Turn-Off Delay Time	$t_{d(off)}$	$V_{GS} = 10\text{ V}$	-	145	-	
Rise time	t_r	$I_D = 40\text{ A}$ $R_G = 25\Omega$	-	168	-	
Fall time	t_f	$T_J = 25^\circ\text{C}$	-	145	-	

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	$T_C=25^\circ\text{C}$	-	-	40	A
Pulsed Diode Forward Current	I_{SM}		-	-	160	
Diode Forward Voltage	V_{SD}	$I_S = 40A$ $T_J = 25^\circ\text{C}$	-	-	1.5	V
Reverse Recovery Time	t_{rr}	$V_R = 100\text{ V}, I_S = 40\text{ A},$	-	155	-	ns
Reverse Recovery Charge	Q_{rr}	$di/dt = 100\text{ A}/\mu\text{s}, T_J = 25^\circ\text{C}$	-	1.3	-	μC

Typical Performance Characteristics



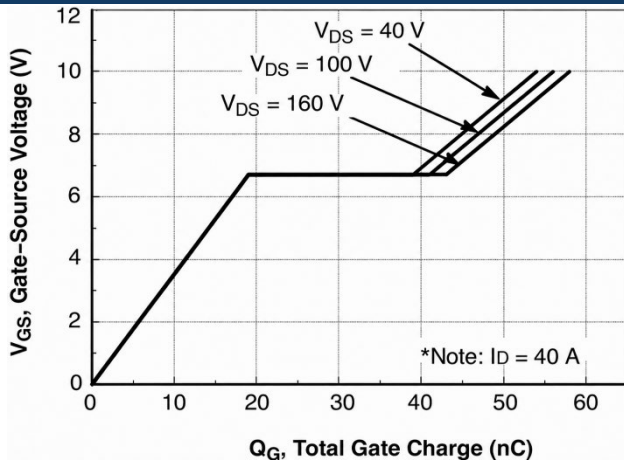


Fig 7. Gate Charge Characteristics

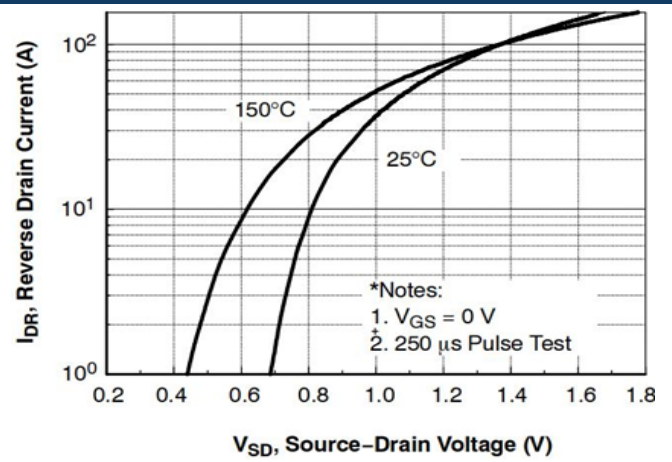


Fig 8. Body-diode Forward Characteristics

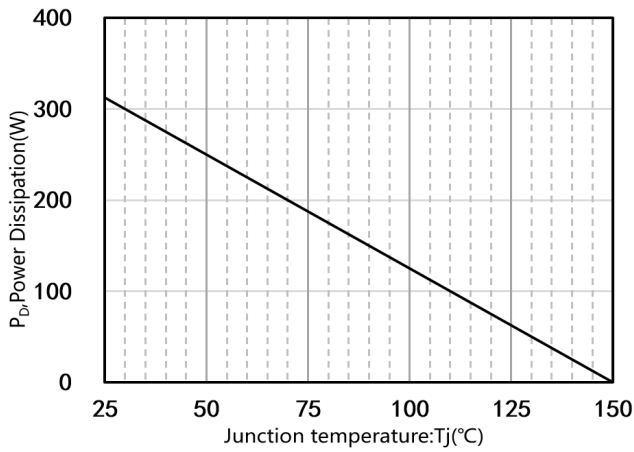


Fig 9. Power Dissipation

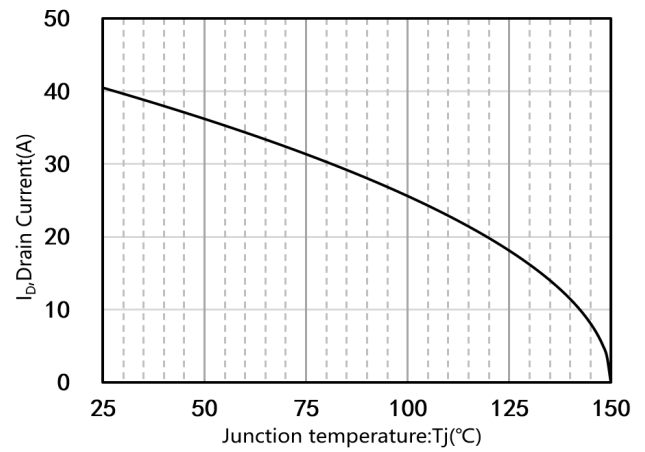


Fig 10. Drain Current Derating

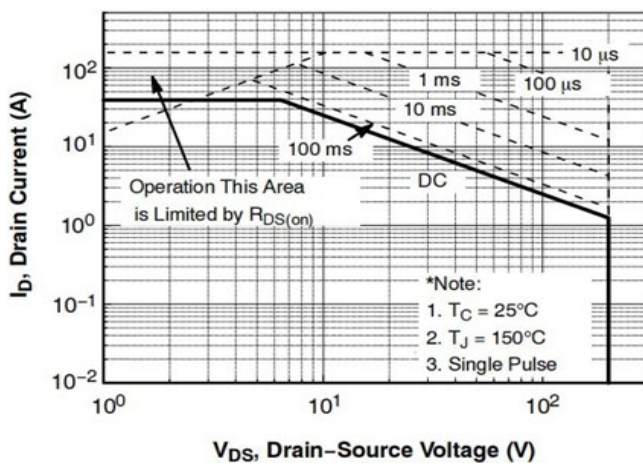


Fig 11. Safe Operating Area

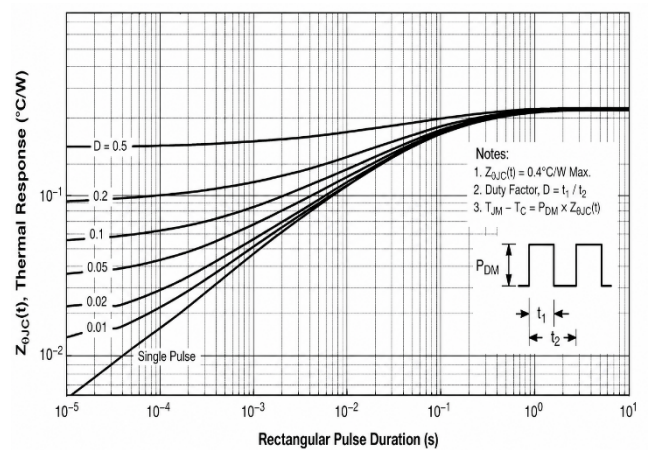
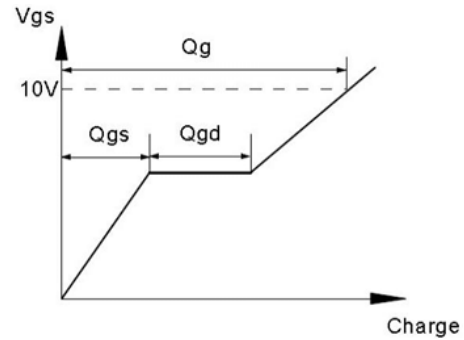
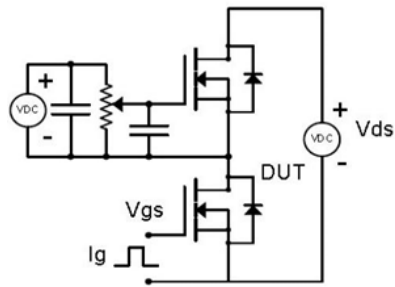
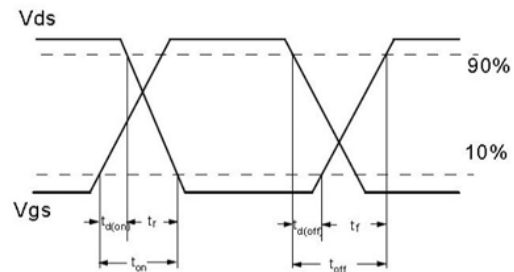
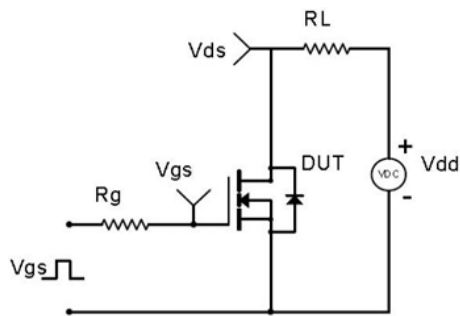


Fig 12. Transient Thermal Response Curve

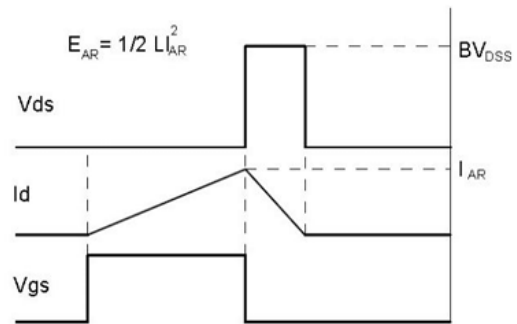
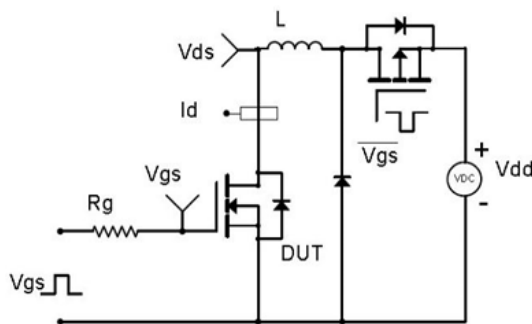
Test Circuit & Waveform



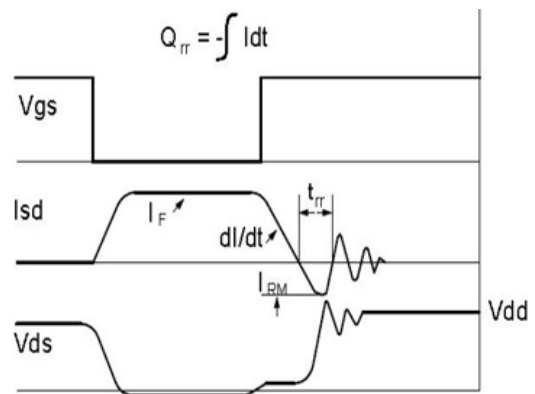
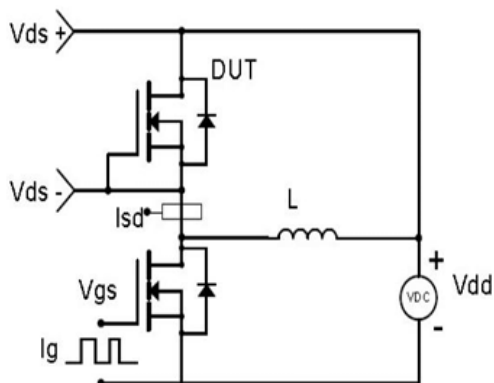
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



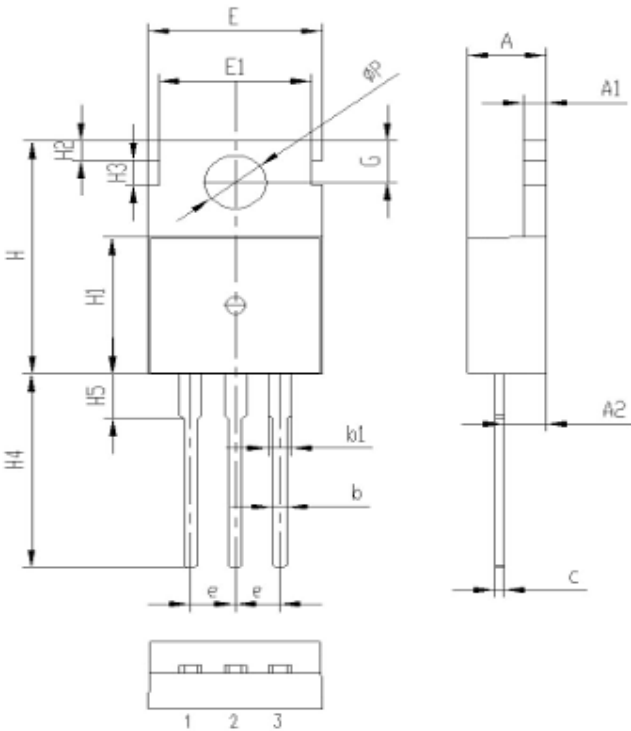
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

Package Information

基本尺寸



Symbol	单位 mm		
	Min	Nom	Max
A	4.30	4.5	4.70
A1	1.20	1.30	1.40
A2	2.20	2.4	2.60
b	0.60	0.8	1.00
b1	1.20	1.30	1.40
c	0.40	0.5	0.60
e	2.44	2.54	2.64
E	9.80	10.0	10.2
E1	8.50	8.70	8.90
H	15.5	15.7	15.9
H1	9.00	9.2	9.40
H2	1.10	1.34	1.50
H3	1.50	1.7	1.90
H4	12.9	13.3	13.7
H5	2.80	3.0	3.20
G	2.60	2.8	3.00
ΦP	3.40	3.6	3.80

Notice

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