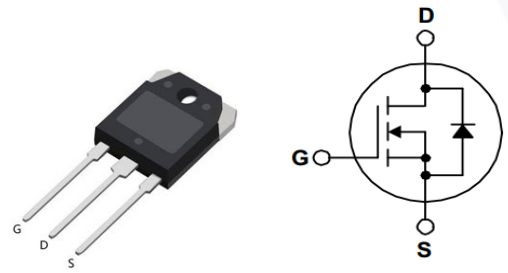


TH60N50PU

500V 60A 65mΩ 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

- $V_{DS}=500V, I_D=60A$
- Low ON Resistance, $R_{DS(on), typ.}=65m\Omega @ V_{GS}=10V, I_D=30A$
- 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
$I_D @ T_C = 25^\circ C (\text{Silicon Limit})$	60	A
$I_{D,pulse} @ T_C = 25^\circ C, t_p \text{ limited by } T_{Jmax.}$	240	A
$R_{DS(on), typ.} @ T_J = 25^\circ C, V_{GS} = 10V$	65	mΩ
$E_{AS}, typ. @ T_J = 25^\circ C$	5590	mJ



Marking Information

Product Name	Package	Marking
TH60N50PU	TO-3P	TH60N50PU

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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	60	A
Pulsed Drain Current	$T_C = 25^\circ\text{C}$ tp limited by T_{vjmax}	I_{DM}	240	A
Avalanche energy, single pulse	$L = 10\text{mH}$, $R_g = 25\Omega$	E_{AS}	5590	mJ
Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	694	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}	0.18	$^\circ\text{C/W}$
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	$R_{DS(on)}$	$V_{GS}=10V$, $I_D=30A$ $T_J=25^\circ\text{C}$	-	65	78	$m\Omega$
Gate resistance	R_g	$V_{GS}=0V, V_{DS}=0V, f=1\text{MHz}$	-	0.6	-	Ω
Transconductance	g_{fs}	$V_{DS}=40V, I_D=30A$	-	58	-	S
Input Capacitance	C_{iss}	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1\text{ MHz}$	-	11220	-	pF
Output Capacitance	C_{oss}		-	855	-	
Reverse Transfer Capacitance	C_{rss}		-	84	-	
Total Gate Charge	Q_g	$V_{DS} = 400\text{ V}, V_{GS} = 0/10\text{ V},$ $I_D = 30\text{ A}$	-	200	-	nC
Gate- Source charge	Q_{gs}		-	75	-	
Gate-Drain charge	Q_{gd}		-	90	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 250\text{ V}$	-	145	-	ns
Turn-Off Delay Time	$t_{d(off)}$	$V_{GS} = 10\text{ V}$	-	490	-	
Rise time	t_r	$I_D = 60\text{ A}$ $R_G = 25\Omega$	-	210	-	
Fall time	t_f	$T_J = 25^\circ\text{C}$	-	245	-	

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	$T_C=25^\circ\text{C}$	-	-	60	A
Pulsed Diode Forward Current	I_{SM}		-	-	240	
Diode Forward Voltage	V_{SD}	$I_S = 60A$ $T_J = 25^\circ\text{C}$	-	-	1.5	V
Reverse Recovery Time	t_{rr}	$V_R = 400\text{ V}, I_S = 60\text{ A},$	-	280	-	ns
Reverse Recovery Charge	Q_{rr}	$di/dt = 100\text{ A}/\mu\text{s}, T_J = 25^\circ\text{C}$	-	3.6	-	μC

Typical Performance Characteristics

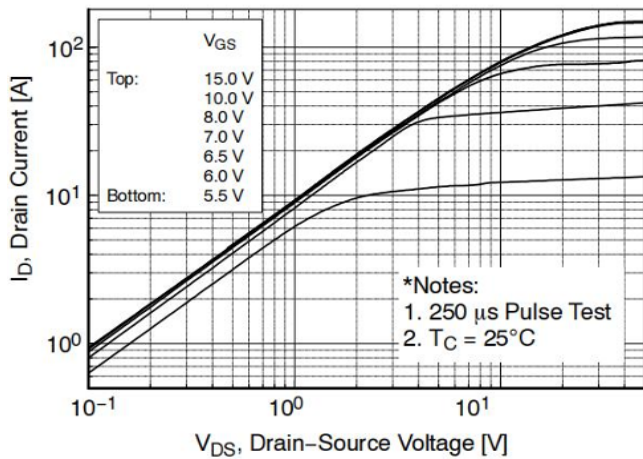


Fig 1. Typical output characteristic

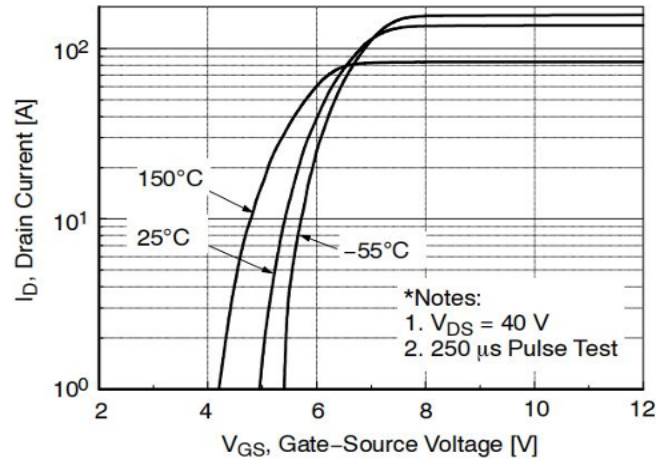


Fig 2. Typical transfer characteristic

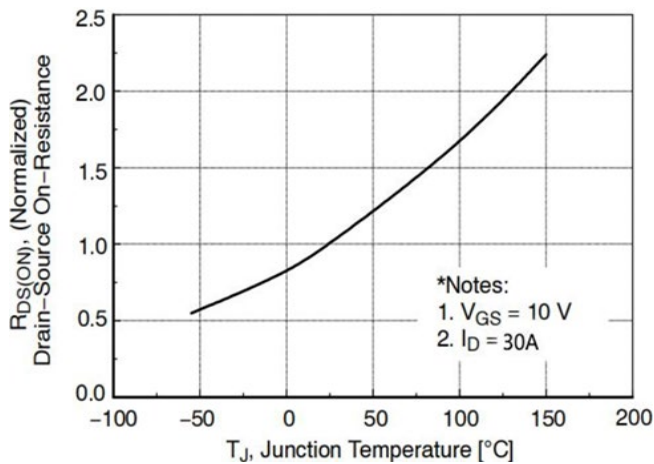


Fig 3. On-Resistance vs. Junction Temperature

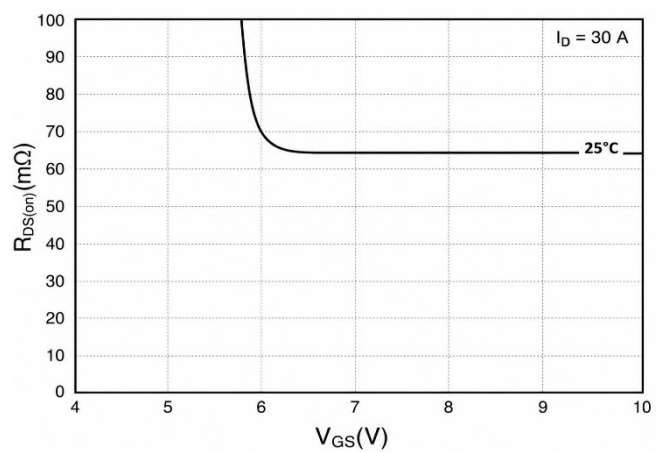


Fig 4. Rds(on) vs Gate Voltage

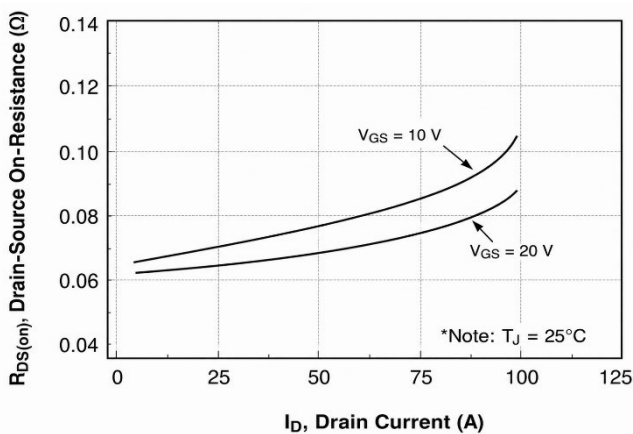


Fig 5. Rds(on) vs Drain Current and Gate Voltage

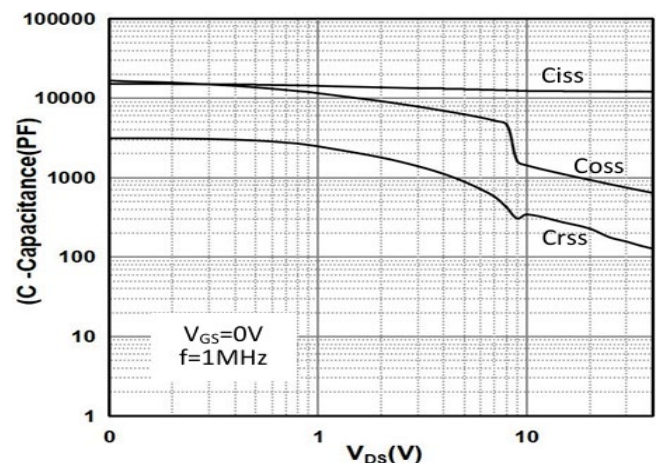


Fig 6. Capacitance Characteristics

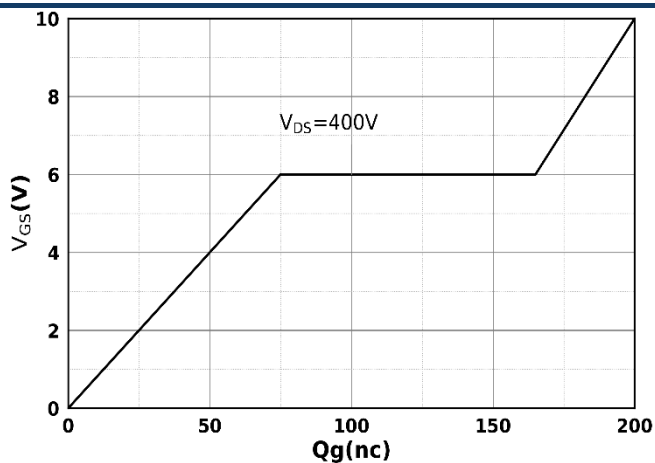


Fig 7. Gate Charge Characteristics

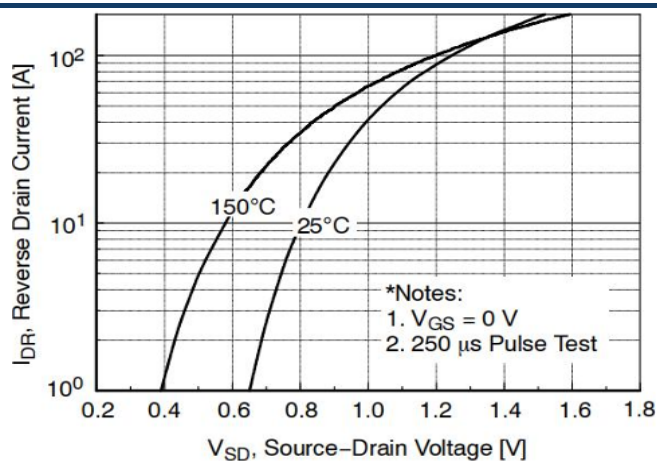


Fig 8. Body-diode Forward Characteristics

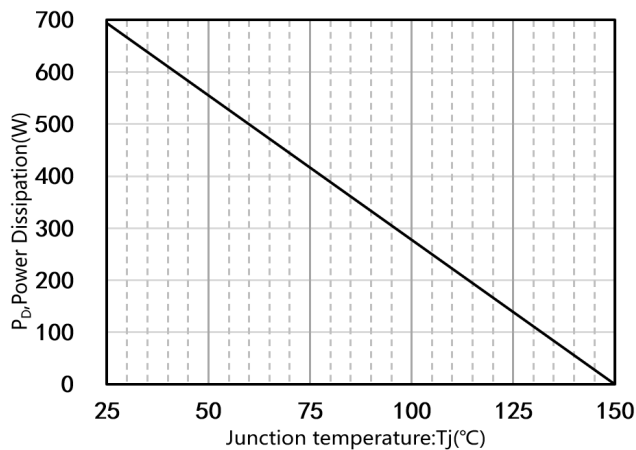


Fig 9. Power Dissipation

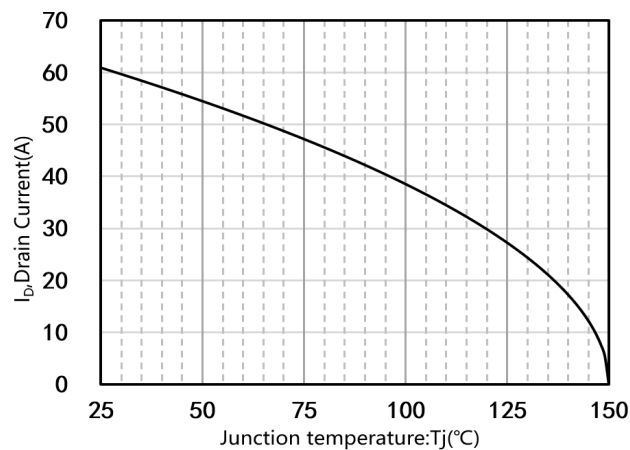


Fig 10. Drain Current Derating

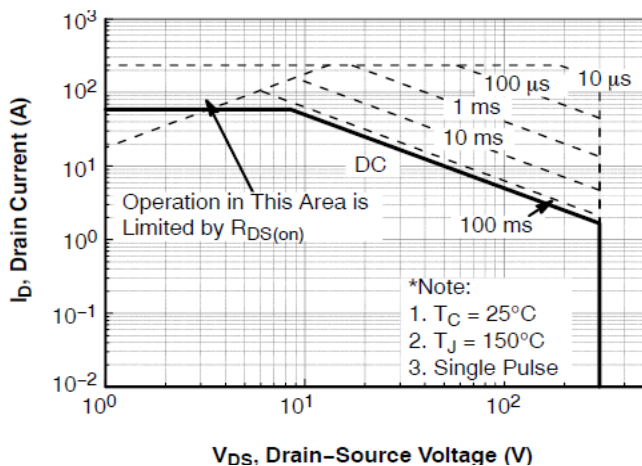


Fig 11. Safe Operating Area

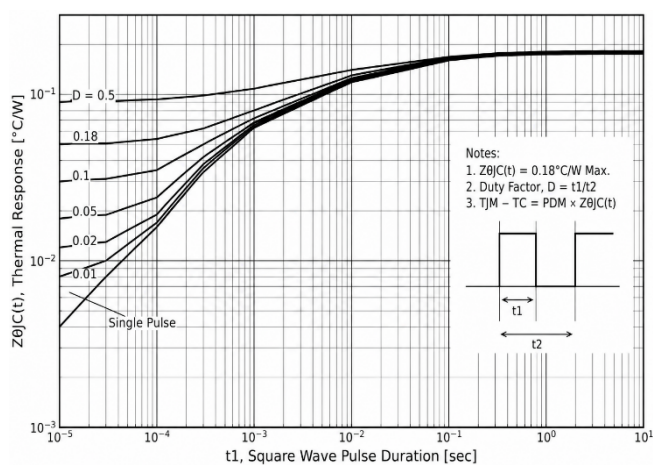
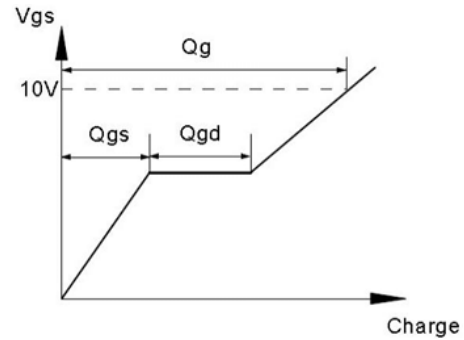
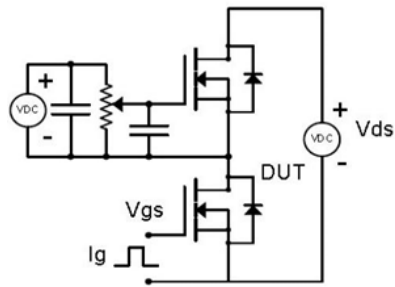
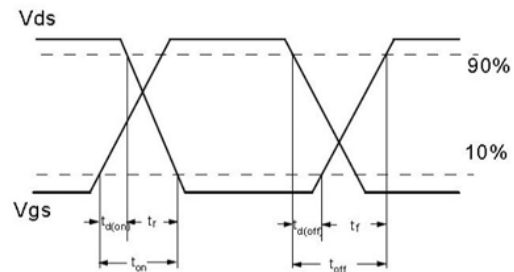
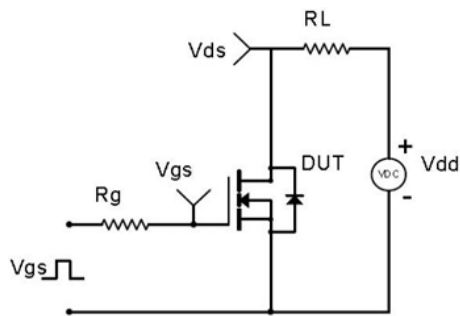


Fig 12. Transient Thermal Response Curve

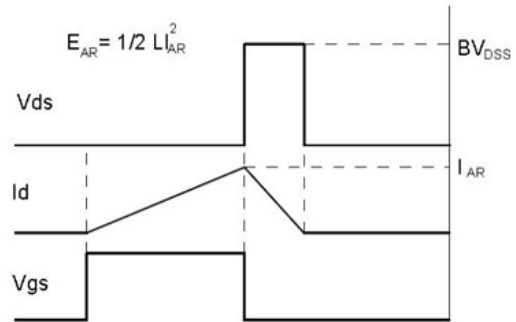
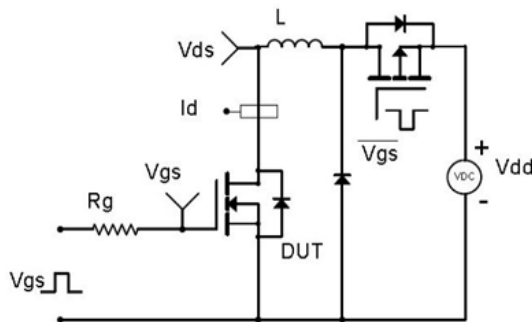
Test Circuit & Waveform



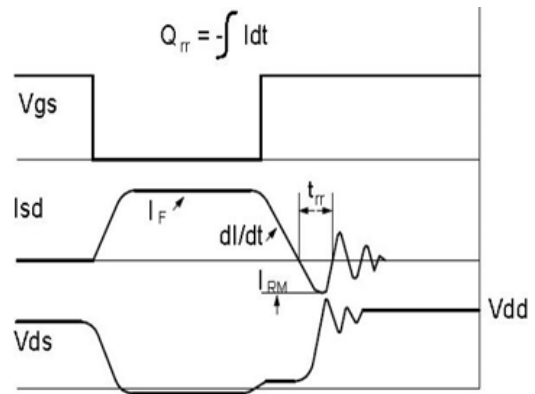
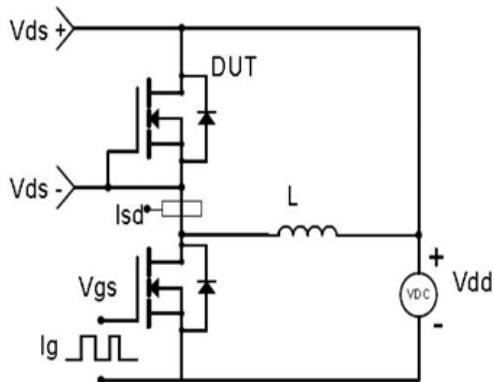
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



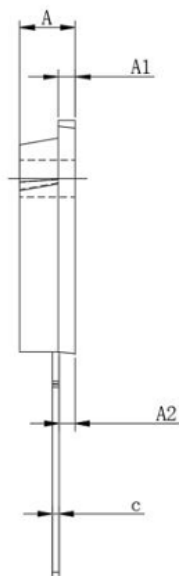
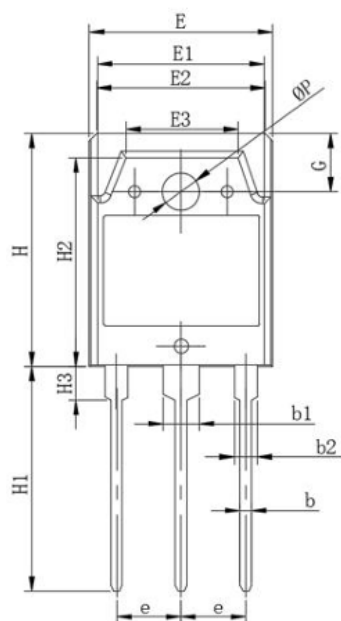
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

Package Information

基本尺寸



Symbol	单位 mm		
	Min	Nom	Max
A	4.60	4.80	5.00
A1	1.3	1.5	1.7
A2	1.20	1.40	1.60
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	20.1	20.3	20.5
H2	18.5	18.7	18.9
H3	3.2	3.5	3.8
G	4.8	5.0	5.2
ΦP	3.00	3.20	3.40

Notice

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