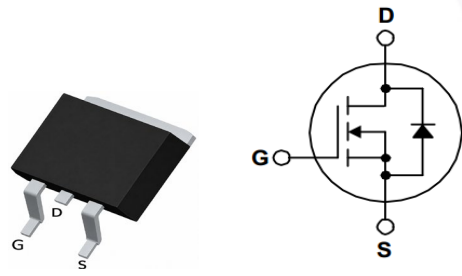


TH65N20PN

200V 65A 33mΩ 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

- $V_{DS}=200V, I_D=65A$
- Low ON Resistance, $R_{DS(on), typ.}=33m\Omega @ V_{GS}=10V, I_D=32.5A$
- 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
$V_{DSS}, \min @ T_J = 25^\circ C$	200	V
$T_J, \text{maximum junction temperature}$	150	°C
$I_D @ T_C = 25^\circ C (\text{Silicon Limit})$	65	A
$I_{D,pulse} @ T_C = 25^\circ C, t_p \text{ limited by } T_{Jmax}.$	260	A
$R_{DS(on), typ.} @ T_J = 25^\circ C, V_{GS} = 10V$	33	mΩ
$E_{AS}, typ. @ T_J = 25^\circ C$	2900	mJ



Marking Information

Product Name	Package	Marking
TH65N20PN	TO-263	TH65N20PN

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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	65	A
Pulsed Drain Current	T _C =25°C tp limited by T _{vjmax}	I _{DM}	260	A
Avalanche energy, single pulse	L=10mH, R _g =25Ω	E _{AS}	2900	mJ
Power Dissipation	T _C =25°C	P _D	416	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}	0.3	°C/W
Thermal Resistance, Junction-to-Ambient	R _{thJA}	62	

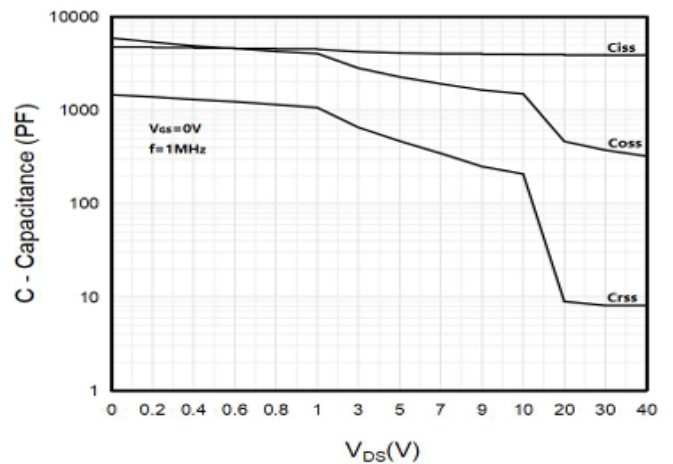
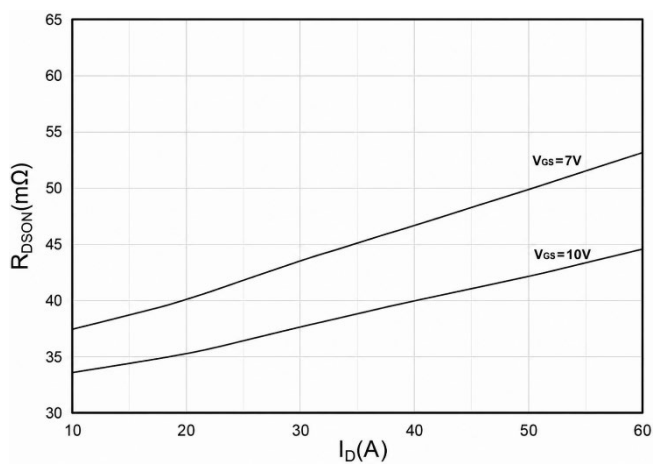
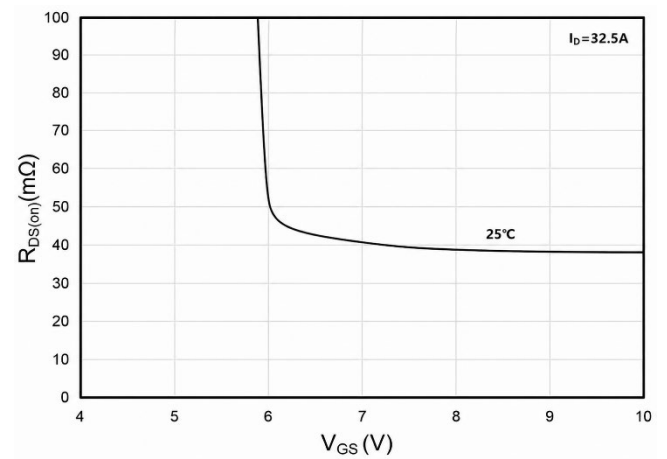
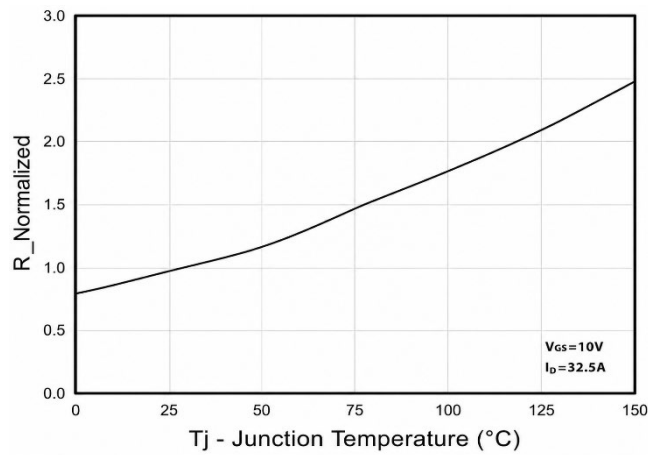
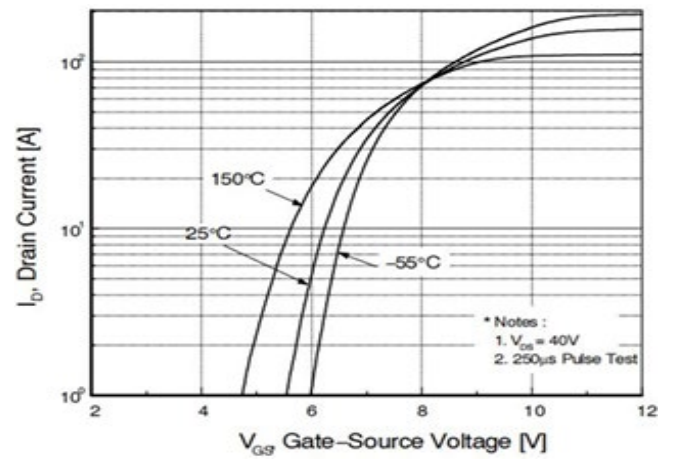
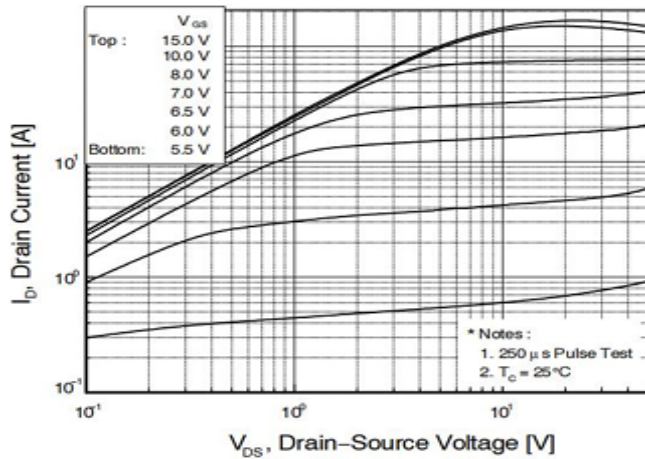
Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Value			Unit
			min.	typ.	max.	
Drain-to-Source Breakdown Voltage	$B_{V_{DS}}$	$V_{GS}=0V, I_D=250\mu A$	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	$R_{DS(on)}$	$V_{GS}=10V$, $I_D=32.5A$ $T_J=25^\circ\text{C}$	-	33	40	m Ω
Gate resistance	R_g	$V_{GS}=0V, V_{DS}=0V, f=1\text{MHz}$	-	1.1	-	Ω
Transconductance	g_{fs}	$V_{DS}=10V, I_D=32.5A$	-	35	-	S
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V$, $f = 1\text{MHz}$	-	3870	-	pF
Output Capacitance	C_{oss}		-	410	-	
Reverse Transfer Capacitance	C_{rss}		-	7.6	-	
Total Gate Charge	Q_g	$V_{DS} = 160V, V_{GS} = 0/10V$, $I_D = 65A$	-	56	-	nC
Gate- Source charge	Q_{gs}			18		
Gate-Drain charge	Q_{gd}			23		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 100V$	-	55	-	ns
Turn-Off Delay Time	$t_{d(off)}$	$V_{GS} = 10V$	-	49	-	
Rise time	t_r	$I_D = 65A$ $R_G = 25\Omega$	-	180	-	
Fall time	t_f	$T_J = 25^\circ\text{C}$	-	30	-	

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	$T_C=25^\circ\text{C}$	-	-	65	A
Pulsed Diode Forward Current	I_{SM}		-	-	260	
Diode Forward Voltage	V_{SD}	$I_S = 65A$ $T_J = 25^\circ\text{C}$	-	-	1.5	V
Reverse Recovery Time	t_{rr}	$V_R = 100V, I_S = 65A$,	-	165	-	ns
Reverse Recovery Charge	Q_{rr}	$di_S/dt = 100A/\mu s, T_J = 25^\circ\text{C}$	-	1.4	-	μC

Typical Performance Characteristics



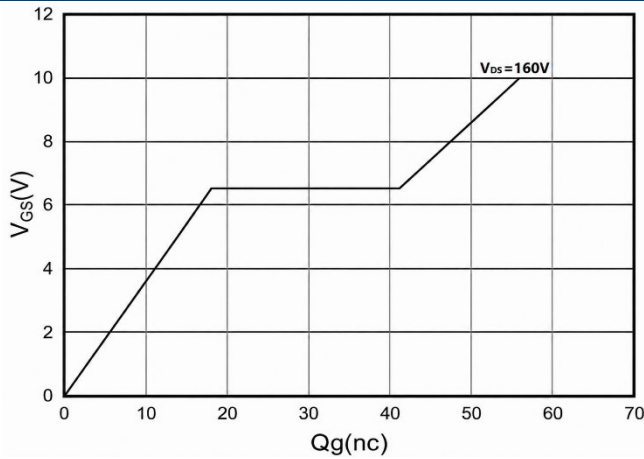


Fig 7. Gate Charge Characteristics

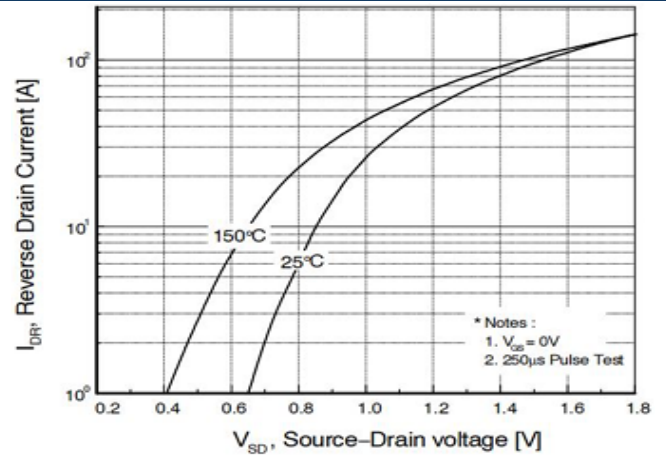


Fig 8. Body-diode Forward Characteristics

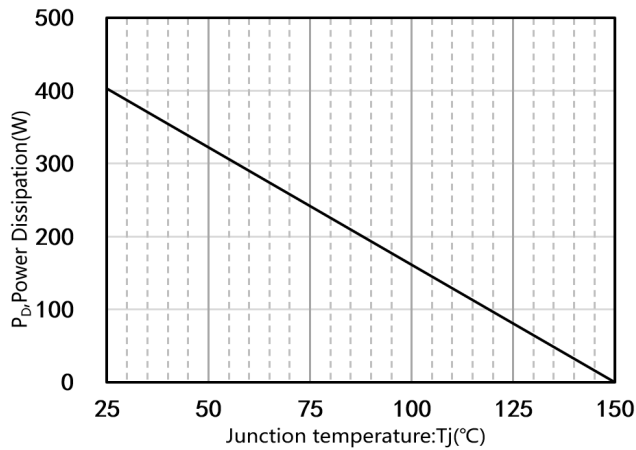


Fig 9. Power Dissipation

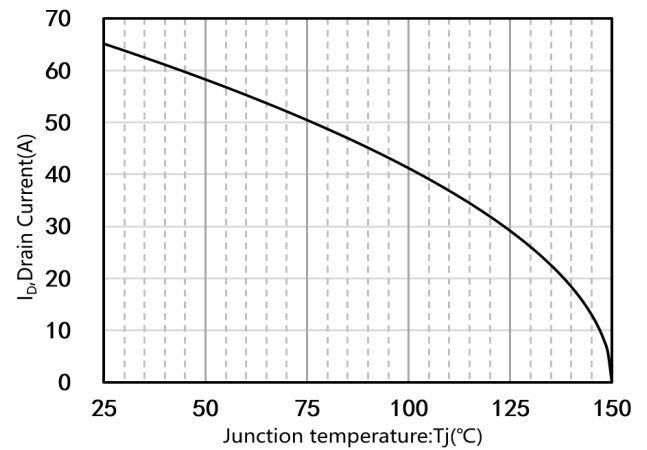


Fig 10. Drain Current Derating

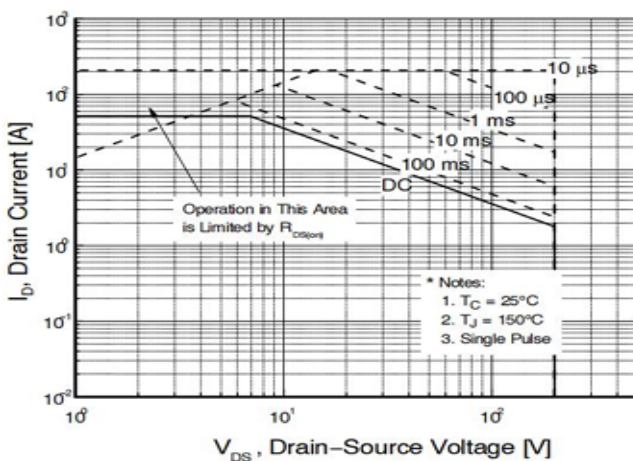


Fig 11. Safe Operating Area

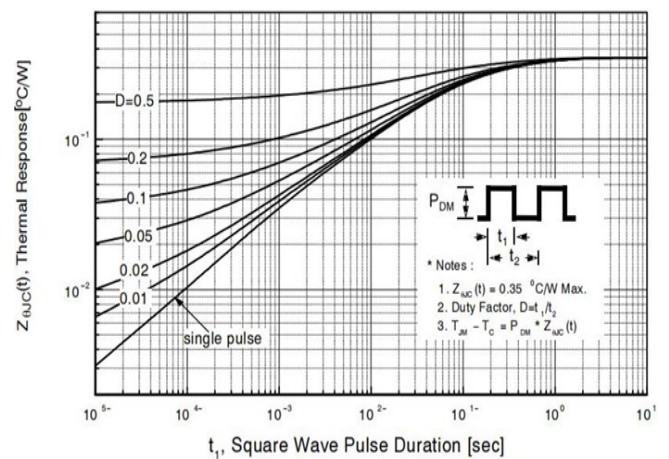
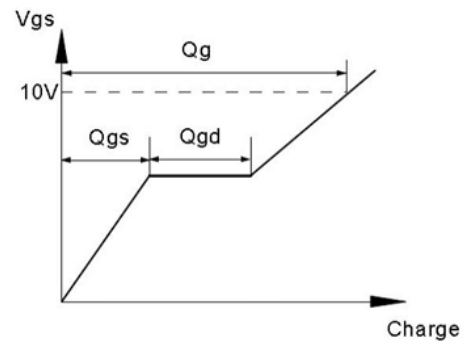
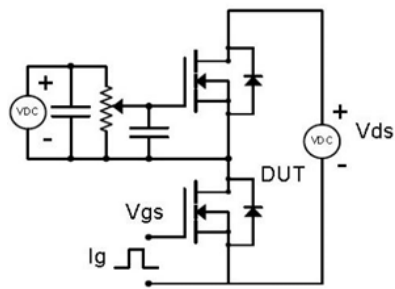
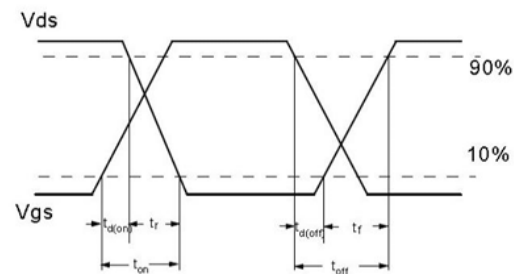
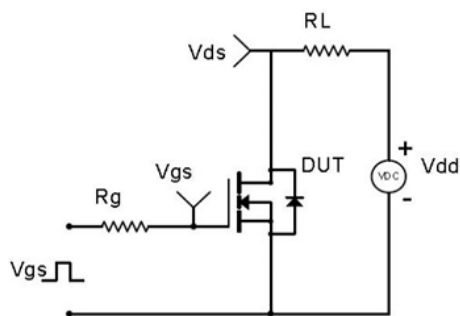


Fig 12. :Transient Thermal Response Curve

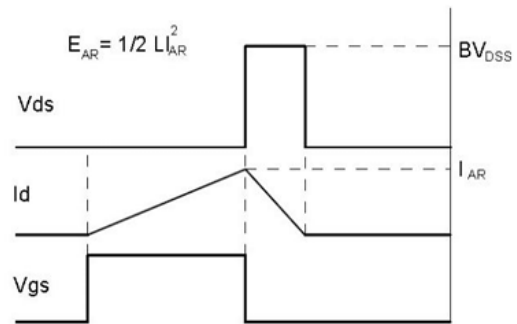
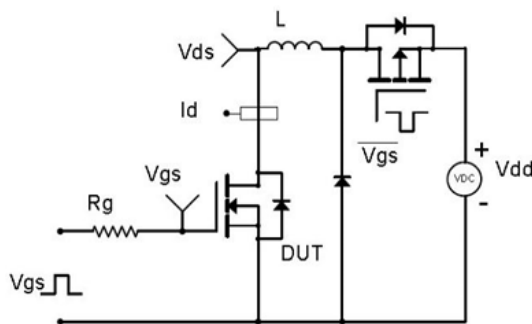
Test Circuit & Waveform



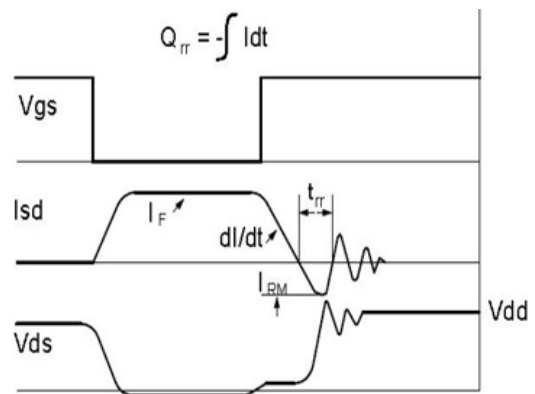
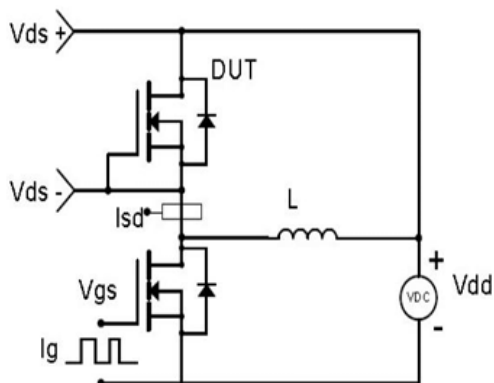
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



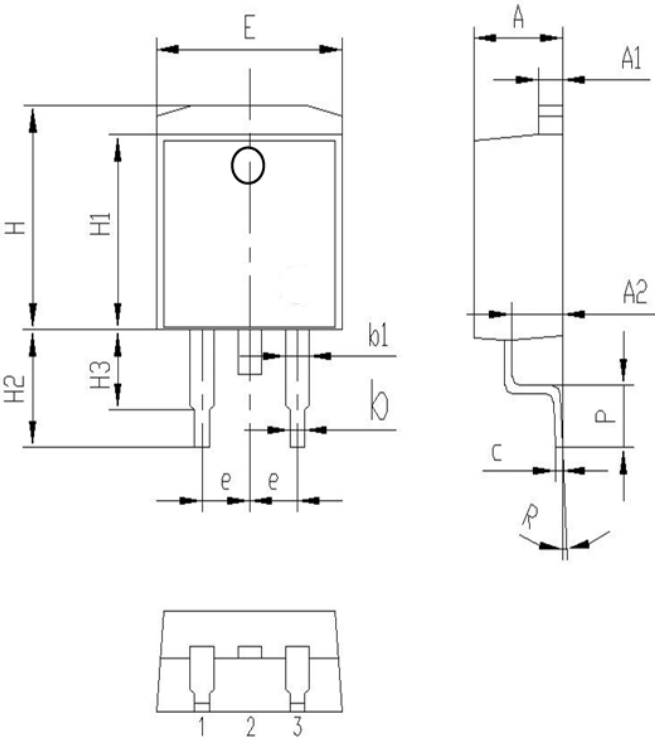
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

Package Information

基本尺寸



Symbol	单位 mm		
	Min	Nom	Max
A	4.40	4.6	4.80
A1	1.17	1.27	1.37
A2	2.40	2.6	2.80
b	0.60	0.8	1.00
b1	1.05	1.25	1.45
c	0.28	0.38	0.48
e	2.34	2.54	2.74
E	9.9	10.1	10.3
H	9.90	10.1	10.3
H1	8.50	8.7	8.90
H2	4.80	5.00	5.20
H3	2.60	2.8	3.00
R	0°	3°	6°
P	2.40	2.70	3.00

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