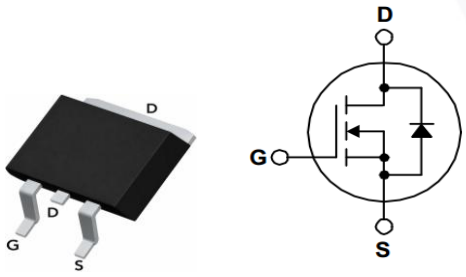
TH4N60PN

600V 4A 1.8Ω Silicon N-Channel Planar Power MOSFET

Features of this MOSFET are 150℃ operating junction temperature and high repetitive peak current capability. These features combine to make this MOSFET a highly efficient, robust and reliable device for a wide variety of applications.



Package view and circuit symbol

General Features

- V_{DS}=600V,I_D=4A
- Low ON Resistance,$R_{DS(on)}$,typ.=1.8Ω@V_{GS}=10V,I_D=2A
- 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 °C	**600**	V
T_J, maximum junction temperature	**150**	°C
I_D @ T_C = 25 °C(Silicon Limit)	**4**	A
$I_{D,pulse}$ @ T_C = 25 °C, tp limited by Tjmax.	**16**	A
$R_{DS(on)}$, typ. @ T_J = 25 °C ,V_{GS} = 10 V	**1.8**	Ω
E_{AS}, typ. @ T_J = 25 °C	**255**	mJ

RoHS SGS

Marking Information

Product Name	Package	Marking
TH4N60PN	TO-263	TH4N60PN

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Maximum Ratings (TJ = 25℃ unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain to Source Voltage		V_{DSS}	600	V
Gate to Source Voltage		V_{GSS}	±30	V
Drain Current(Silicon limit)	T_C=25℃	I_D	4	A
Pulsed Drain Current	T_C=25℃ tp limited by T_{vjmax}	I_{DM}	16	A
Avalanche energy, single pulse	L=10mH, R_g=25Ω	E_{AS}	255	mJ
Power Dissipation	T_C=25℃	P_D	89	W
Operating Junction and Storage Temperature Range		T_J,T_{stg}	-55 To +150	℃
Lead Temperature for Soldering Purposes		T_L	270	

Thermal Characteristics

Parameter	Symbol	Max Value	Unit
Thermal Resistance, Junction−to−Case	R_{thJC}	1.4	℃/W
Thermal Resistance, Junction−to−Ambient	R_{thJA}	62	

Electerical Characteristics (T_J = 25℃ unless otherwise specified)

Parameter	Symbol	Test Condition	Value			Unit
			min.	typ.	max.	
Drain-to-Source Breakdown Voltage	B_{VDSS}	V_{GS}=0V,I_D=250μA	600	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS}=0V V_{DS}=V_{DSS} T_J=25℃	-	-	1	μA
		V_{GS}=0V V_{DS}=80%V_{DSS} T_J=125℃	-	-	10	
Gate−to−Source leakage Current	I_{GSS}	V_{GS}=±30V,V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D=250uA T_J=25℃	2.0	-	4.0	V
Drain-Source on-state resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=2A T_J=25℃	-	1.8	2.2	Ω
Gate resistance	Rg	V_{GS}=0V,V_{DS}=30V,f=1MHz	-	18.6	-	Ω
Transconductance	g_{fs}	V_{DS}=25V,I_D=2A	-	5.5	-	S
Input Capacitance	C_{ISS}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1 MHz	-	510	-	pF
Output Capacitance	C_{OSS}		-	57	-	
Reverse Transfer Capacitance	C_{RSS}		-	10	-	
Total Gate Charge	Qg	V_{DS} = 480 V, V_{GS} = 0/10 V, I_D = 4 A	-	19	-	nC
Gate- Source charge	Qgs		-	4	-	
Gate-Drain charge	Qgd		-	10	-	
Turn−On Delay Time	td(on)	V_{DS} = 300 V V_{GS} = 10 V I_D = 4 A R_G = 5Ω TJ = 25℃	-	12	-	ns
Turn−Off Delay Time	td(off)		-	30	-	
Rise time	tr		-	10	-	
Fall time	tf		-	16	-	

Diode Characteristics (T_J = 25℃ unless otherwise specified)

Parameter	Symbol	Test Condition	Value			Unit
			min.	typ.	max.	
Diode Continous Forward Current	I_S	T_C=25℃	-	-	4	A
Pulsed Diode Forward Current	I_{SM}		-	-	16	
Diode Forward Voltage	V_{SD}	I_S = 4A T_J = 25℃	-	-	1.5	V
Reverse Recovery Time	trr	V_{GS} = 0 V, I_S = 4 A, d_{IS}/dt = 100 A/μs,T_J = 25℃	-	380	-	ns
Reverse Recovery Charge	Qrr		-	1.6	-	nC

Typical Performance Characteristics

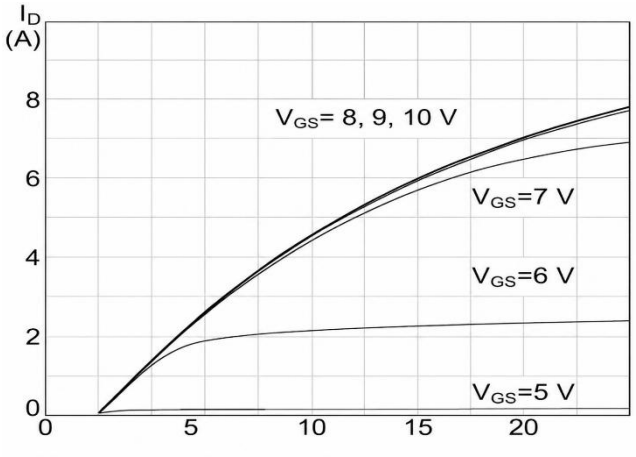


Fig 1. Typical output characteristic

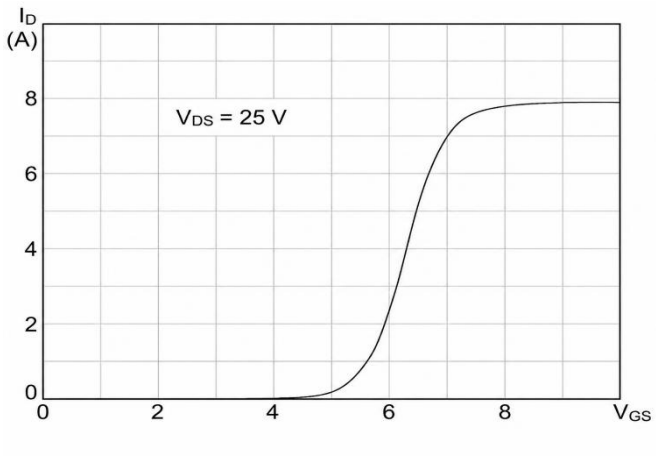


Fig 2. Typical transfer characteristic

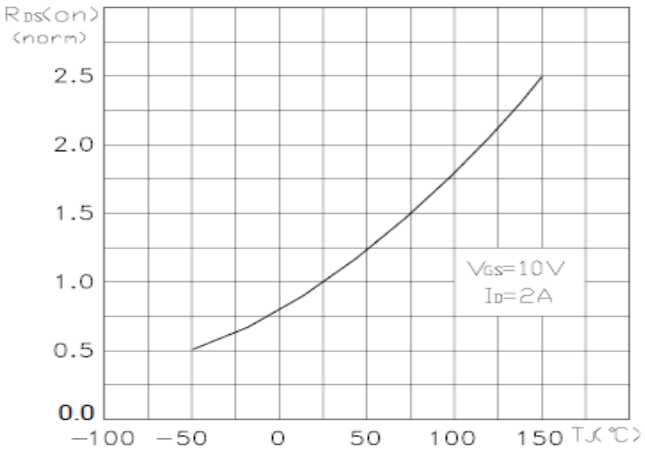


Fig 3. On-Resistance vs. Junction Temperature

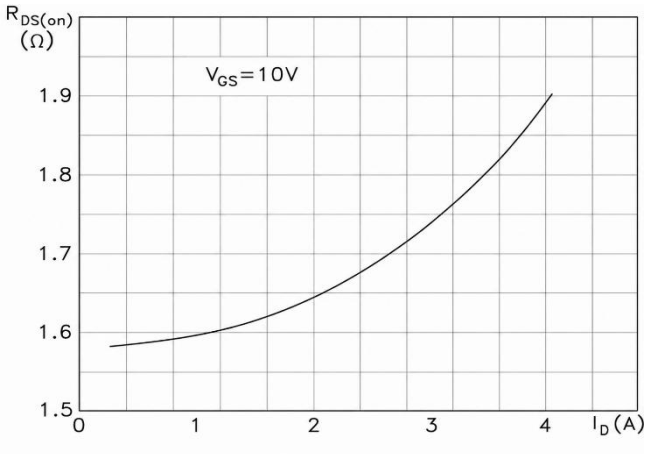


Fig 4. Rds(on) vs Drain Currentand Gate Voltage

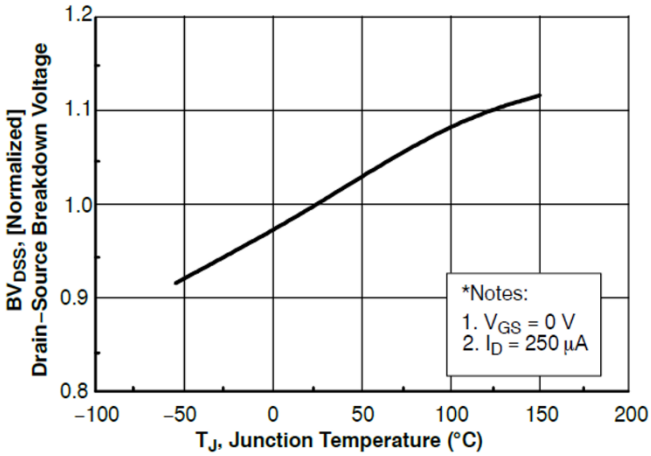


Fig 5. Breakdown Voltage Variation vs Temperature

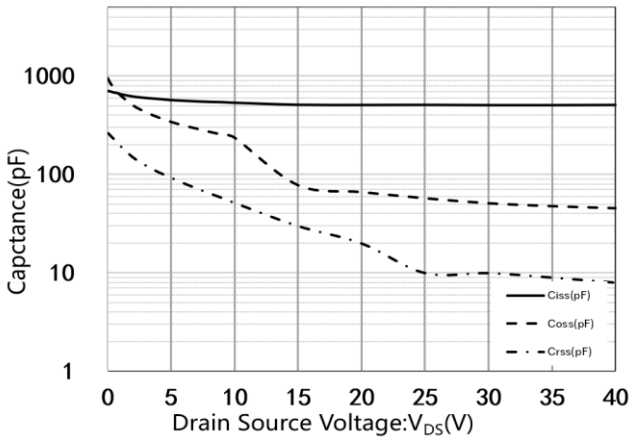


Fig 6. Capacitance Characteristics

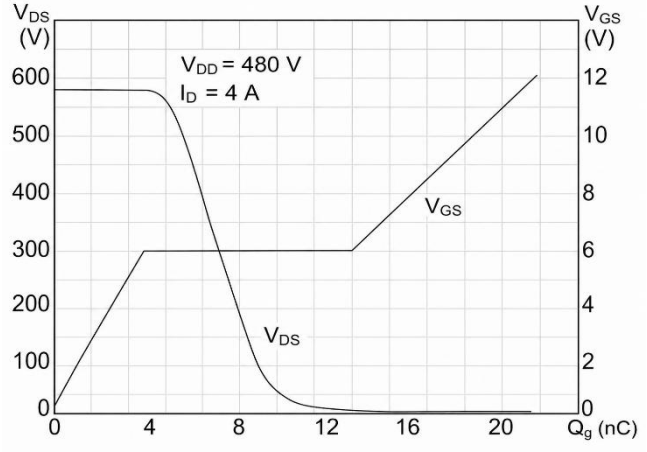


Fig 7. Gate Charge Characteristics

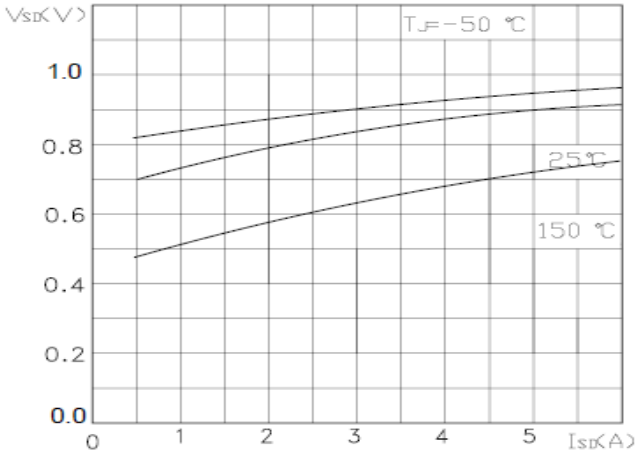


Fig 8. Body-diode Forward Characteristics

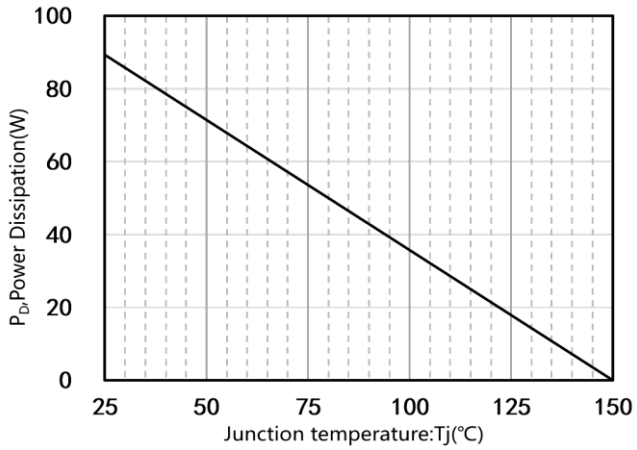


Fig 9. Power Dissipation

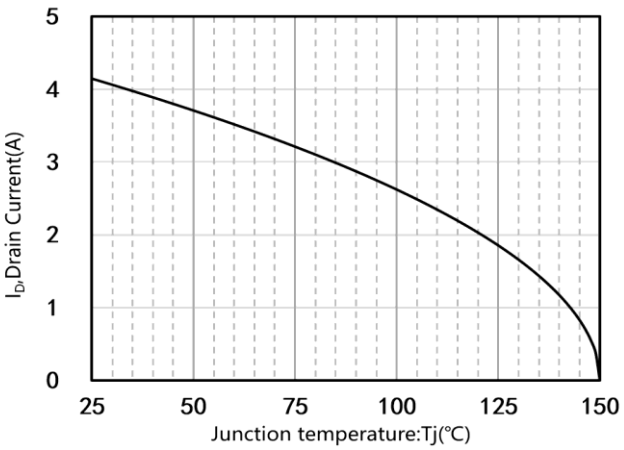


Fig 10. Drain Current Derating

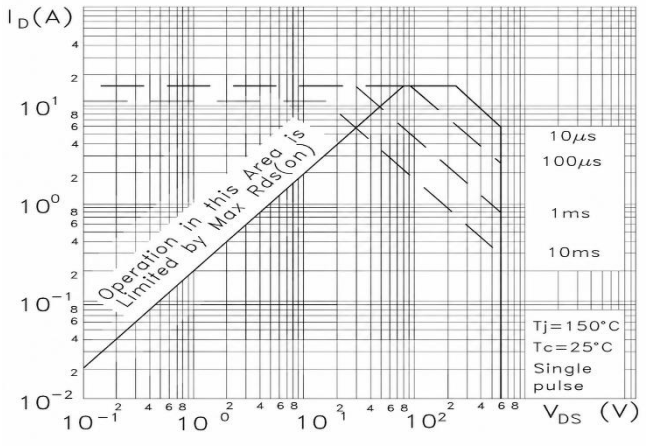


Fig 11. Safe Operating Area

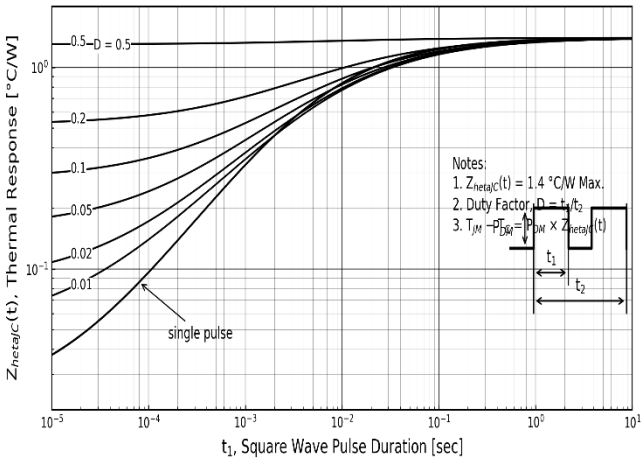
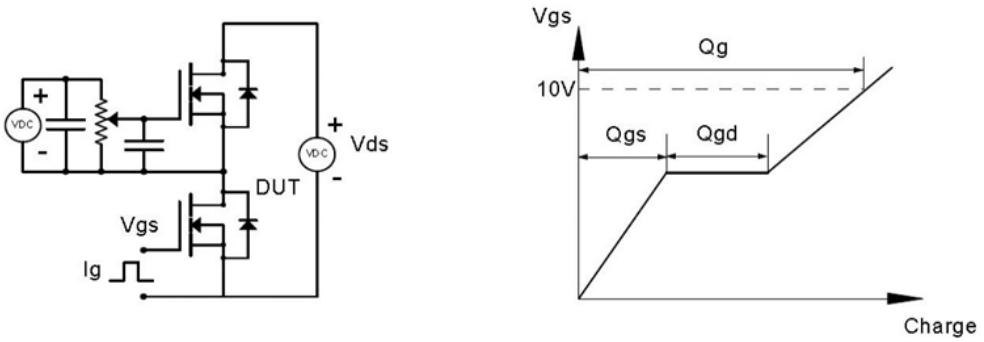
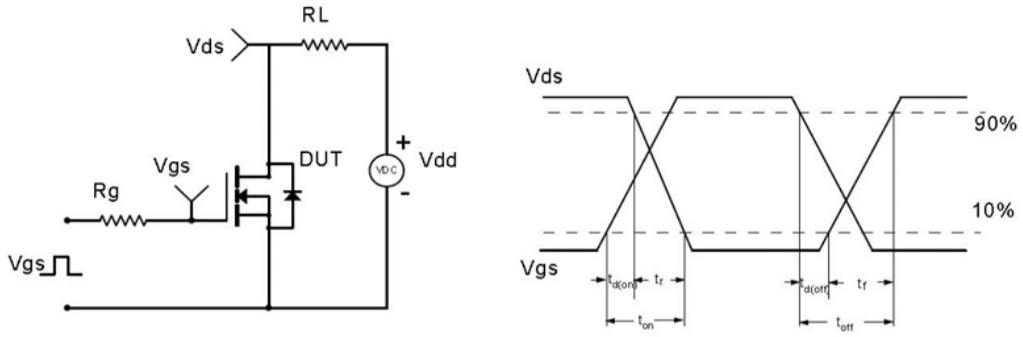


Fig 12. Transient Thermal Response Curve

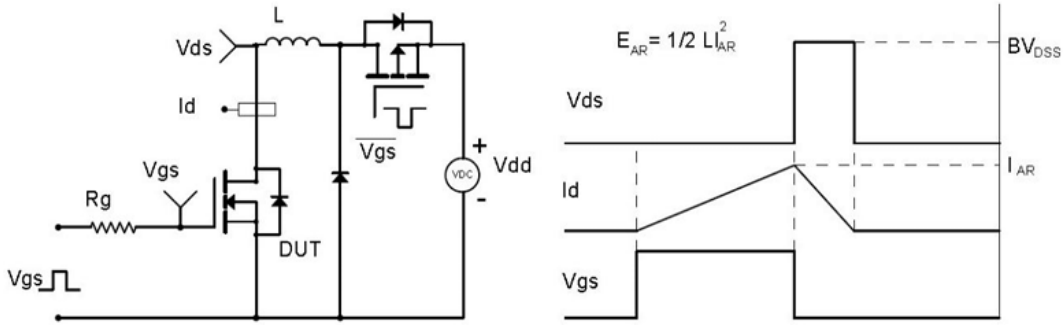
Test Circuit & Waveform



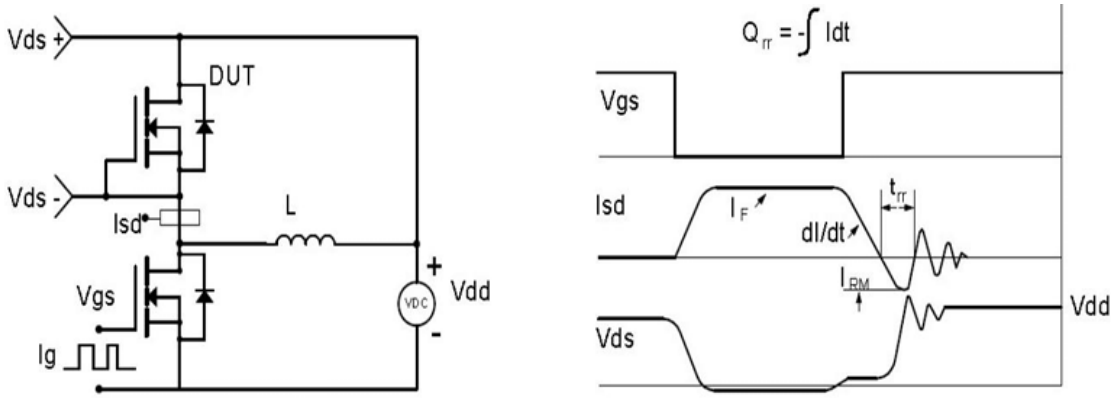
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

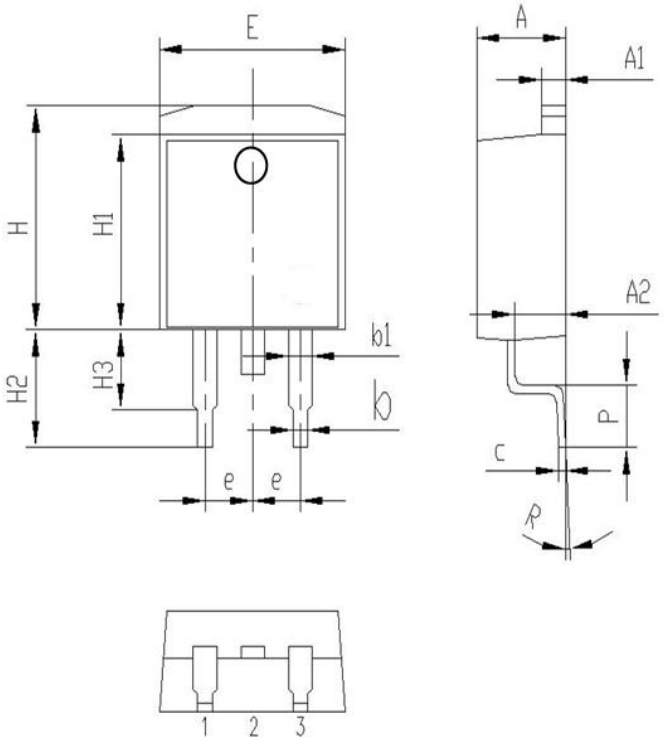


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

Package Information



基本尺寸

Symbol	单位 mm		
	Min	**Nom**	Max
A	4.40	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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