

General Description

The MDH3331 uses advanced MagnaChip's Trench MOSFET Technology to provide high performance in on-state resistance, switching performance and reliability.

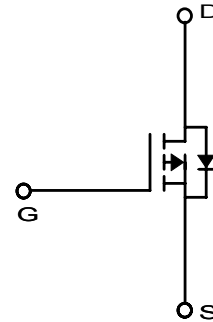
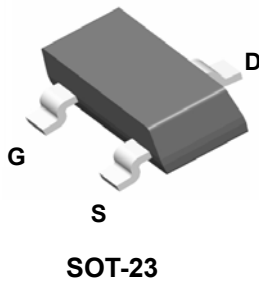
Low $R_{DS(ON)}$, Low Gate Charge can be offering superior benefit in the application.

Features

- $V_{DS} = -20V$
- $I_D = -3.5 @ V_{GS} = -10V$
- $R_{DS(ON)} < 75m\Omega @ V_{GS} = -4.5V$
 $< 105m\Omega @ V_{GS} = -2.5V$

Applications

- PWM
- Load Switch
- General Purpose



Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Characteristics	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	-20	V
Gate-Source Voltage	V_{GSS}	± 12	V
Continuous Drain Current (Note 1)	I_D	-3.5	A
Pulsed Drain Current	I_{DM}	-15	A
Power Dissipation	P_D	1.4	W
Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150	$^\circ C$

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient (Note 1)	$R_{\theta JA}$	90	$^\circ C/W$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	60	

Ordering Information

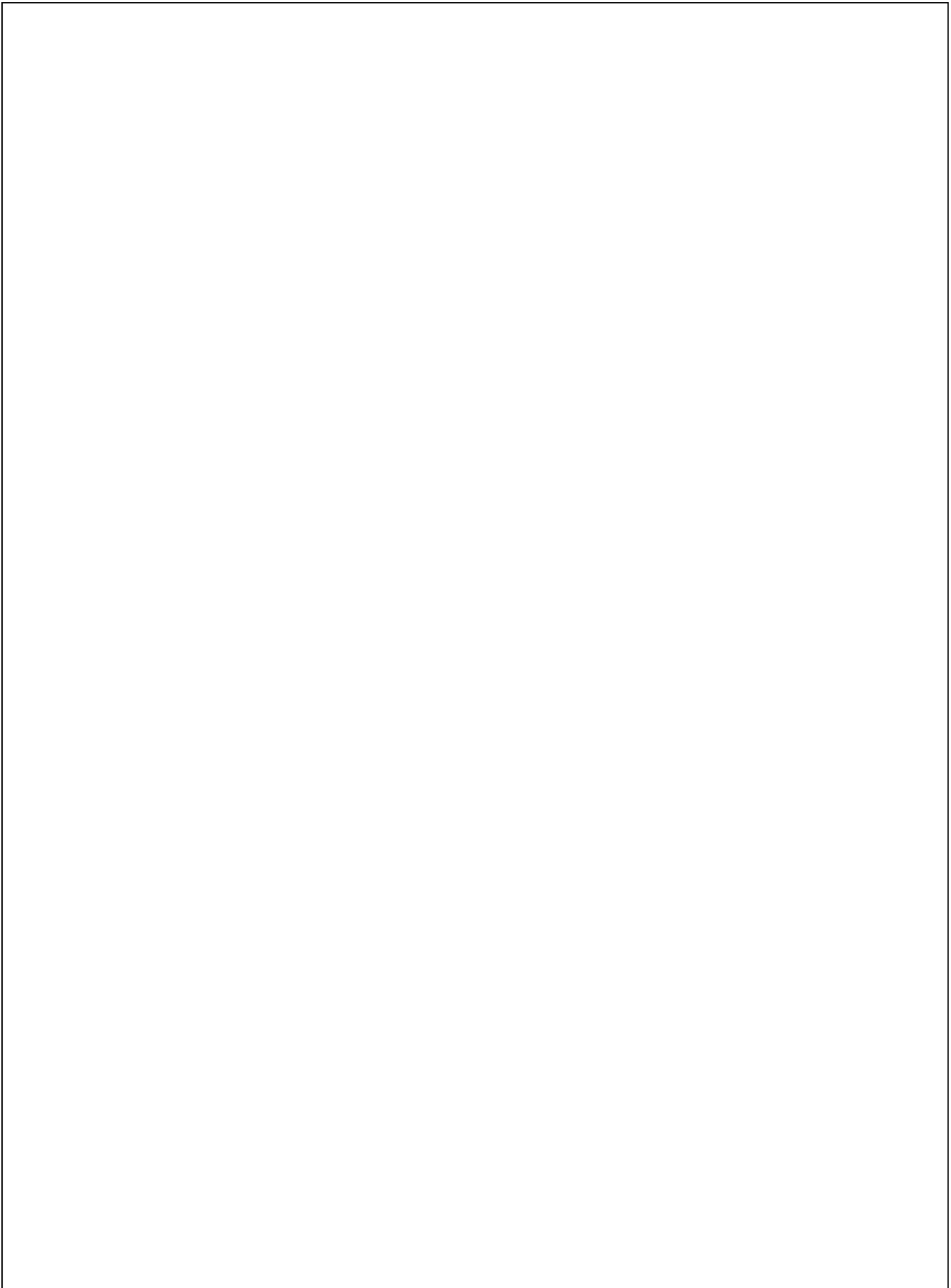
Part Number	Temp. Range	Package	Packing	RoHS Status
MDH3331RH	-55~150°C	SOT-23	Tape & Reel	Halogen Free
MDH3331RP	-55~150°C	SOT-23	Tape & Reel	Pb Free

Electrical Characteristics (T_J = 25°C unless otherwise noted)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D = -250μA, V _{GS} = 0V	-20	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-0.4	-0.9	-1.5	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -16 V, V _{GS} = 0V	-	-	-1	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±12 V, V _{DS} = 0V	-	-	±0.1	
Drain-Source ON Resistance	R _{DS(ON)}	V _{GS} = -4.5V, I _D = -3.5A	-	55	75	mΩ
		V _{GS} = -2.5V, I _D = -3A	-	81	105	
Forward Transconductance	g _{FS}	V _{DS} = -4.5V, I _D = -3.5A	-	11.8	-	S
Dynamic Characteristics						
Total Gate Charge	Q _g	V _{DD} = -10V, I _D = -3.5A, V _{GS} = -4.5V	-	7	-	nC
Gate-Source Charge	Q _{gs}		-	1.3	-	
Gate-Drain Charge	Q _{gd}		-	2	-	
Input Capacitance	C _{iss}	V _{DS} = -10V, V _{GS} = 0V, f = 1.0MHz	-	472	-	pF
Reverse Transfer Capacitance	C _{rss}		-	67	-	
Output Capacitance	C _{oss}		-	101	-	
Turn-On Delay Time	t _{d(on)}	V _{GS} = -10V, V _{DD} = -10V, I _D = -3.5A, R _{GEN} = 3Ω	-	3.0	-	ns
Turn-On Rise Time	t _r		-	24.8	-	
Turn-Off Delay Time	t _{d(off)}		-	30	-	
Turn-Off Fall Time	t _f		-	11.8	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V _{SD}	I _S = -3.5A, V _{GS} = 0V	-	-	1.2	V
Reverse Recovery Time	t _{rr}	I _S = -3.5A, di/dt = 100A/us	-	35.9	-	ns
Reverse Recovery Charge	Q _{rr}		-	17.8	-	nC

Note :

1. Surface mounted RF4 board with 2oz. Copper.



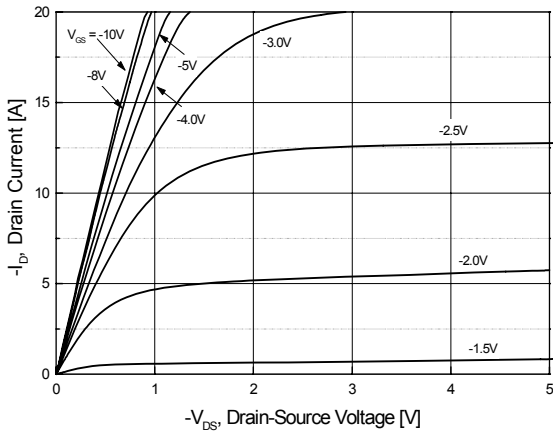


Fig.1 On-Region Characteristics

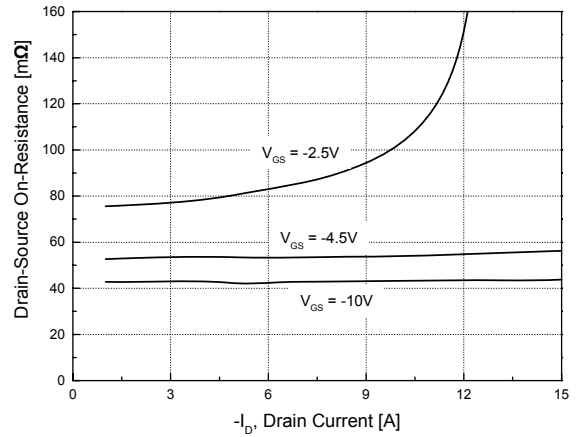


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

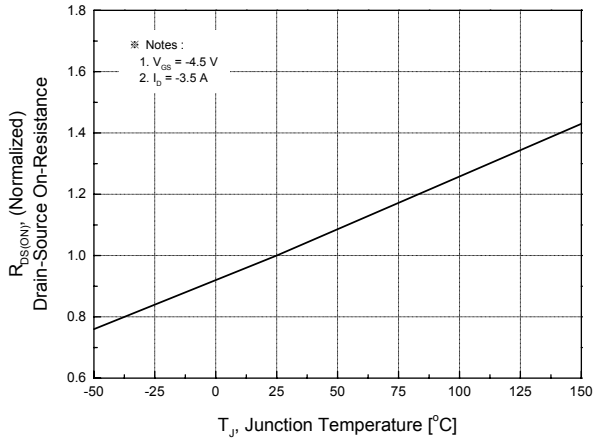


Fig.3 On-Resistance Variation with Temperature

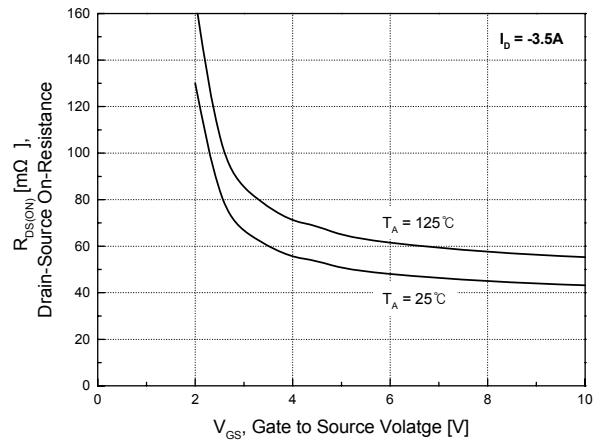


Fig.4 On-Resistance Variation with Gate to Source Voltage

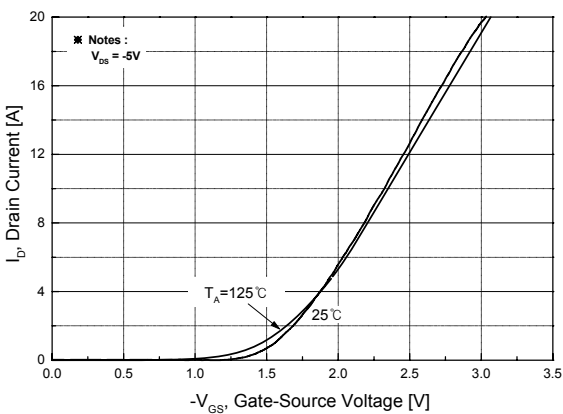


Fig.5 Transfer Characteristics

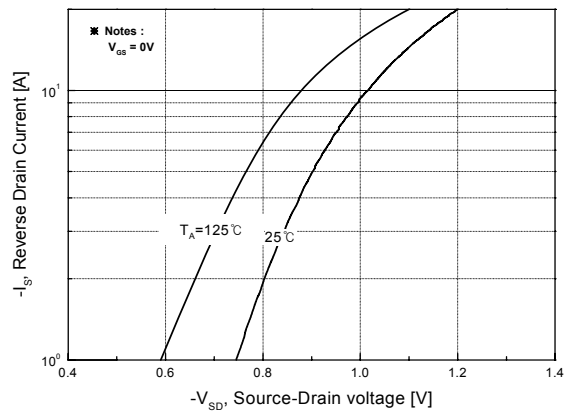


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

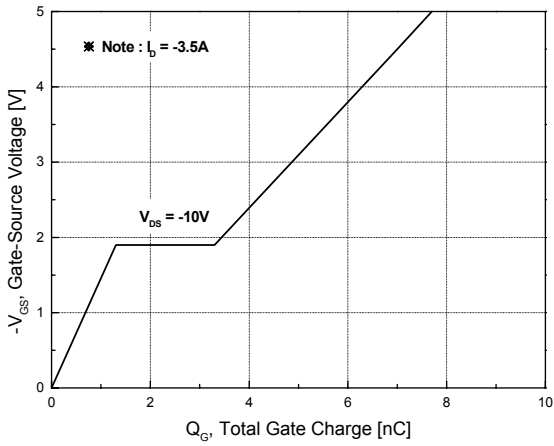


Fig.7 Gate Charge Characteristics

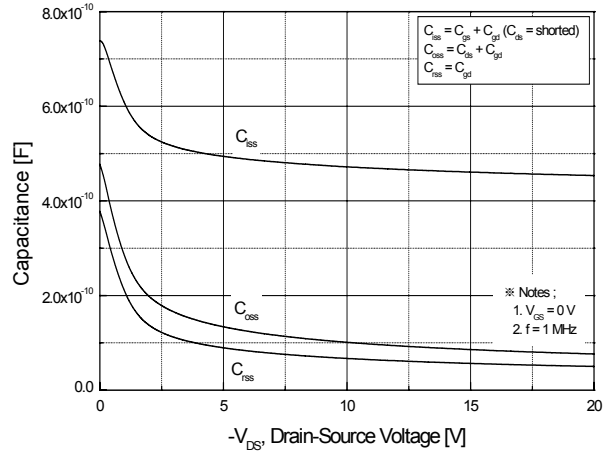


Fig.8 Capacitance Characteristics

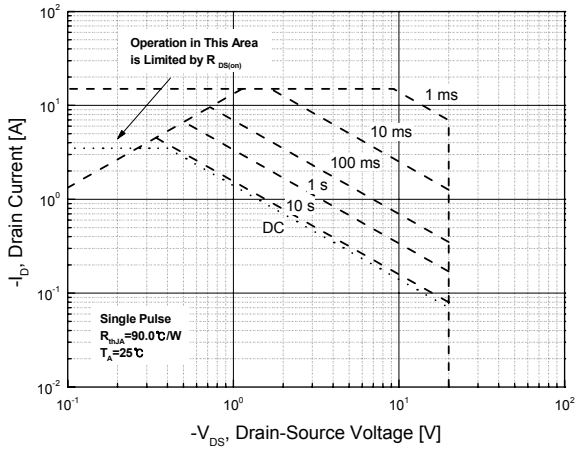


Fig.9 Maximum Safe Operating Area

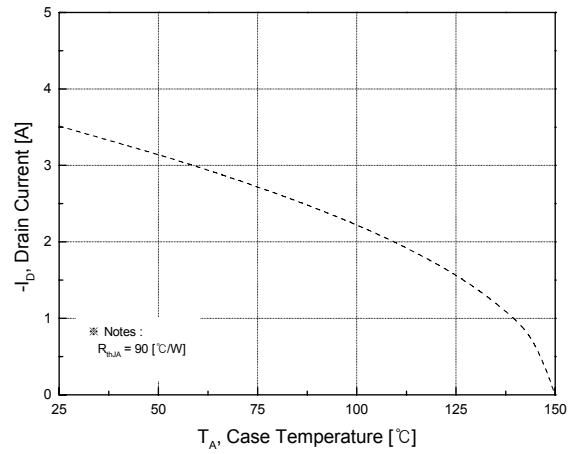


Fig.10 Maximum Drain Current vs. Case Temperature

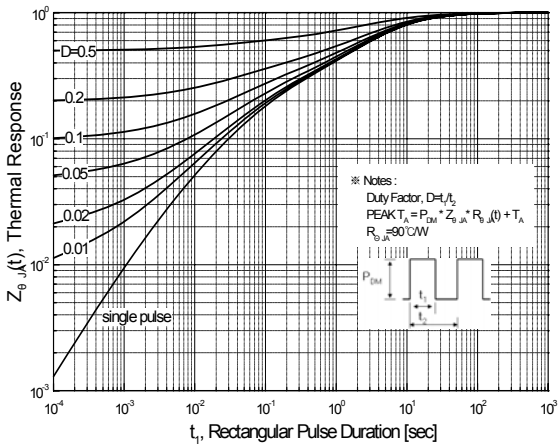
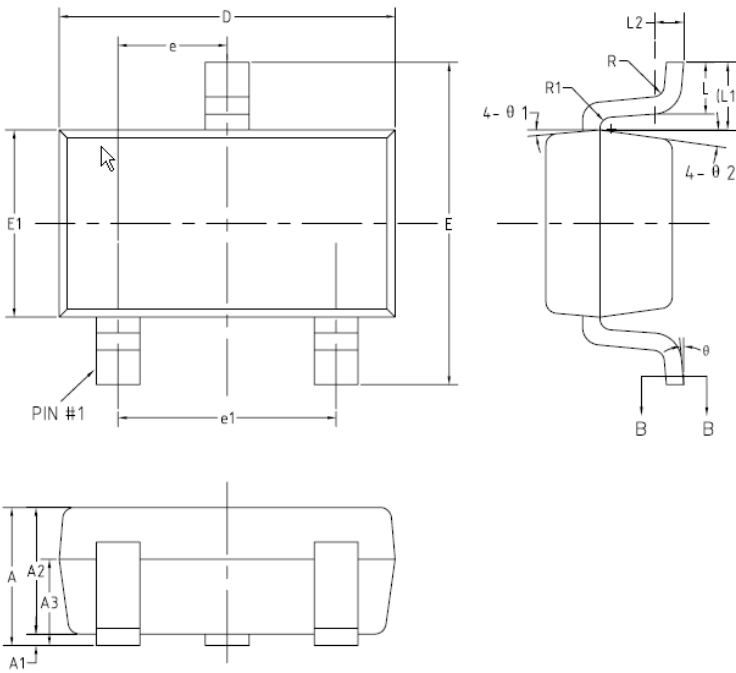


Fig.11 Transient Thermal Response Curve

Physical Dimensions

3 Leads, SOT-23

Dimensions are in millimeters unless otherwise specified



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	—	—	1.25
A1	0	—	0.15
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.36	—	0.50
b1	0.36	0.38	0.45
c	0.14	—	0.20
c1	0.14	0.15	0.16
D	2.826	2.926	3.026
E	2.60	2.80	3.00
E1	1.526	1.626	1.726
e	0.95BSC		
e1	1.90BSC		
L	0.35	0.45	0.60
L1	0.59REF		
L2	0.25BSC		
R	0.05	—	—
R1	0.05	—	0.20
theta	0°	—	8°
theta 1	3°	5°	7°
theta 2	6°	8°	10°

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