
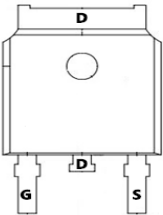


TM60P03D

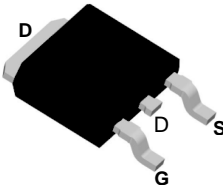
P -Channel Enhancement Mosfet

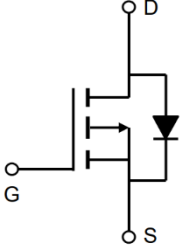
<p>General Description</p> <ul style="list-style-type: none"> • Low $R_{DS(ON)}$ • RoHS and Halogen-Free Compliant <p>Applications</p> <ul style="list-style-type: none"> • Load switch • PWM 	<p>General Features</p> <p>$V_{DS} = -30V$ $I_D = -60A$</p> <p>$R_{DS(ON)} = 8m\Omega (typ.) @ V_{GS} = -10V$</p> <p>100% UIS Tested 100% R_g Tested</p> 
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Marking: 60P03

D:TO-252-3L





Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit	
Drain-Source Voltage	V_{DS}	-30	V	
Gate-Source Voltage	V_{GS}	±20	V	
Continuous Drain Current	I_D	$T_C = 25^\circ C$	-60	A
		$T_C = 100^\circ C$	-35	
Pulsed Drain Current ¹	I_{DM}	-185	A	
Single Pulse Avalanche Energy ²	EAS	80	mJ	
Total Power Dissipation	P_D	$T_C = 25^\circ C$	43.1	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient ³	$R_{\theta JA}$	70	°C/W
Thermal Resistance from Junction-to-Case	$R_{\theta JC}$	2.9	°C/W

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

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Static Characteristics							
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-30	-	-	V	
Gate-body Leakage current	I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -30V, V _{GS} = 0V	T _J =25°C	-	-	-1	μA
			T _J =100°C	-	-	-100	
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-1	-1.5	-2.5	V	
Drain-Source on-Resistance ⁴	R _{DS(on)}	V _{GS} = -10V, I _D = -15A	-	8	10	mΩ	
		V _{GS} = -4.5V, I _D = -10A	-	11	19		
Forward Transconductance ⁴	g _{fs}	V _{DS} = -10V, I _D = -15A	-	44	-	S	
Dynamic Characteristics⁵							
Input Capacitance	C _{iss}	V _{DS} = -15V, V _{GS} = 0V, f = 1MHz	-	2203	-	pF	
Output Capacitance	C _{oss}		-	315	-		
Reverse Transfer Capacitance	C _{rss}		-	279	-		
Gate Resistance	R _g	f = 1MHz	-	10.5	-	Ω	
Switching Characteristics⁵							
Total Gate Charge	Q _g	V _{GS} = -10V, V _{DS} = -15V, I _D = -15A	-	30	-	nC	
Gate-Source Charge	Q _{gs}		-	5	-		
Gate-Drain Charge	Q _{gd}		-	7.5	-		
Turn-on Delay Time	t _{d(on)}	V _{GS} = -10V, V _{DD} = -15V, R _G = 2.5Ω, I _D = -15A	-	14.1	-	ns	
Rise Time	t _r		-	20	-		
Turn-off Delay Time	t _{d(off)}		-	94	-		
Fall Time	t _f		-	65	-		
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ⁴	V _{SD}	I _S = -1A, V _{GS} = 0V	-	-	-1.2	V	
Continuous Source Current	I _S	T _C =25°C	-	-	-60	A	

Notes:

1. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C.
2. The EAS data shows Max. rating . The test condition is V_{DD}= -25V, L=0.1mH, I_{AS}= -40A.



Typical Characteristics

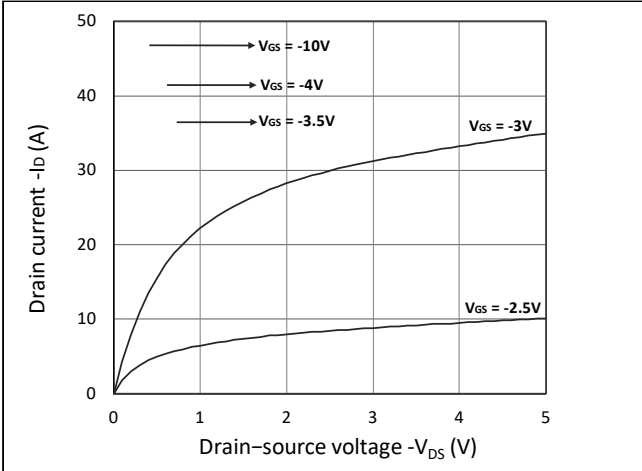


Figure 1. Output Characteristics

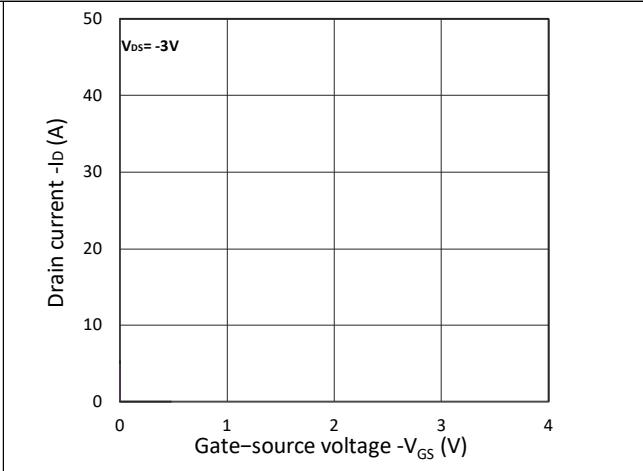


Figure 2. Transfer Characteristics

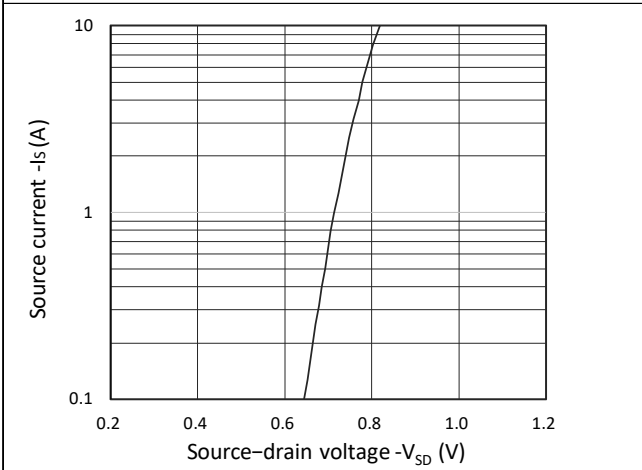


Figure 3. Forward Characteristics of Reverse

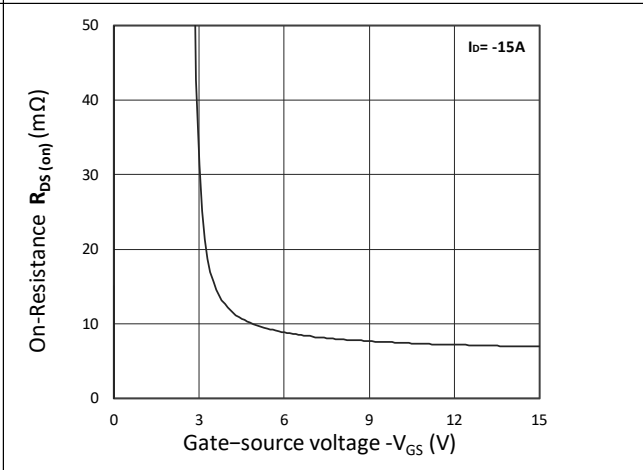


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

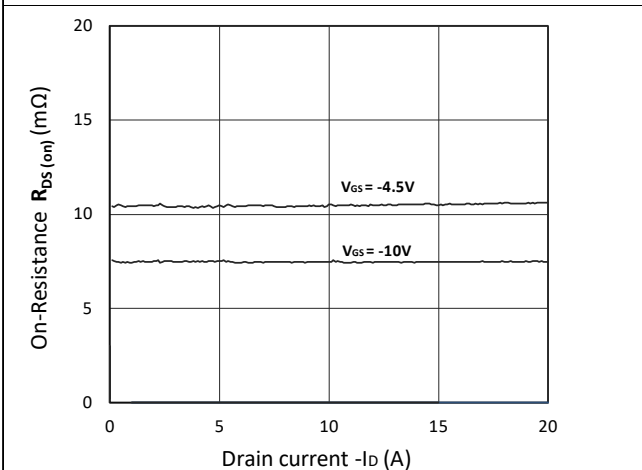


Figure 5. $R_{DS(ON)}$ vs. I_D

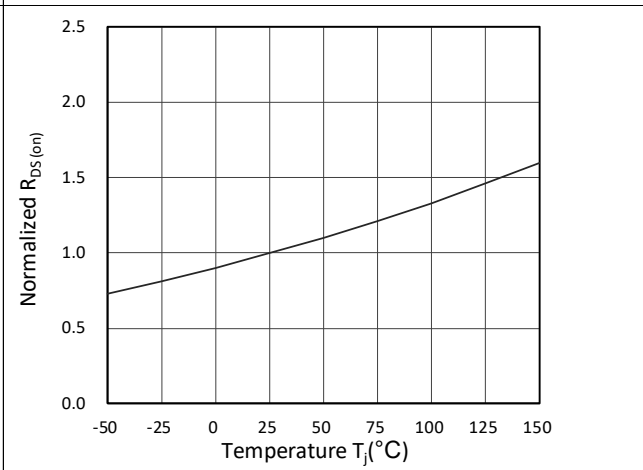


Figure 6. Normalized $R_{DS(ON)}$ vs. Temperature

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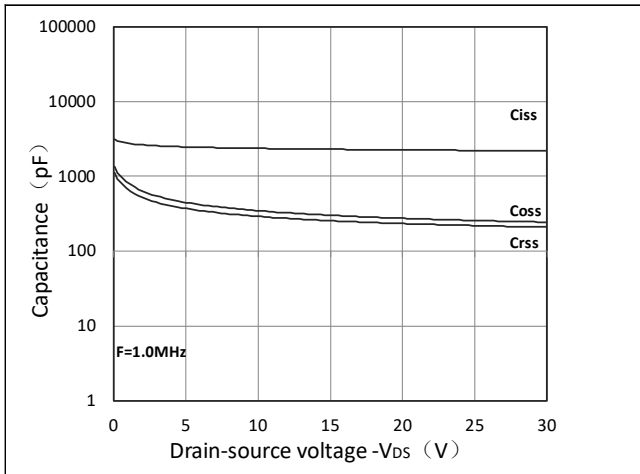


Figure 7. Capacitance Characteristics

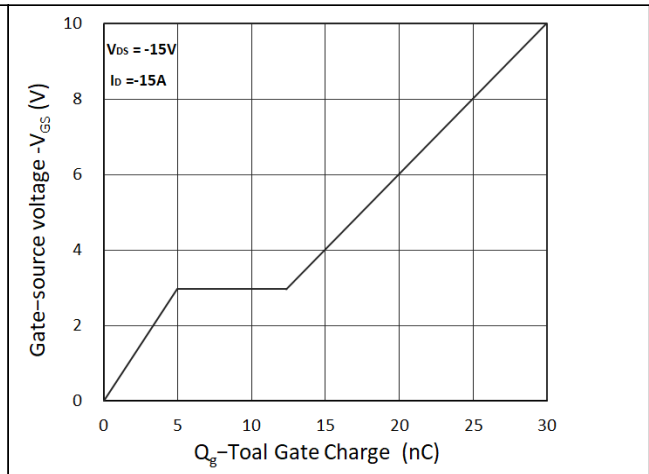


Figure 8. Gate Charge Characteristics

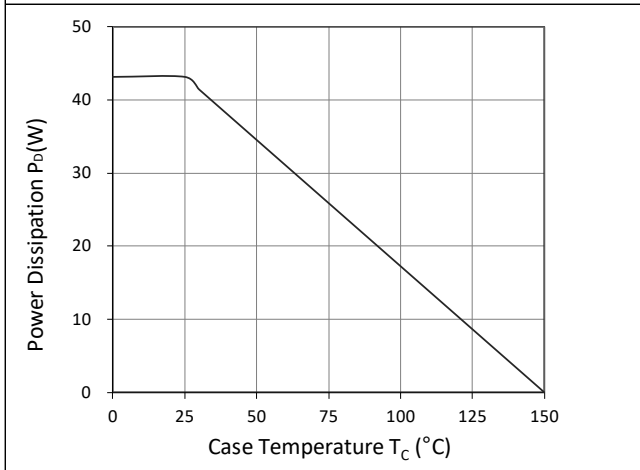


Figure 9. Power Dissipation

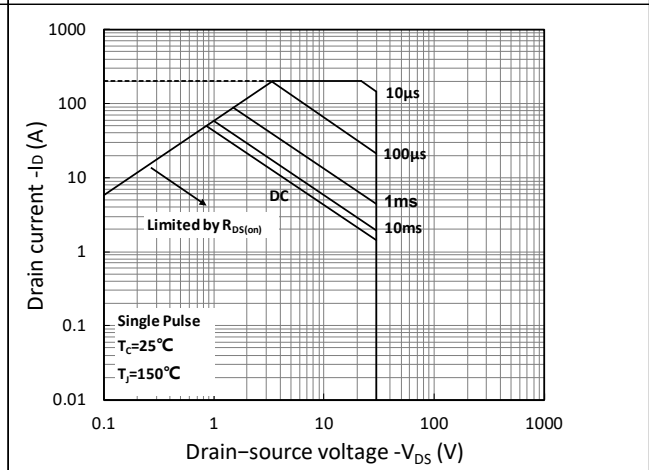


Figure 10. Safe Operating Area

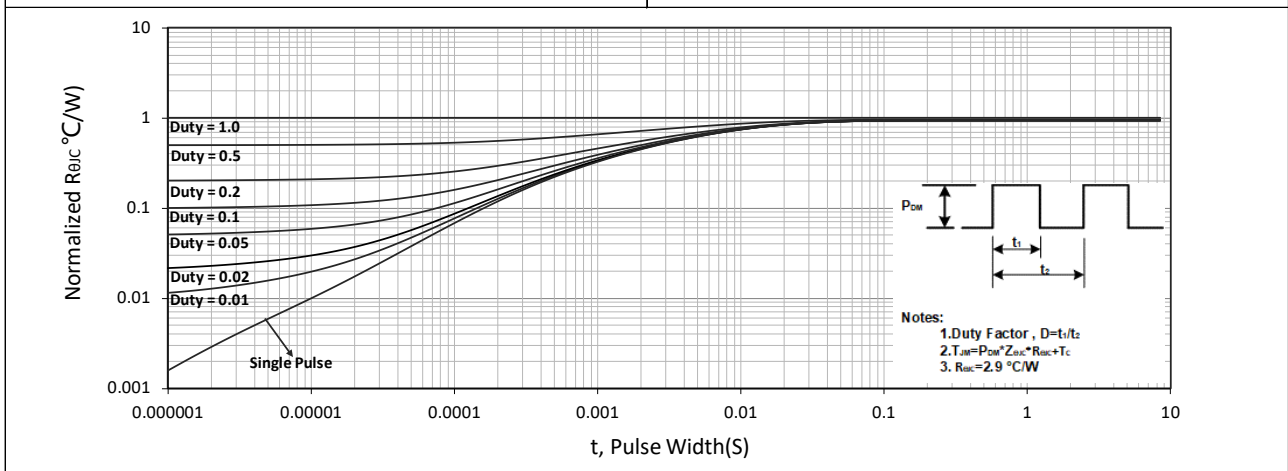
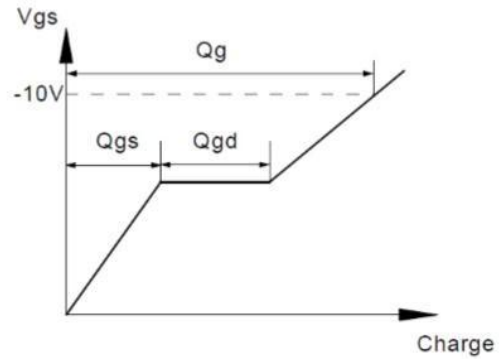
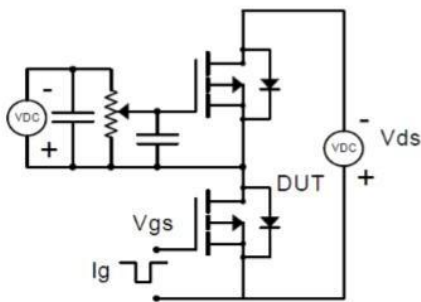


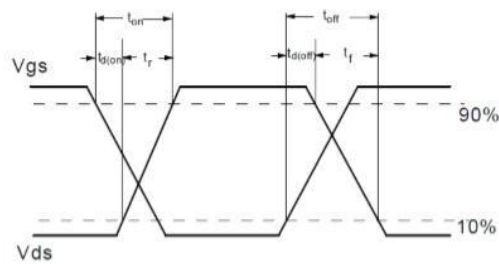
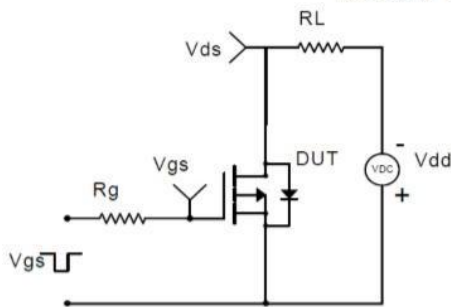
Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

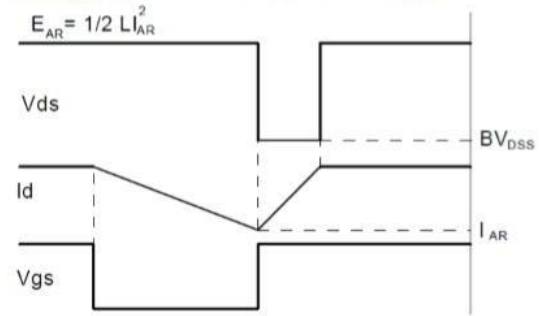
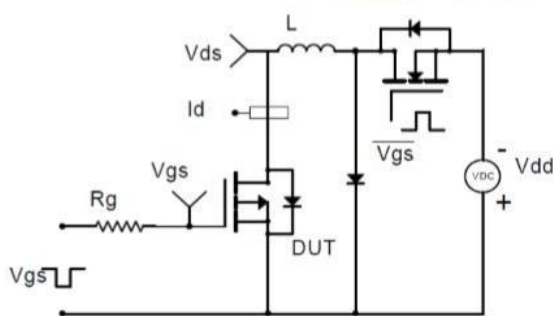
Gate Charge Test Circuit & Waveform



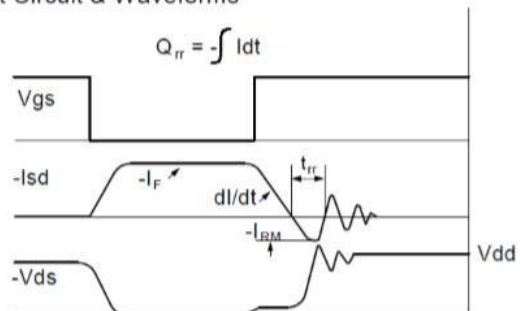
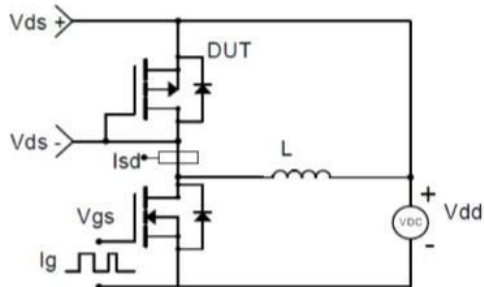
Resistive Switching Test Circuit & Waveforms



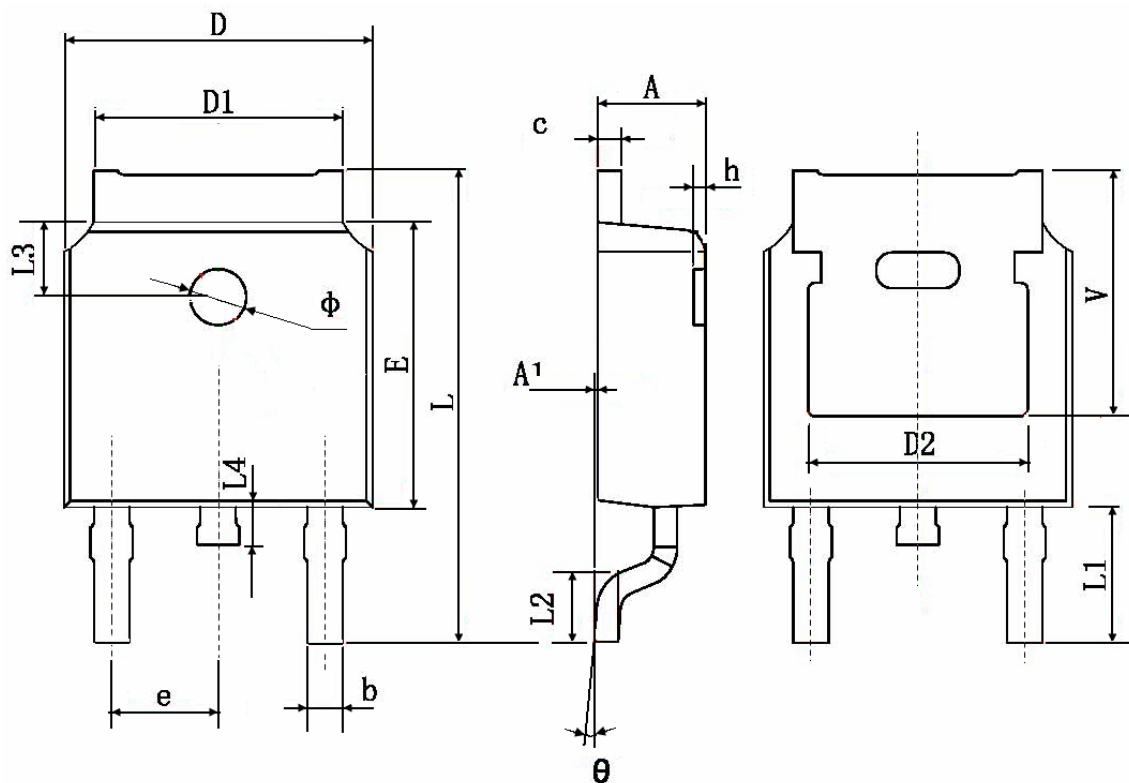
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Information: TO-252-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
ϕ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	