

BMI65R380B

N-channel Super Junction MOSFET

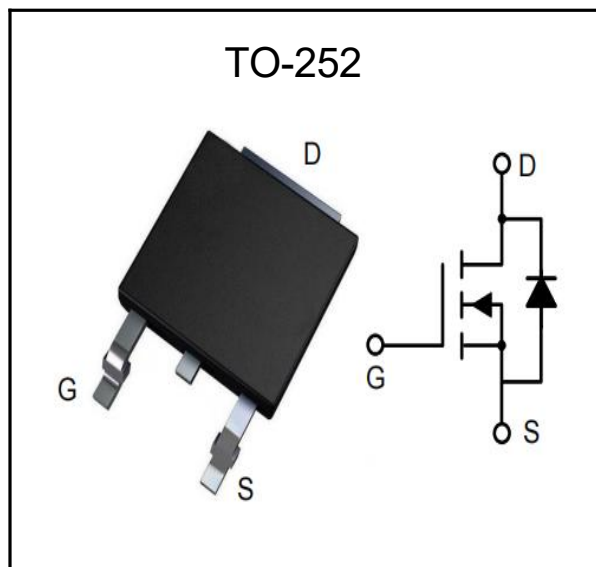
Features

- $V_{(BR)DSS}=650V$, $I_D=13A$
- $R_{DS(on)}@V_{GS}=10V$, TYP=330m Ω
- 100% avalanche tested
- Fast Switching
- Low Gate Charge
- Low $R_{DS(on)}$ per chip area(Low FOM)

Applications

- Switch Mode Power Supply(SMPS)
- TV and Lighting
- Adapter

Package



Absolute Maximum Ratings ($T_J=25^{\circ}C$ unless otherwise specified)

Symbol	Parameter		Value	Units
V_{DS}	Drain-Source Voltage		650	V
V_{GS}	Gate - Source Voltage		± 30	
I_D	Drain Current	$T_C=25^{\circ}C$	13	A
		$T_C=100^{\circ}C$	8	
I_{DM}	Drain Current-Pulse	$T_C=25^{\circ}C$	24	
E_{AS}	Avalanche Energy		88.2	mJ
P_D	Power Dissipation	$T_C=25^{\circ}C$	67	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range		-55 to +150	$^{\circ}C$
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		1.85	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient		62	



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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D =250uA	650	–	–	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 650V, V _{GS} =0V	–	–	1	uA
Gate- Source Leakage Current	I _{GSS}	V _{GS} = ±30V, V _{DS} =0V	–	–	±100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _{DS} =250uA	3	3.5	4	V
Static Drain-source On Resistance	R _{DS(on)}	V _{GS} =10V, I _D =7A	–	330	380	mΩ
Dynamic Characteristics						
Gate Resistance	R _g	f = 1 MHz	–	15	–	Ω
Input capacitance	C _{iSS}	V _{DS} =50V, V _{GS} =0V, f =1 MHz	–	952	–	pF
Output capacitance	C _{oss}		–	243	–	
Reverse transfer capacitance	C _{rSS}		–	5.3	–	
Switching Characteristics						
Turn-on delay time	T _{d(on)}	V _{DD} =400V, V _{GS} =15V, I _D =5A, R _G =10Ω	–	34	–	ns
Turn-on Rise time	T _r		–	4.9	–	
Turn -Off Delay Time	T _{d(off)}		–	47	–	
Turn -Off Fall time	T _f		–	3.5	–	
Gate to Source Charge	Q _{gs}	V _{DS} =400V, V _{GS} =10V, I _D =5A	–	2.2	–	nC
Gate to Drain Charge	Q _{gd}		–	3.8	–	
Gate to Drain Charge	Q _g		–	10.6	–	
Source - Drain Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =1A	–	–	1.3	V
Reverse Recovery Time	t _{rr}	I _{SD} =3A, d _i /dt=100A/us	–	217		ns
Reverse Recovery Current	I _{rr}		–	15	–	A
Reverse Recovery Charge	Q _{rr}		–	2	–	uC

Notes:

(1) Calculated continuous current based on maximum allowable junction temperature. Note that current limitations arising from heating of the device leads may occur with some lead mounting arrangements.

(2) $L=10\text{mH}$, $R_G=25\Omega$, Start $T_J=25^{\circ}\text{C}$.



Typical Performance Characteristics

Figure 1: Output Characteristics

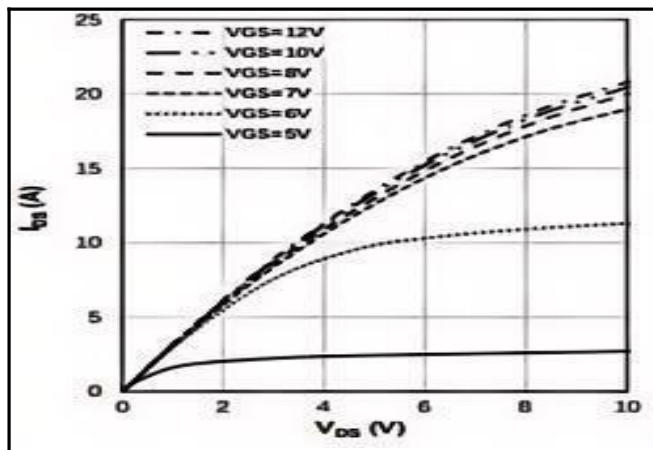


Figure 2: Capacitances

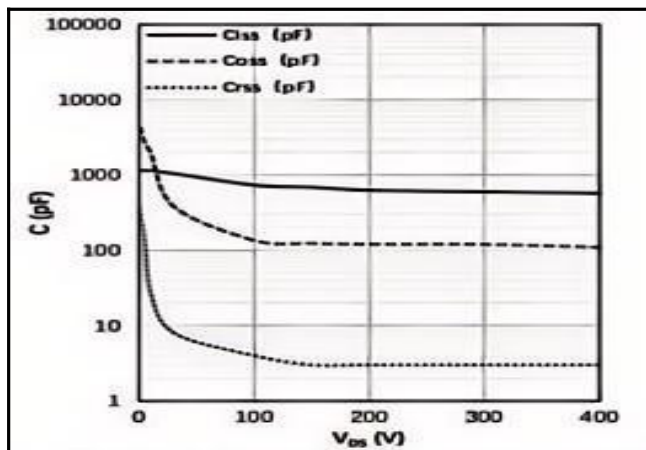


Figure 3: Threshold Voltage vs Temperature

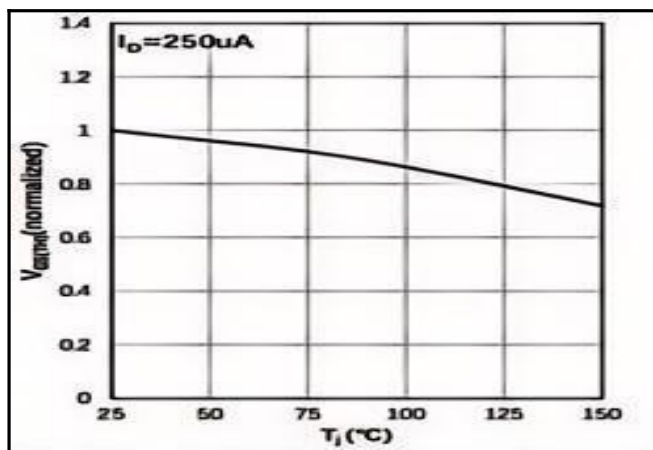


Figure 4: On-state Resistance with Temperature

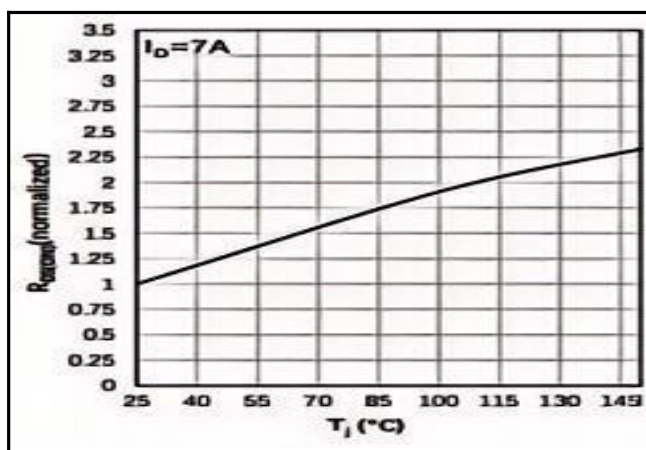


Figure 5: Transfer Characteristics

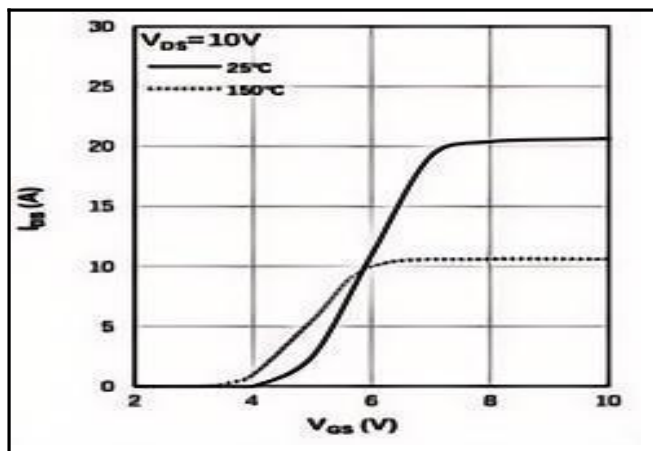
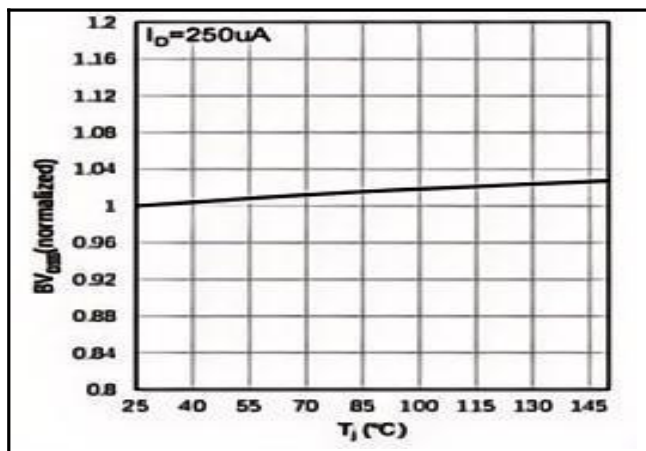


Figure 6: Breakdown Voltage with Temperature



Typical Performance Characteristics

Figure 7: Gate Charge

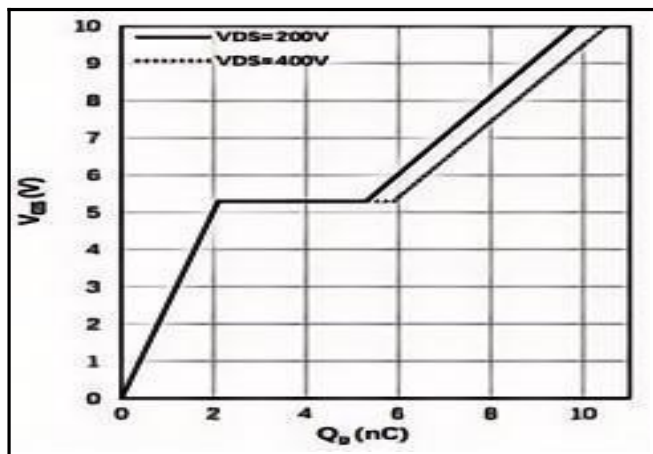


Figure 8: Maximum Drain Current

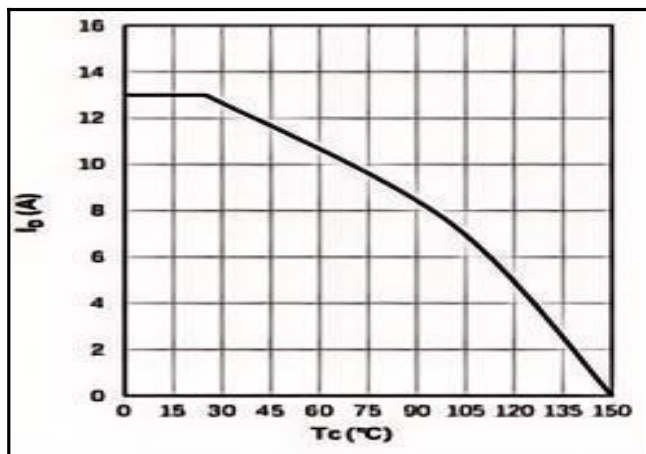


Figure 9: Maximum Transient Thermal Characteristics

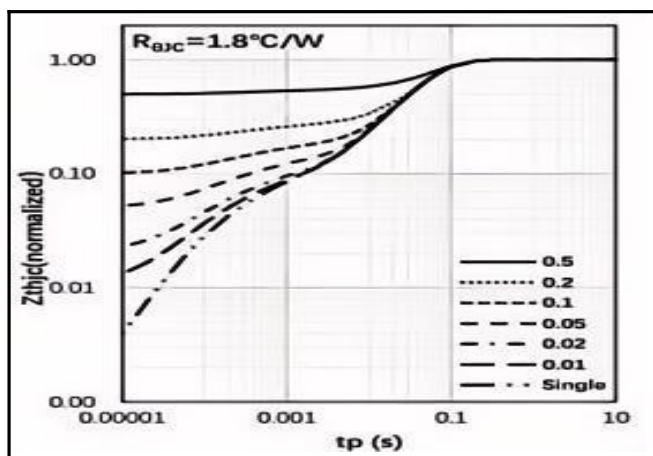


Figure 10: Body Diode Characteristics

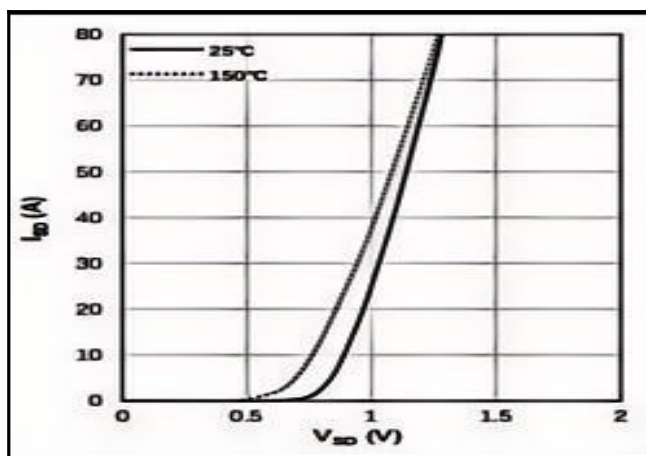


Figure 11: Power Dissipation

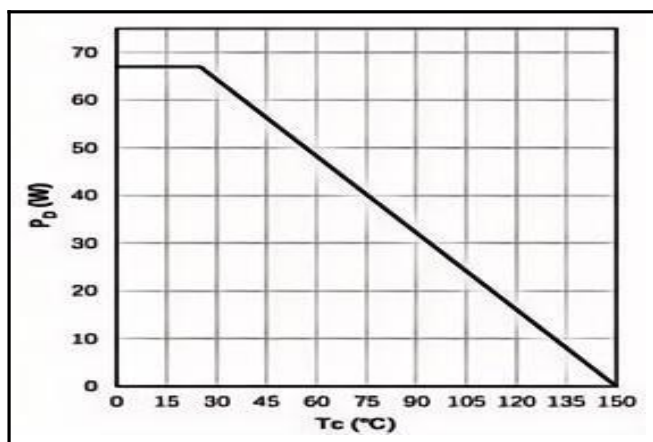
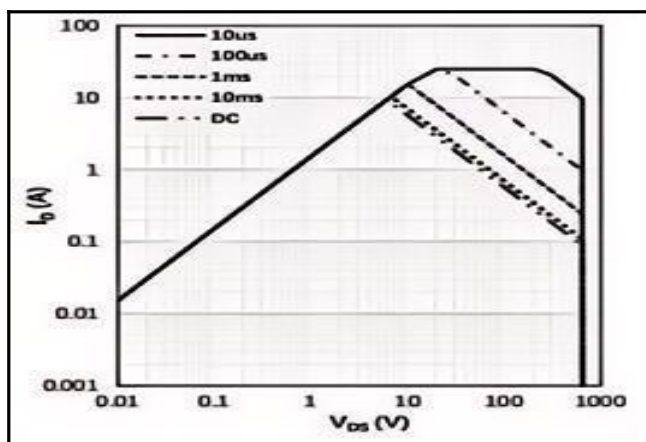


Figure 12: Safe Operating Area



Test Circuit and Waveform

Figure 13: Resistive Switching Test Circuit and Waveforms

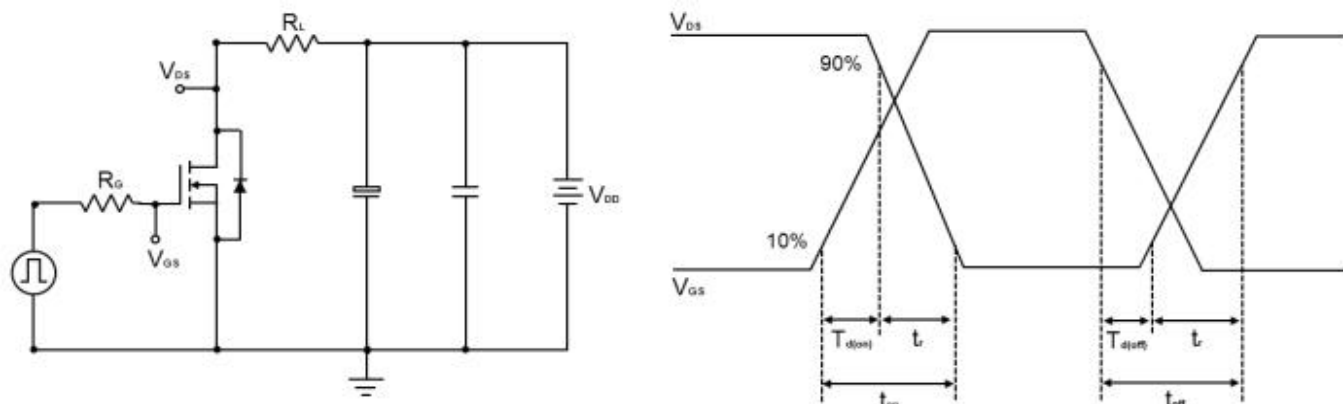


Figure 14: Diode Reverse Recovery Test Circuit and Waveforms

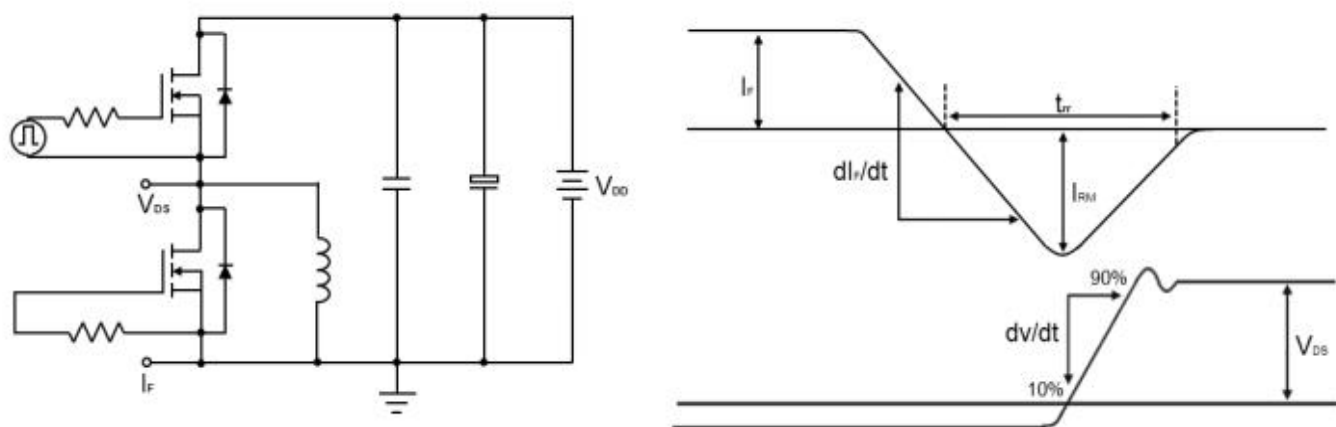
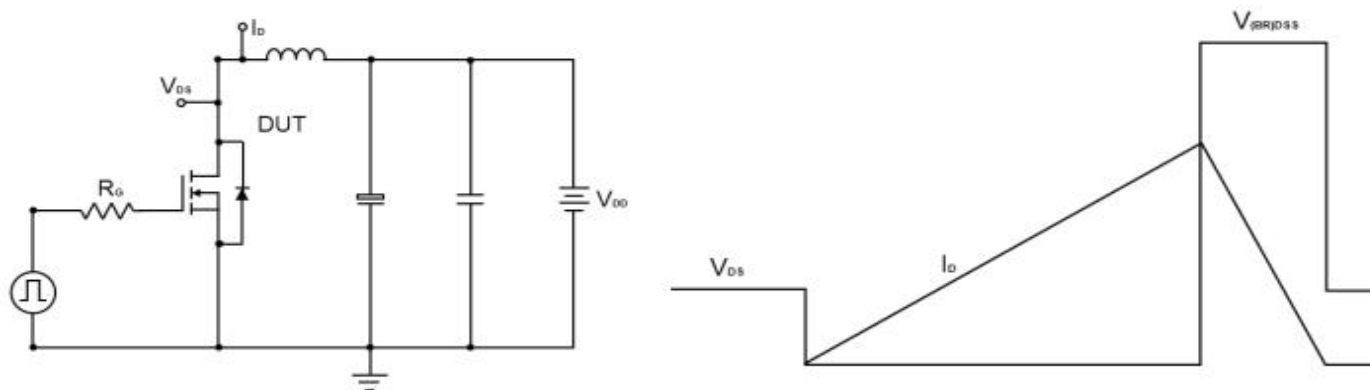
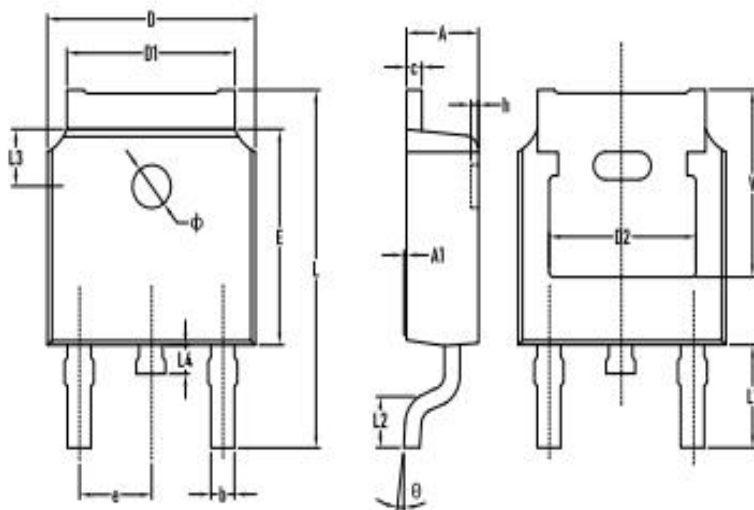


Figure 15: Unclamped Inductive Switching Test Circuit and Waveforms





Symbol	Millimeters		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.	

