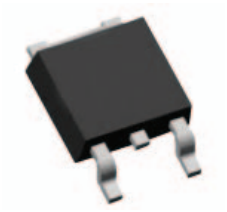
GOOD-ARK
SEMICONDUCTOR

SSFD4060

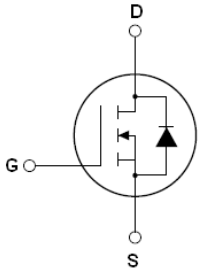
40V N-Channel MOSFET

Main Product Characteristics

V_{DS}	40V
$R_{DS(ON)}$	13mΩ (Max) @V_{GS}=10 V
I_D	60A



TO-252(DPAK)



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Ideal for high efficiency switched mode power supplies
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery

Description

The SSFD4060 utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supply and a wide variety of other applications.

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	60	A
Drain Current-Continuous (Tc=100°C)	$I_{D\ (100°C)}$	42	A
Pulsed Drain Current	I_{DM}	200	A
Maximum Power Dissipation	P_D	65	W
Power Dissipation-Derating Factor		0.43	W/°C
Single Pulse Avalanche Energy[4]	E_{AS}	400	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 to +175	°C
Thermal Resistance，Junction-to-Case[1]	$R_{\theta JC}$	2.3	°C /W

Electrical Characteristics (T_C=25°C unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	40	45	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=40V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics[2]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1.2	1.6	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	7.3	13	mΩ
Forward Transconductance	g_{FS}	V_{DS}=10V,I_D=20A	15	-	-	S
Dynamic Characteristics[3]						
Input Capacitance	C_{lss}	V_{DS}=20V,V_{GS}=0V, F=1.0MHz	-	1800	-	PF
Output Capacitance	C_{oss}		-	280	-	PF
Reverse Transfer Capacitance	C_{rss}		-	190	-	PF
Switching Characteristics[3]						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=20V,I_D=2A,R_L=1Ω V_{GS}=10V,R_G=3Ω	-	6.4	-	nS
Turn-on Rise Time	t_r		-	17.2	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	29.6	-	nS
Turn-Off Fall Time	t_f		-	16.8	-	nS
Total Gate Charge	Q_g	V_{DS}=20V,I_D=20A, V_{GS}=10V	-	29	-	nC
Gate-Source Charge	Q_{gs}		-	4.5	-	nC
Gate-Drain Charge	Q_{gd}		-	6.4	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V,I_S=10A	-	-	1.2	V
Diode Forward Current[1]	I_S		-	-	60	A
Reverse Recovery Time	t_{rr}	T_J = 25°C, I_F = 20A di/dt = 100A/μS[3]	-	29	-	nS
Reverse Recovery Charge	Qrr		-	26	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1. Surface Mounted on FR4 Board, t ≤ 10 sec.
2. Pulse Test: Pulse Width ≤ 300μS, Duty Cycle ≤ 2%.
3. Guaranteed by design, not subject to production
4. E_{AS} condition: T_J=25°C,V_{DD}=20V, V_G=10V, L=1mH, R_g=25Ω

Typical Electrical and Thermal Characteristic Curves

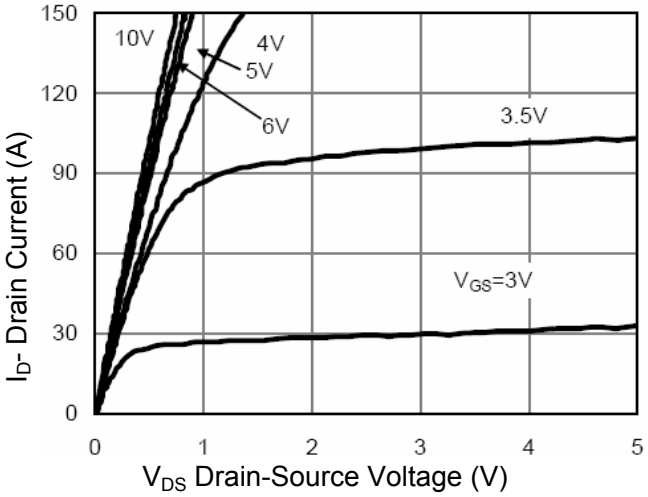


Figure 1 Output Characteristics

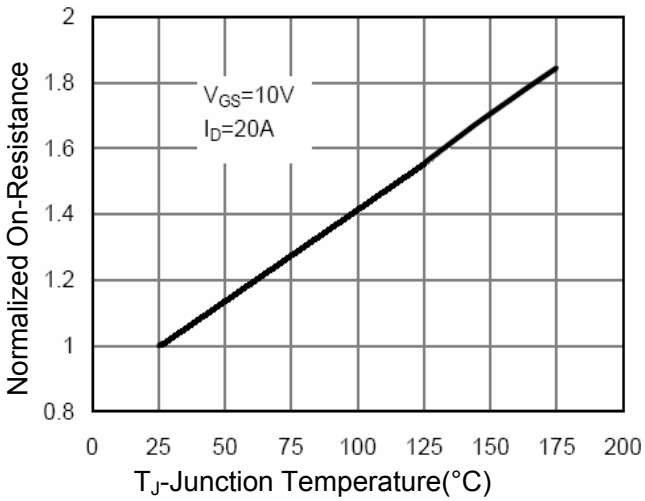


Figure 2 $R_{DS(ON)}$-JunctionTemperature

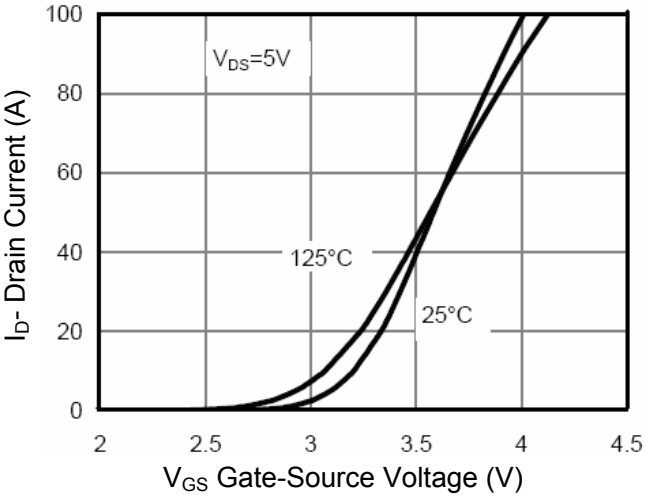


Figure 3 Transfer Characteristics

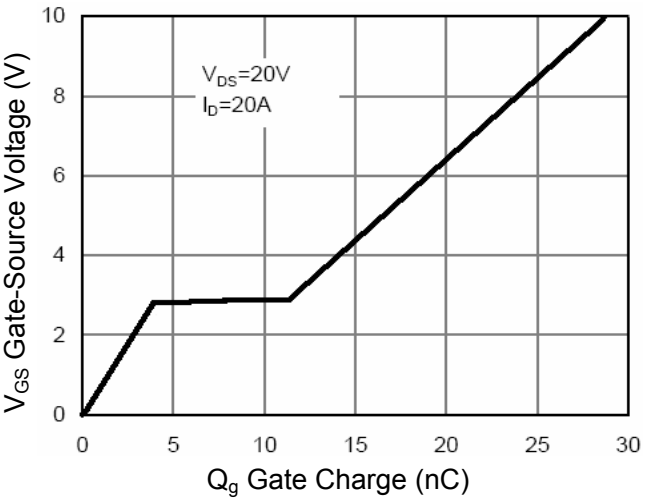


Figure 4 Gate Charge

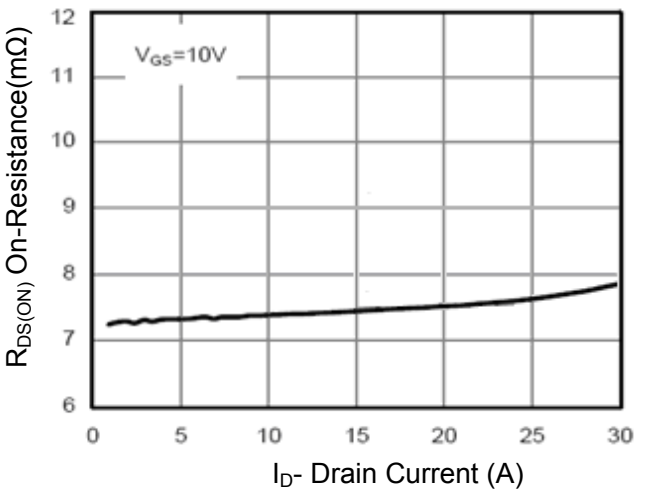


Figure 5 $R_{DS(ON)}$- Drain Current

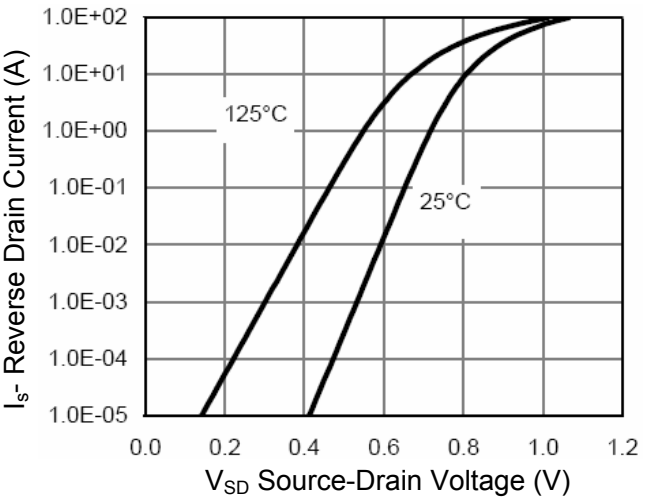


Figure 6 Source- Drain Diode Forward

Typical Electrical and Thermal Characteristic Curves

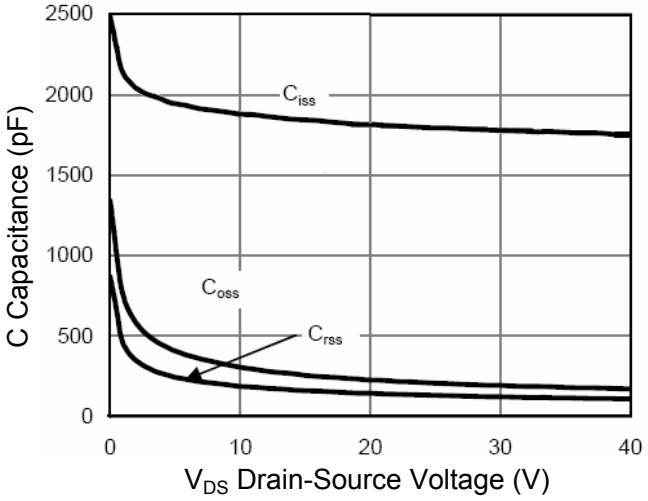


Figure 7 Capacitance vs V_{DS}

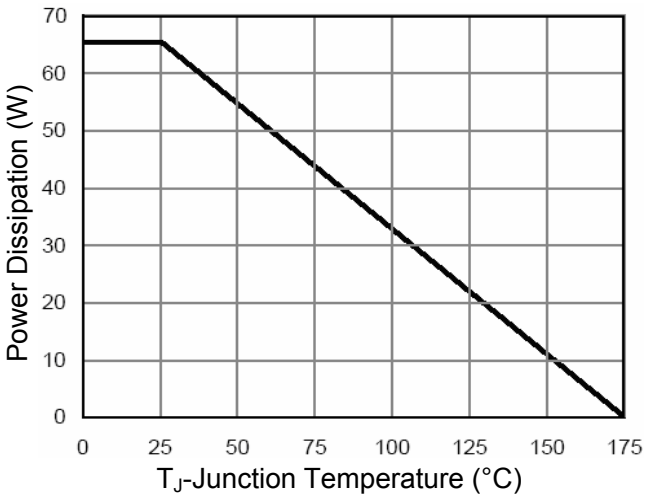


Figure 8 Power De-rating

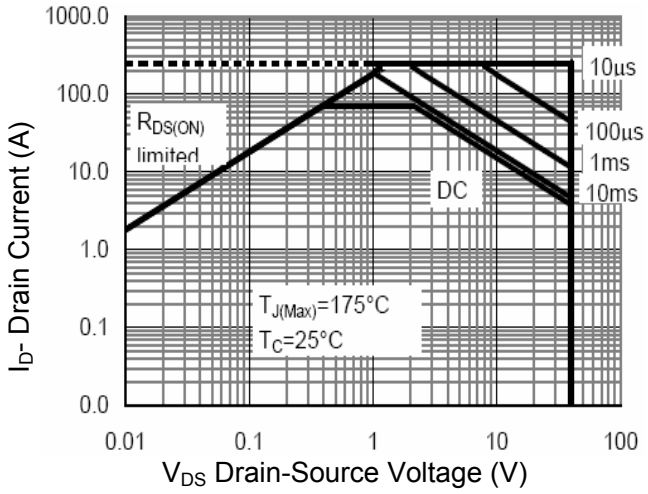


Figure 9 Safe Operation Area

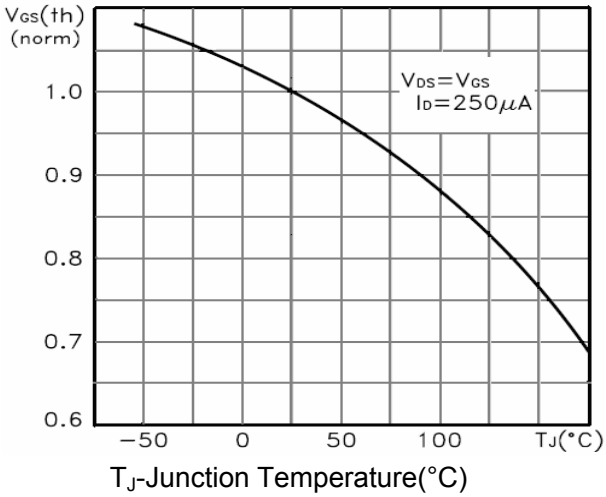


Figure 10 $V_{GS(th)}$ vs Junction Temperature

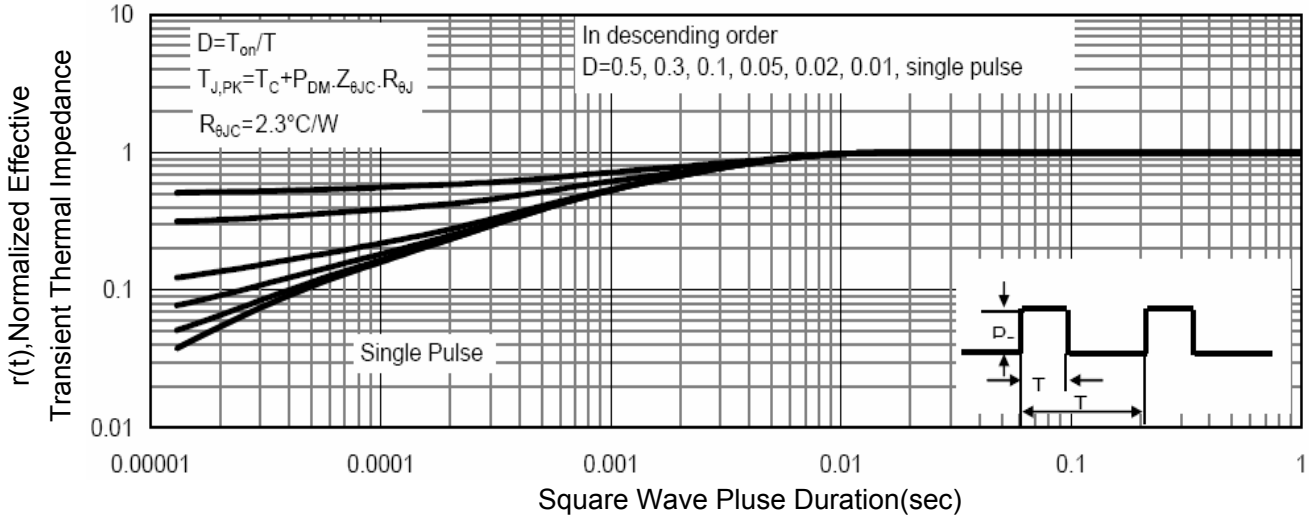


Figure 11 Normalized Maximum Transient Thermal Impedance

Test Circuit

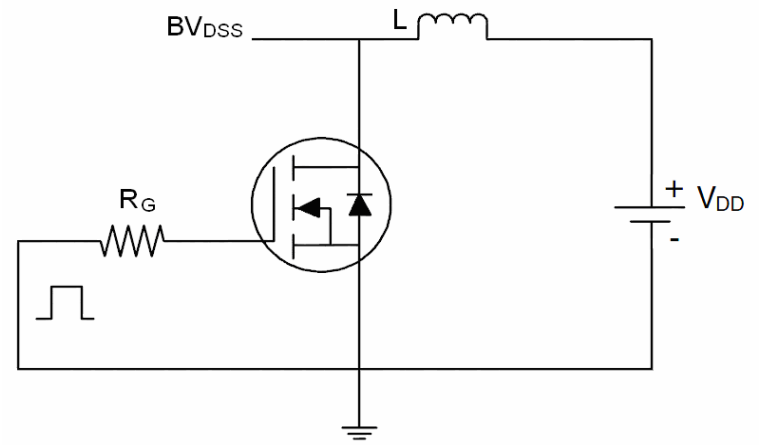


Figure 12 E_{AS} Test Circuit

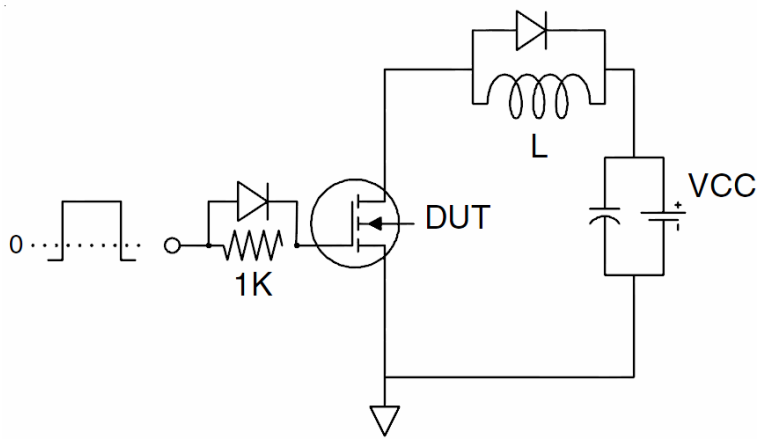


Figure 13 Gate Charge Test Circuit

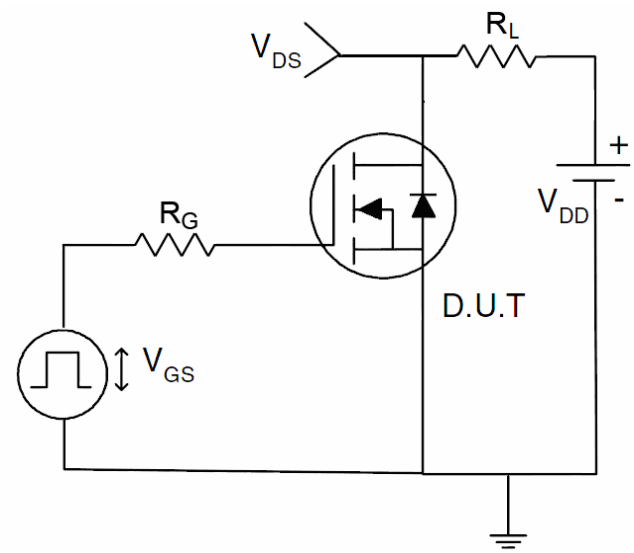
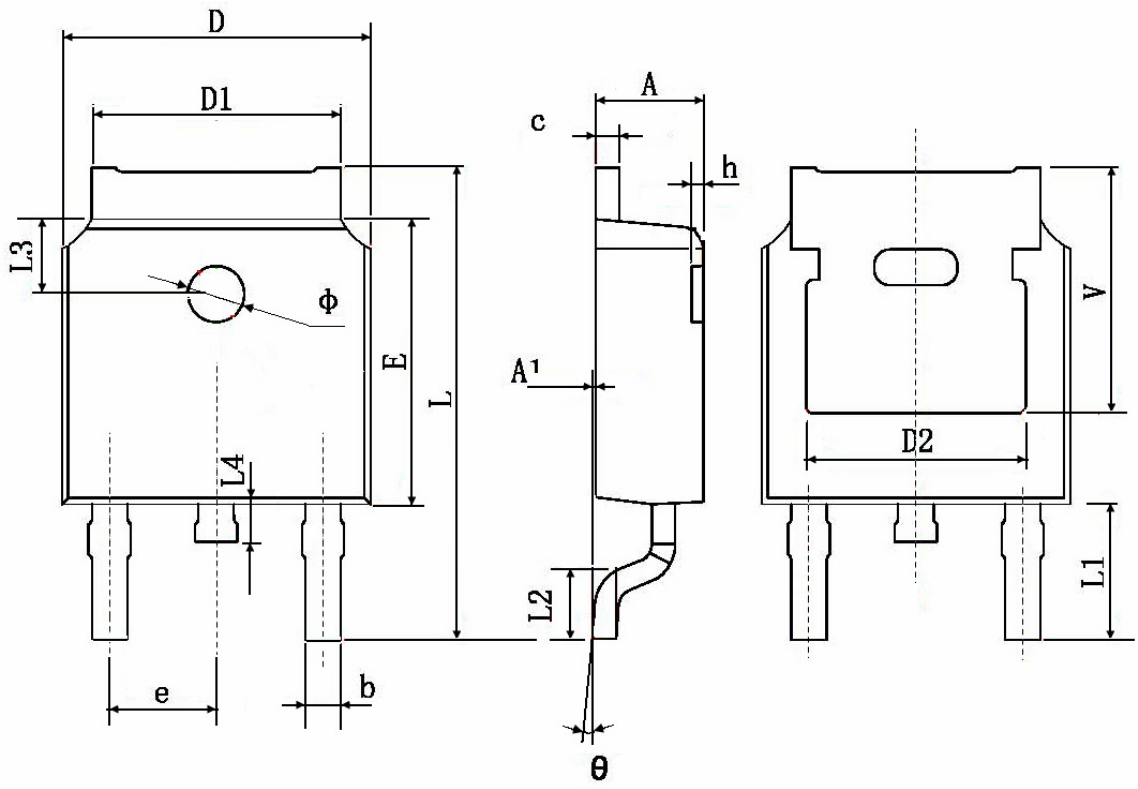


Figure 14 Switch Time Test Circuit

Package Outline Dimensions TO-252(DPAK)



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.	