

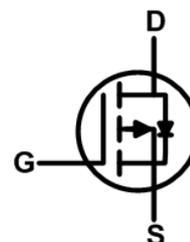
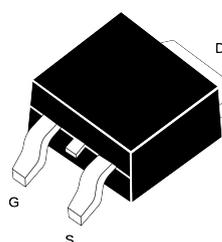
- ★ 100% EAS Guaranteed
- ★ Super Low Gate Charge
- ★ Green Device Available
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

### Product Summary



BVDSS	RDSON	ID
-20V	9mΩ	-50A

### TO-252 Pin Configuration



### Description

The JH50P02 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The JH50P02 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

### Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	-20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D@T_c=25^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-50	A
$I_D@T_c=70^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-25	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	-68	A
$P_D@T_c=25^\circ C$	Total Power Dissipation <sup>3</sup>	38	W
$P_D@T_c=70^\circ C$	Total Power Dissipation <sup>3</sup>	18	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

### Thermal Data

Symbol	Parameter	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup>	75	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup> ( $t \leq 10s$ )	40	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	4.2	$^\circ C/W$

## Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-20	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =-1mA	---	-0.012	---	V/°C
R <sub>DS(on)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-10A	---	9	13	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-8A	---	12	18	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA	-0.4	-0.7	-1.0	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	2.94	---	mV/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V	---	---	±100	nA
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>D</sub> =-10A	---	43	---	S
Q <sub>g</sub>	Total Gate Charge (-4.5V)	V <sub>DS</sub> =-10V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-10A	---	35	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	5.0	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	10	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =-10V, V <sub>GS</sub> =-4.5V, R <sub>G</sub> =3.3Ω, I <sub>D</sub> =-10A	---	12.0	---	ns
T <sub>r</sub>	Rise Time		---	40.0	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	30	---	
T <sub>f</sub>	Fall Time		---	10	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz	---	2800	---	pF
C <sub>oss</sub>	Output Capacitance		---	690	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	590	---	

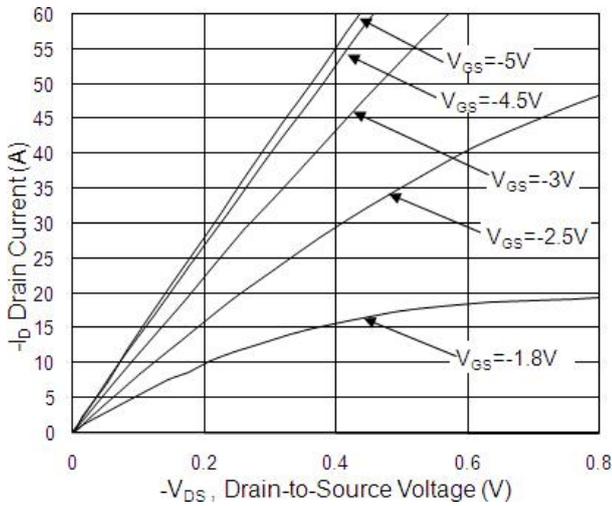
## Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,4</sup>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	-50.0	A
I <sub>SM</sub>	Pulsed Source Current <sup>2,4</sup>		---	---	---	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =-1A, T <sub>J</sub> =25°C	---	---	-1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =-10A, di/dt=100A/μs, T <sub>J</sub> =25°C	---	27	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge		---	17.8	---	nC

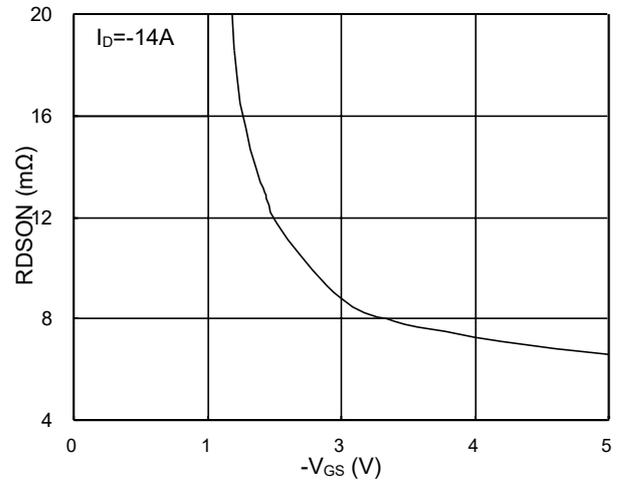
Note :

1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z copper.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
3. The power dissipation is limited by 150°C junction temperature
4. The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.

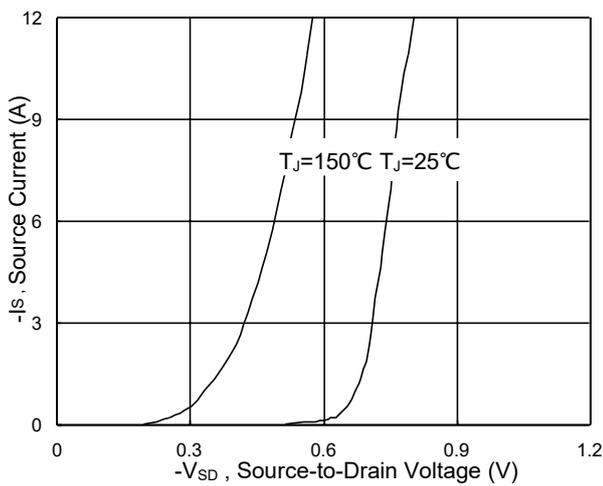
## Typical Characteristics



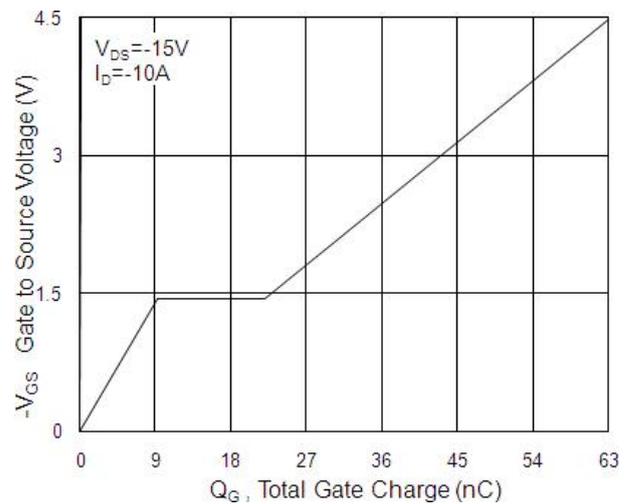
**Fig.1 Typical Output Characteristics**



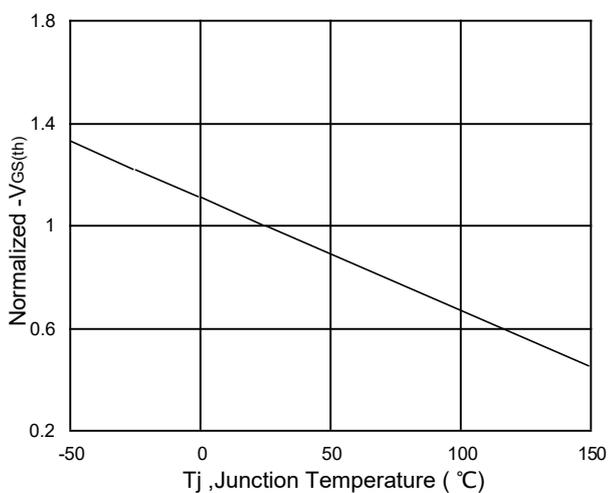
**Fig.2 On-Resistance vs. G-S Voltage**



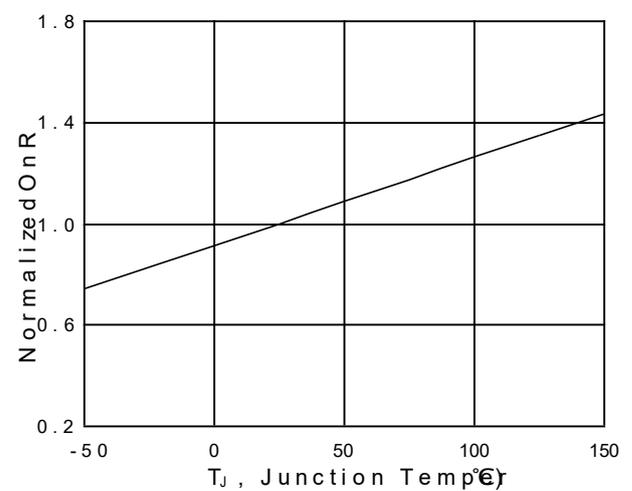
**Fig.3 Forward Characteristics of Reverse**



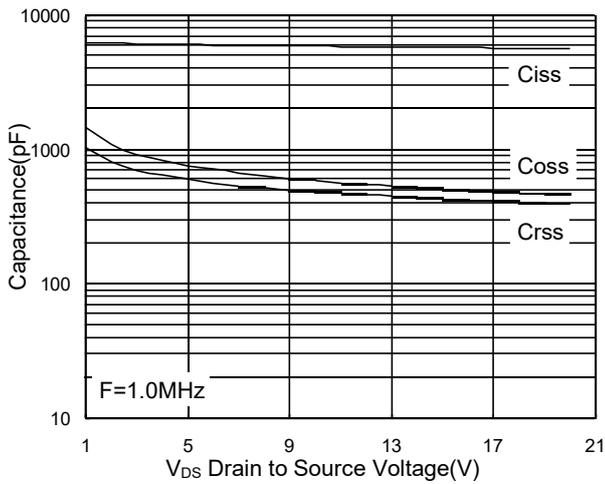
**Fig.4 Gate-charge Characteristics**



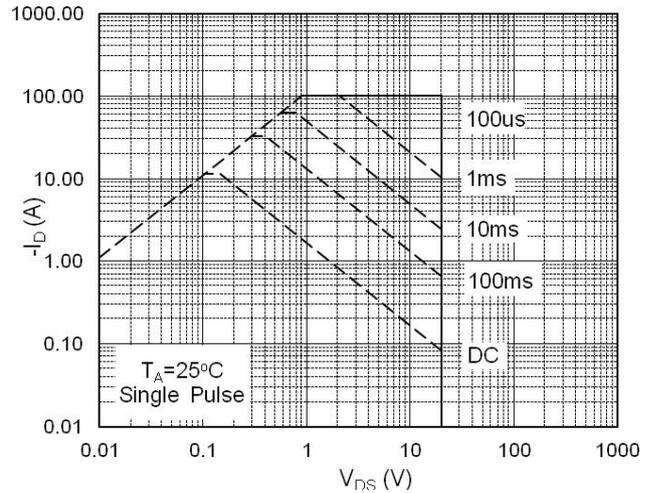
**Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$**



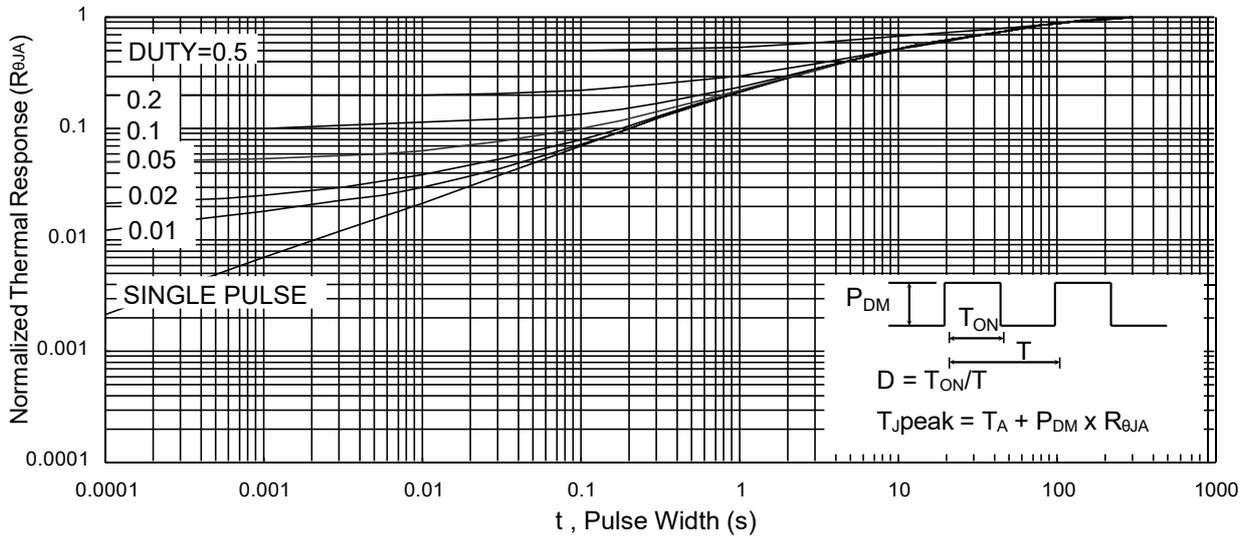
**Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$**



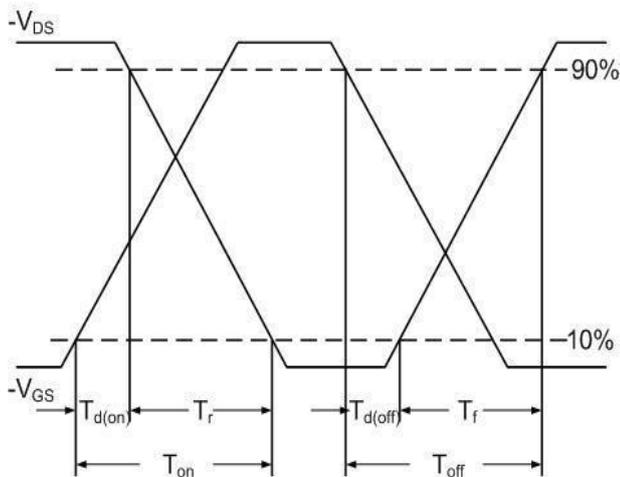
**Fig.7 Capacitance**



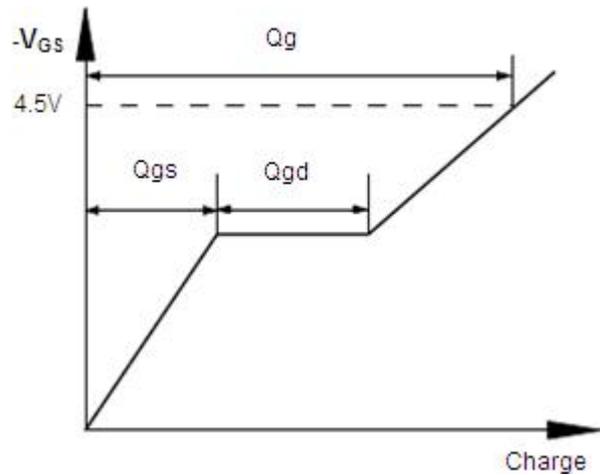
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



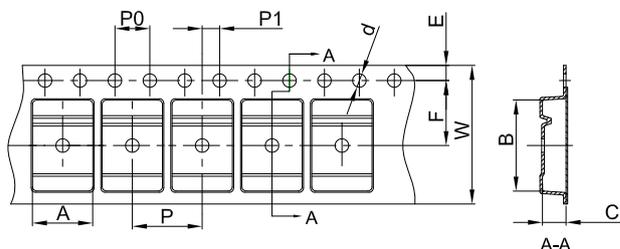
**Fig.10 Switching Time Waveform**



**Fig.11 Gate Charge Waveform**

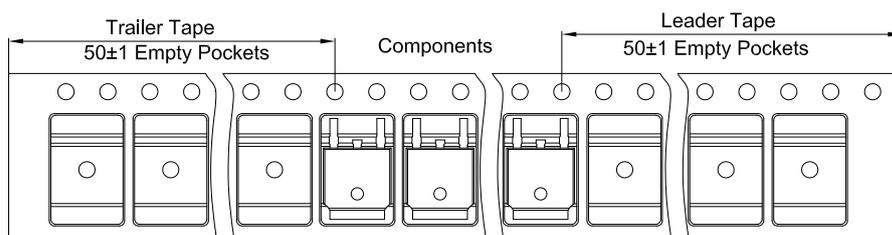
## TO-252-2L Tape and Reel

### TO-252 Embossed Carrier Tape

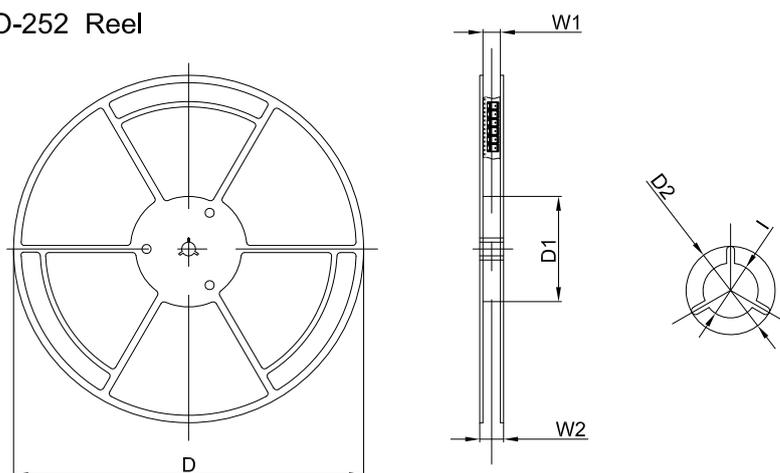


Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
TO-252	6.90	10.50	2.70	Ø1.55	1.75	7.50	4.00	8.00	2.00	16.00

### TO-252 Tape Leader and Trailer

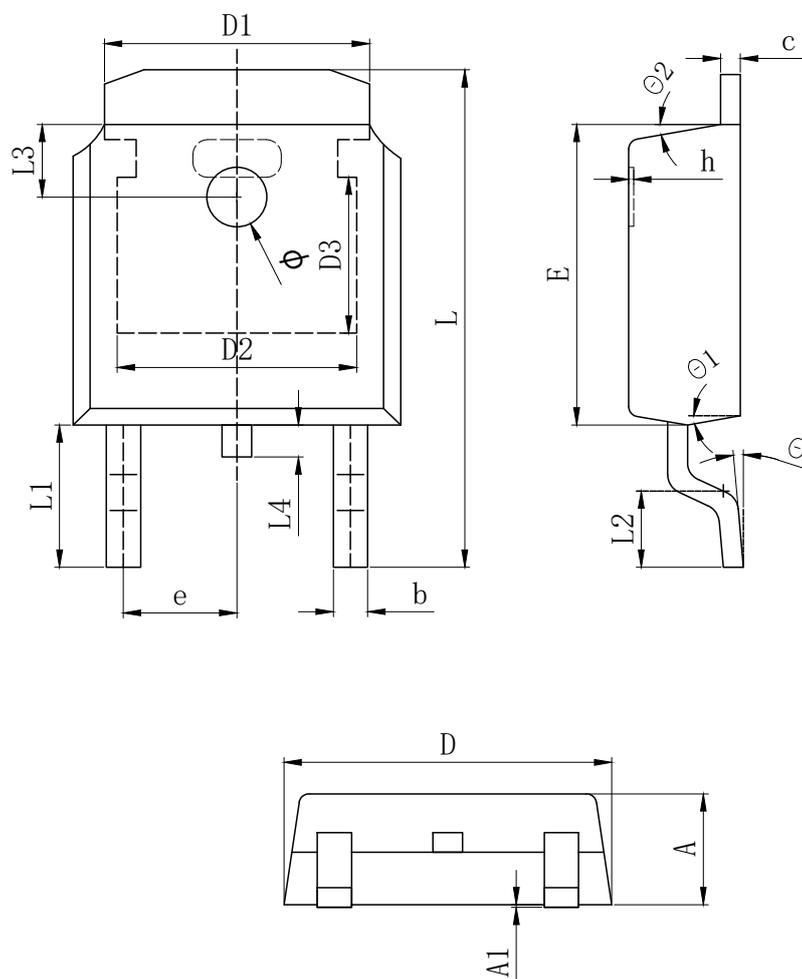


### TO-252 Reel



Dimensions are in millimeter						
Reel Option	D	D1	D2	W1	W2	I
13"Dia	330.00	100.00	Ø21.00	16.40	21.00	Ø13.00

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
2,500 pcs	13inch	2,500 pcs	340×336×29	25,000 pcs	353×346×365	



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	2.200	2.300	2.400
A1	0.000		0.127
b	0.640	0.690	0.740
c (电镀后)	0.460	0.520	0.580
D	6.500	6.600	6.700
D1	5.334 REF		
D2	4.826 REF		
D3	3.166 REF		
E	6.000	6.100	6.200
e	2.286 TYP		
h	0.000	0.100	0.200
L	9.900	10.100	10.300
L1	2.888 REF		
L2	1.400	1.550	1.700
L3	1.600 REF		
L4	0.600	0.800	1.000
$\phi$	1.100	1.200	1.300
$\theta$	0°		8°
$\theta_1$	9° TYP		
$\theta_2$	9° TYP		

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