



## DESCRIPTION

The AM4102 uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

AM4102 is available in a TO252-2 package.

## ORDERING INFORMATION

Package Type	Part Number	
TO252-2 SPQ: 2,500pcs/Reel	D	AM4102DR
		AM4102DVR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

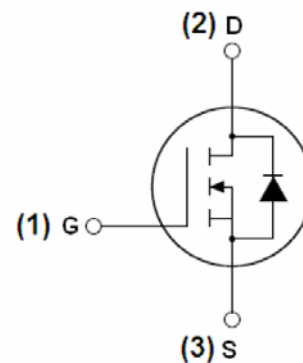
## FEATURES

- $V_{DS}=30V, I_D=50A$   
 $R_{DS(ON)} < 11m\Omega @ V_{GS} = 10V$   
 $R_{DS(ON)} < 16m\Omega @ V_{GS} = 5V$
- High density cell design for ultra low  $R_{DS(ON)}$
- Fully characterized Avalanche voltage and current
- Good stability and uniformity with high  $E_{AS}$
- Excellent package for good heat dissipation
- Special process technology for high ESD capability
- Available in a TO252-2 package.

## APPLICATION

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible Power Supply

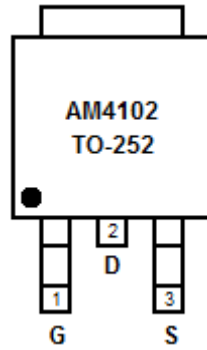
## PIN DESCRIPTION



Schematic diagram



## PIN DESCRIPTION



Top View

Pin #	Symbol	Function
1	G	Gate
2	D	Drain
3	S	Source



## ABSOLUTE MAXIMUM RATINGS

T<sub>C</sub>= 25°C, unless otherwise noted

V <sub>DS</sub> , Drain-Source Voltage	30V
V <sub>GS</sub> , Gate-Source Voltage	±20V
I <sub>D</sub> , Drain Current-Continuous	50A
I <sub>D(100°C)</sub> , Drain Current-Continuous	T <sub>C</sub> =100°C 35A
I <sub>DM</sub> , Pulsed Drain Current	140A
P <sub>D</sub> , Maximum Power Dissipation	60W
Derating Factor	0.4 W/°C
E <sub>AS</sub> , Single pulse avalanche energy <sup>NOTE1</sup>	70mJ
T <sub>J</sub> , T <sub>STG</sub> , Operating Junction and Storage Temperature Range	-55°C~175°C

Stress beyond above listed "Absolute Maximum Ratings" may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## THERMAL CHARACTERISTIC

Parameter	Symbol	Value	Units
Thermal Resistance , Junction-to-Case <sup>NOTE2</sup>	R <sub>θJC</sub>	2.5	°C/W



## ELECTRICAL CHARACTERISTICS

T<sub>C</sub> = 25°C, unless otherwise noted

Parameter	Symbol	Conditions	Min	Typ.	Max	Units
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	33	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V	-	-	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>On Characteristics</b> <sup>NOTE3</sup>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1	1.6	3	V
Drain-Source On-state Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =25A	-	8	11	mΩ
		V <sub>GS</sub> =5V, I <sub>D</sub> =20A	-	10	16	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =20A	15	-	-	S
<b>Dynamic Characteristics</b> <sup>NOTE4</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1.0MHz	-	2000	-	pF
Output Capacitance	C <sub>oss</sub>		-	280	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	160	-	
<b>Switching Characteristics</b> <sup>NOTE4</sup>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =15V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V, R <sub>GEN</sub> =1.8Ω	-	10	-	ns
Turn-on Rise Time	t <sub>r</sub>		-	8	-	
Turn-off Delay Time	t <sub>d(off)</sub>		-	30	-	
Turn-off Fall Time	t <sub>f</sub>		-	5	-	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =25A, V <sub>GS</sub> =10V	-	23	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	7	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	4.5	-	
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>NOTE3</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =25A	-	0.85	1.2	V
Diode Forward Current <sup>NOTE2</sup>	I <sub>S</sub>		-	-	40	A
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> = 25°C, I <sub>F</sub> = 40A	-	22	35	ns
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt = 100A/μs <sup>NOTE3</sup>	-	12	20	nC
Forward Turn-On Time	t <sub>on</sub>	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

NOTE1: EAS condition : T<sub>J</sub>=25°C, V<sub>DD</sub>=15V, V<sub>G</sub>=10V, L=1mH, R<sub>G</sub>=25Ω

NOTE2: Surface Mounted on FR4 Board, t ≤ 10 sec.

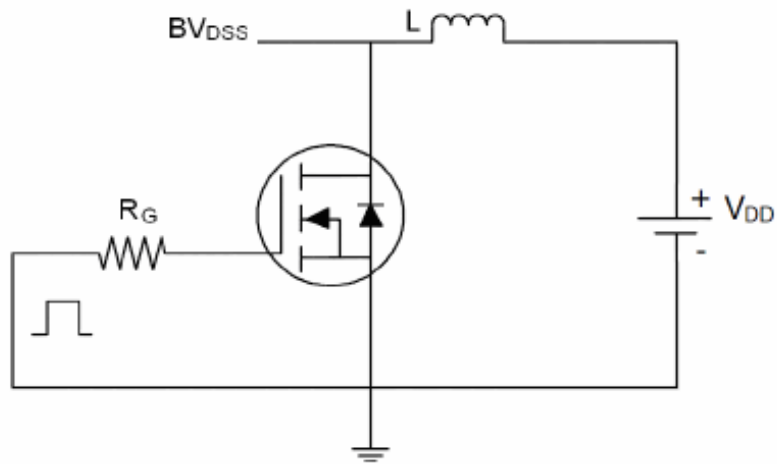
NOTE3: Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

NOTE4: Guaranteed by design, not subject to production

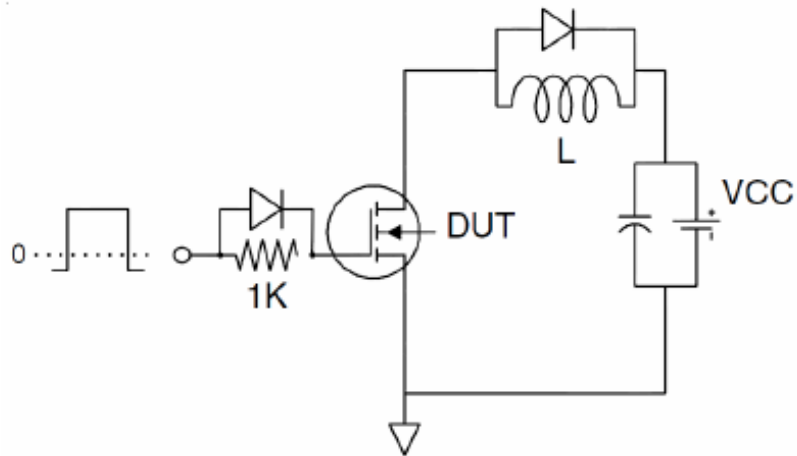


## TEST CIRCUIT

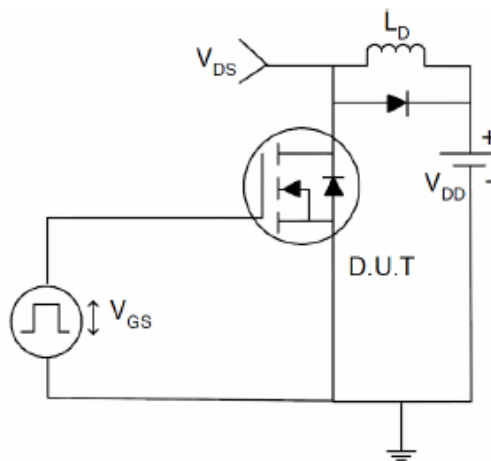
### 1. E<sub>AS</sub> Test Circuit



### 2. Gate Charge Test Circuit



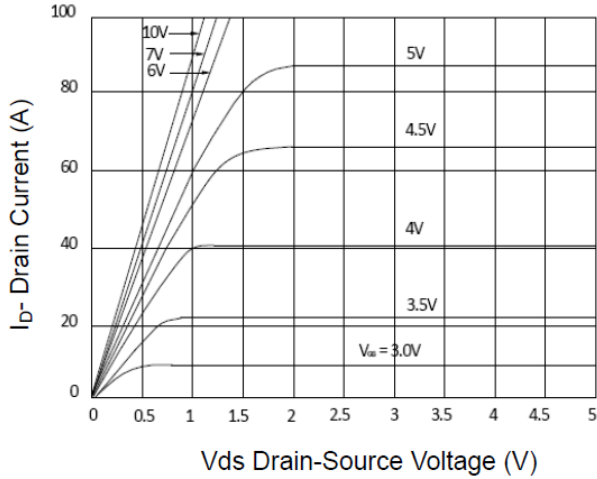
### 3. Switch Time Test Circuit



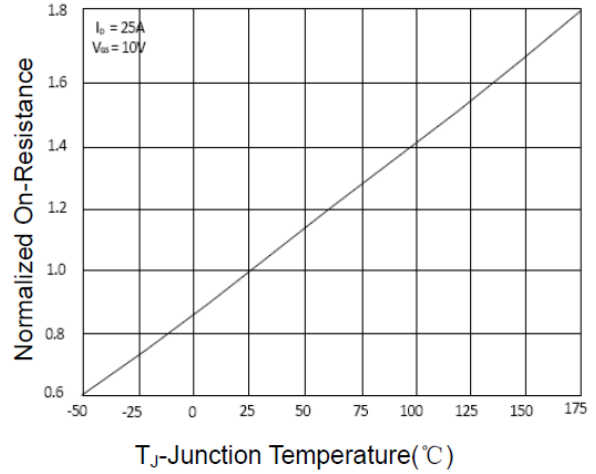


## TYPICAL CHARACTERISTICS

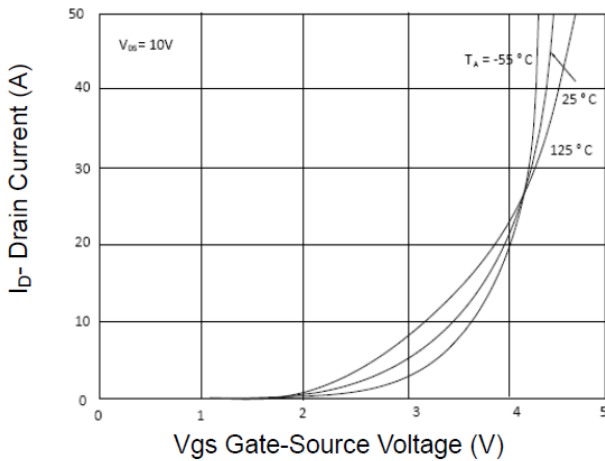
### 1. Output Characteristics



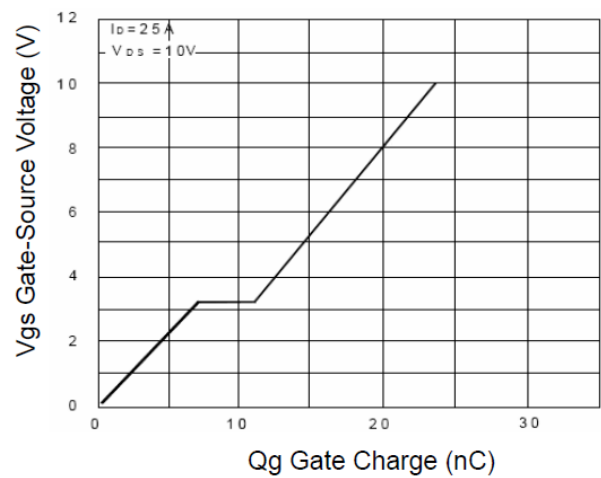
### 2. $R_{dson}$ -Junction Temperature



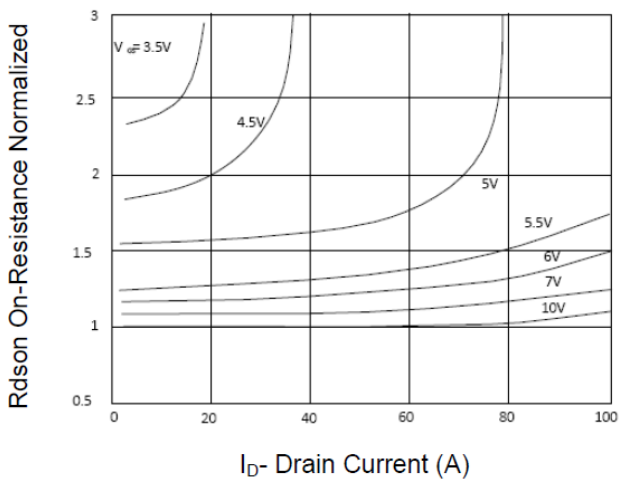
### 3. Transfer Characteristics



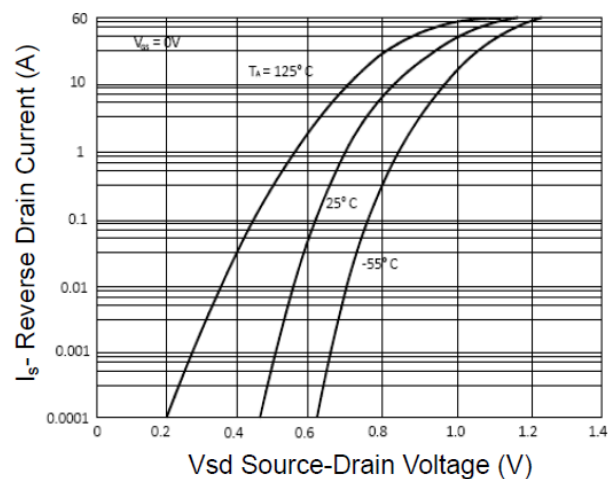
### 4. Gate Charge



### 5. $R_{dson}$ - Drain Current

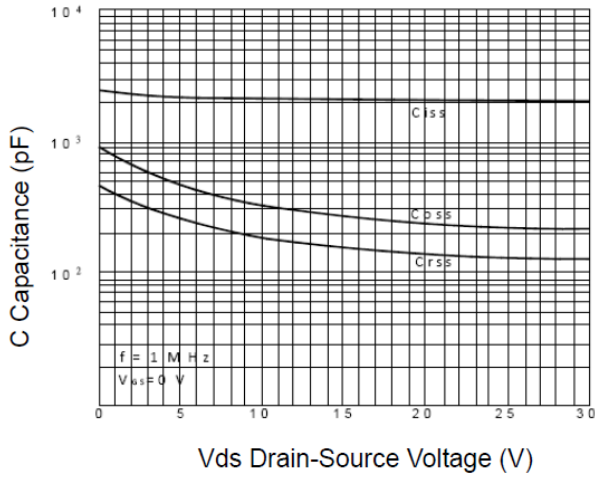


### 6. Source- Drain Diode Forward

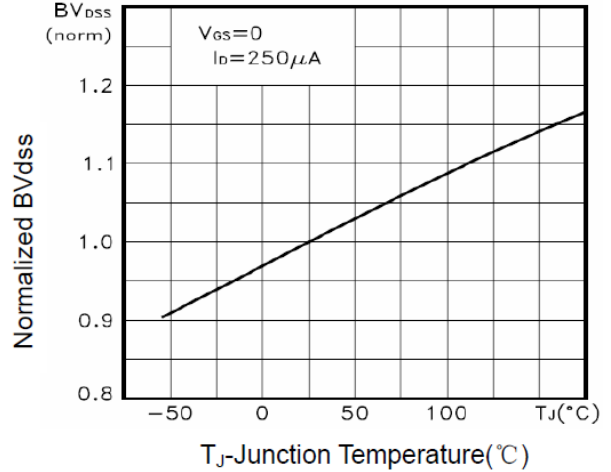




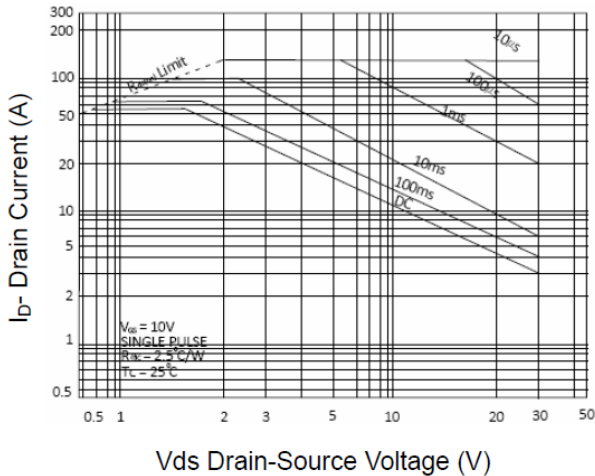
7. Capacitance vs. Vds



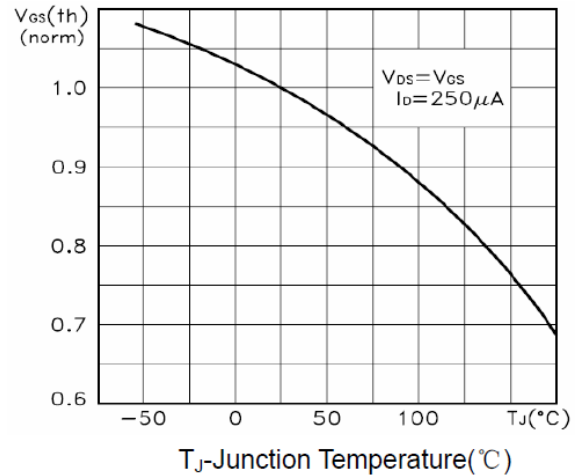
8. BV<sub>DSS</sub> vs. Junction Temperature



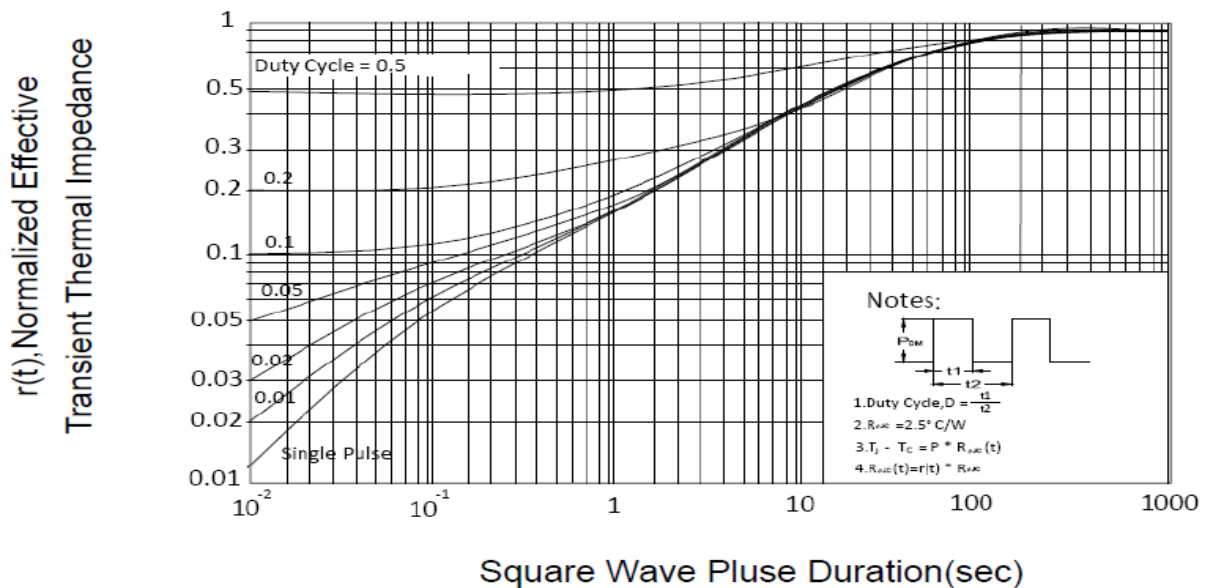
9. Safe Operation Area



10. V<sub>GS(th)</sub> vs. Junction Temperature



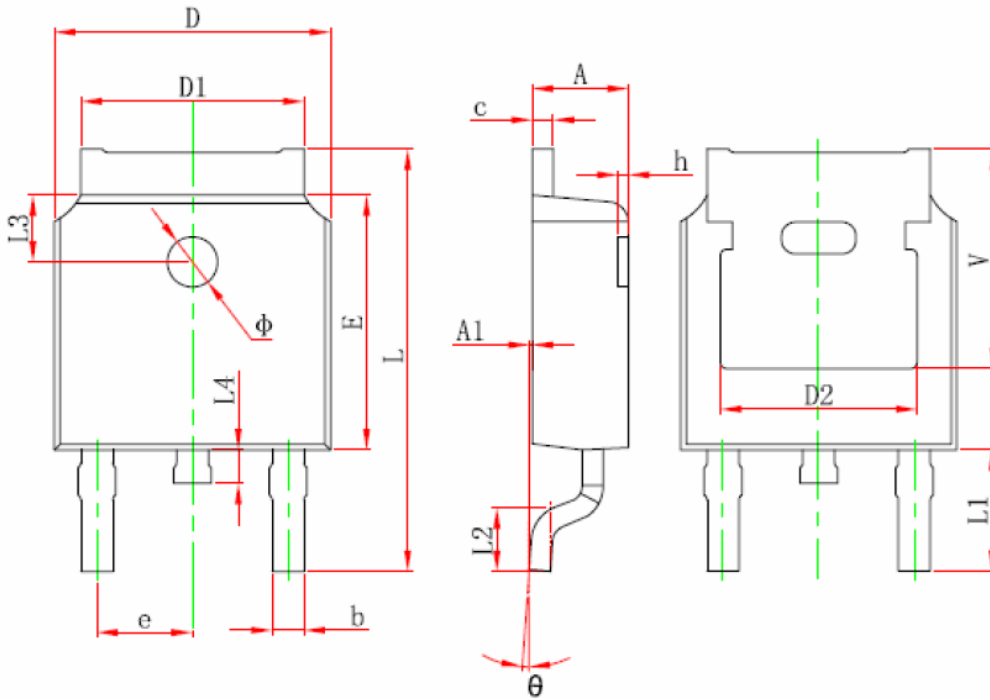
11. Normalized Maximum Transient Thermal Impedance





**PACKAGE INFORMATION**

Dimension in TO252-2 (Unit: mm)



Symbol	Millimeters		Inchers	
	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 REF.		0.190 REF.	
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 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
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 REF.		0.211 REF.	





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