

JMSH1001MTHL

Product Summary

Parameters	Value	Unit
V_{DSS}	100	V
$V_{GS(th_Typ)}$	2.9	V
$I_D(@V_{GS}=10V)$	447	A
$R_{DS(ON_Typ)}(@V_{GS}=10V)$	1.1	m Ω

Ordering Information

Device	Marking	MSL	Form	Package	Reel(pcs)	Per Carton (pcs)
JMSH1001MTHL-13	SH1001M	1	Tape&Reel	TOLT	1800	9000

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

Symbol	Parameter	Value	Unit
V_{DS}	Drain-to-Source Voltage	100	V
V_{GS}	Gate-to-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	A
I_{DM}	Pulsed Drain Current ⁽¹⁾	Refer to Fig.4	A
E_{AS}	Single Pulsed Avalanche Energy ⁽²⁾	1987	mJ
P_D	Power Dissipation	$T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	W
T_J, T_{STG}			$^\circ\text{C}$

Symbol	Parameter	Max	Unit
R	Thermal Resistance, Junction to Ambient ⁽³⁾	33	$^\circ\text{C}/\text{W}$
R	Thermal Resistance, Junction to Case	0.25	$^\circ\text{C}/\text{W}$

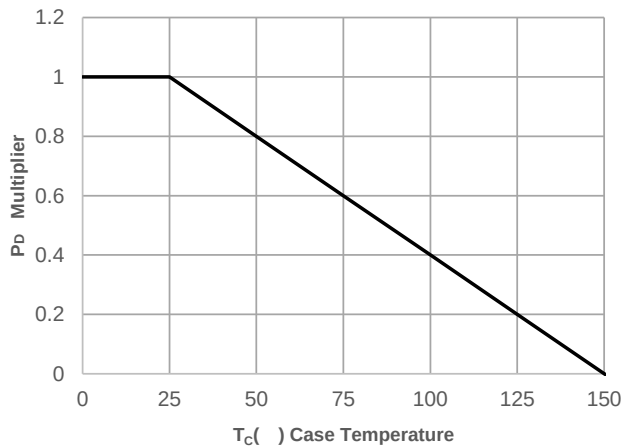
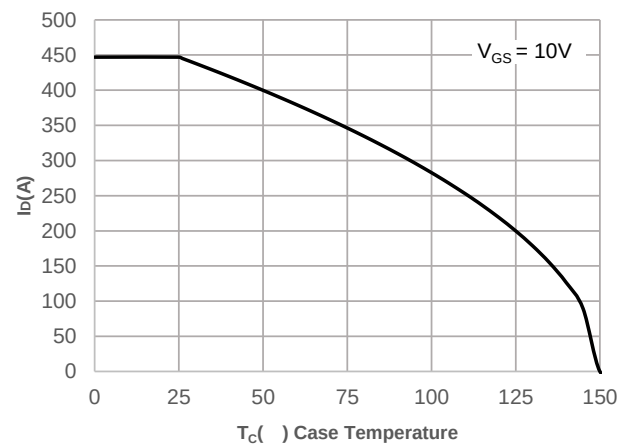
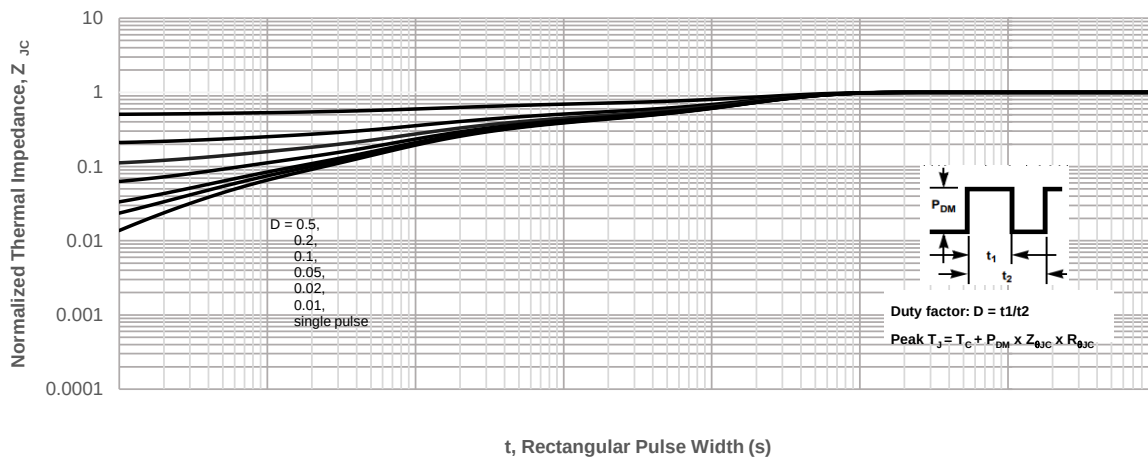
**Electrical Characteristics** ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	I _D = 250μA, V _{GS} = 0V	100	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 80V, V _{GS} = 0V	-	-	1.0	μA
I _{GSS}	Gate-Body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2.0	2.9	3.8	V
R _{DS(ON)}	Static Drain-Source ON-Resistance ⁽⁴⁾	V _{GS} = 10V, I _D = 20A	-	1.1	1.4	mΩ
Dynamic Characteristics						
R _g	Gate Resistance	f = 1MHz	-	3.8	-	Ω
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = 50V, f = 1MHz	-	13360	20040	pF
C _{oss}	Output Capacitance		-	5113	7669	pF
C _{rss}	Reverse Transfer Capacitance		-	122	244	pF
Q _g	Total Gate Charge	V _{GS} = 0 to 10V V _{DS} = 50V, I _D = 20A	-	217	-	nC
Q _{gs}	Gate Source Charge		-	65	-	nC
Q _{gd}	Gate Drain("Miller") Charge		-	57	-	nC
Switching Characteristics						
t _{d(on)}	Turn-On DelayTime	V _{GS} = 10V, V _{DD} = 50V I _D = 20A, R _{GEN} = 3Ω	-	41	-	ns
t _r	Turn-On Rise Time		-	69	-	ns
t _{d(off)}	Turn-Off DelayTime		-	157	-	ns
t _f	Turn-Off Fall Time		-	92	-	ns
Body Diode Characteristics						
I _S	Maximum Continuous Body Diode Forward Current		-	-	447	A
I _{SM}	Maximum Pulsed Body Diode Forward Current		-	-	1788	A
V _{SD}	Body Diode Forward Voltage	V _{GS} = 0V, I _S = 20A	-		1.2	V
trr	Body Diode Reverse Recovery Time	I _F = 20A, di/dt = 100A/us	65	130	196	ns
Qrr	Body Diode Reverse Recovery Charge		-	374	-	nC

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. E_{AS} condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 50\text{V}$, $V_{GS} = 10\text{V}$, $R_G = 25\text{ohm}$, $L = 3\text{mH}$, $I_{AS} = 36.4\text{A}$, $V_{DD} = 0\text{V}$ during time in avalanche.
 3. R is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB.
 4. Pulse Test: Pulse Width 0.5%.



Typical Performance Characteristics

Figure 1: Power De-rating

Figure 2: Current De-rating

Figure 3: Normalized Maximum Transient Thermal Impedance

Figure 4: Peak Current Capacity


Typical Performance Characteristics

Figure 5: Output Characteristics

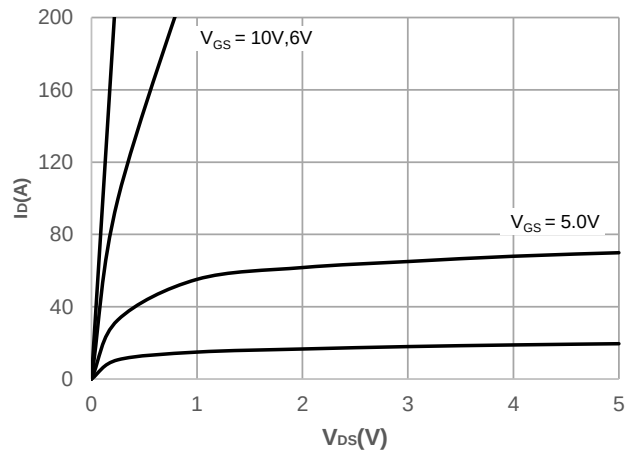


Figure 6: Typical Transfer Characteristics

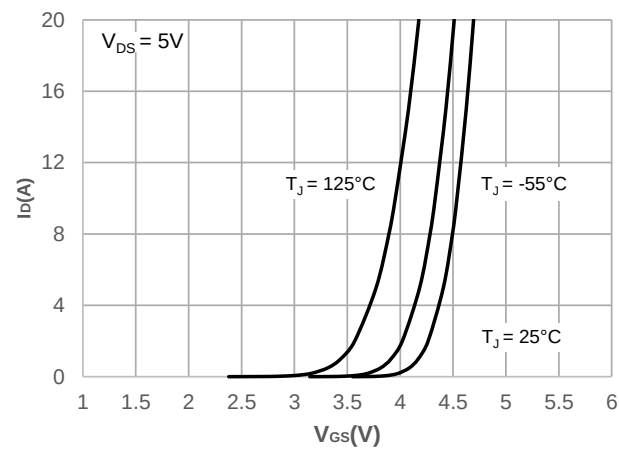


Figure 7: On-resistance vs. Drain Current

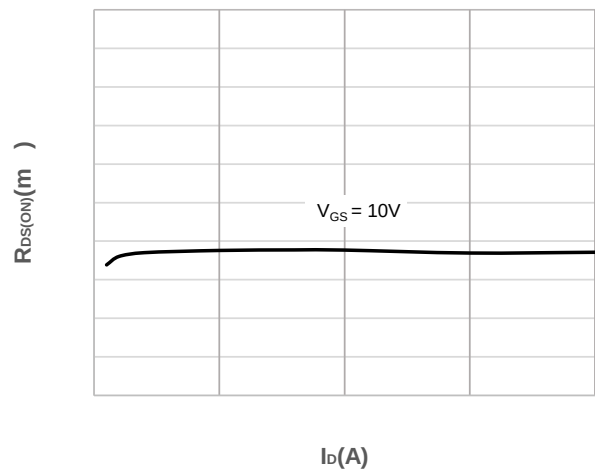


Figure 8: Body Diode Characteristics

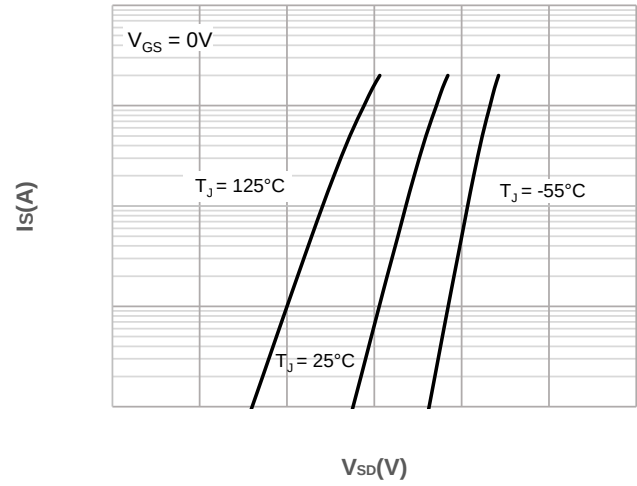
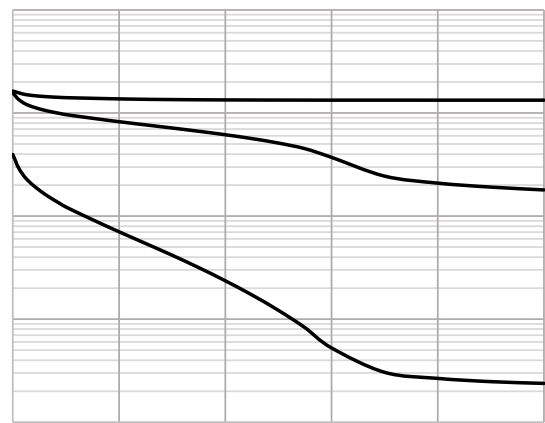
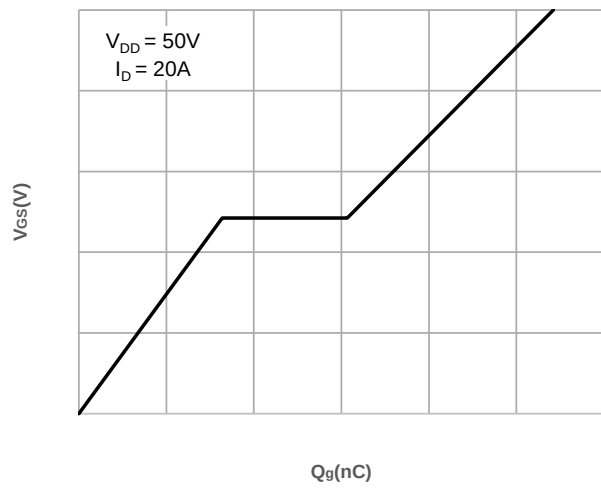


Figure 9: Gate Charge Characteristics



Typical Performance Characteristics

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

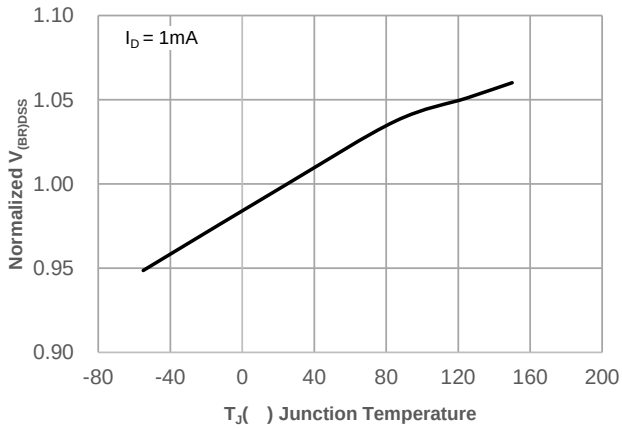


Figure 12: Normalized on Resistance vs. Junction Temperature

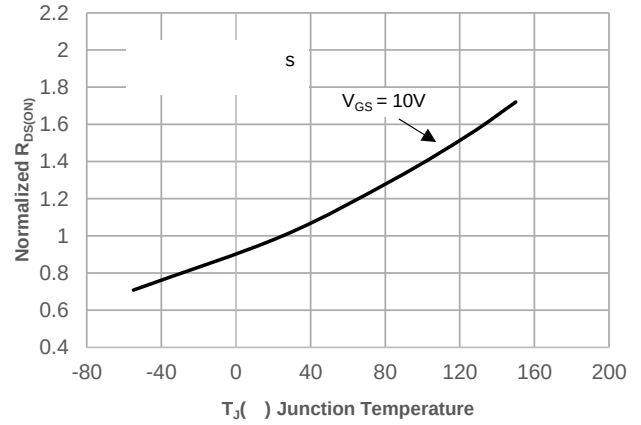


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

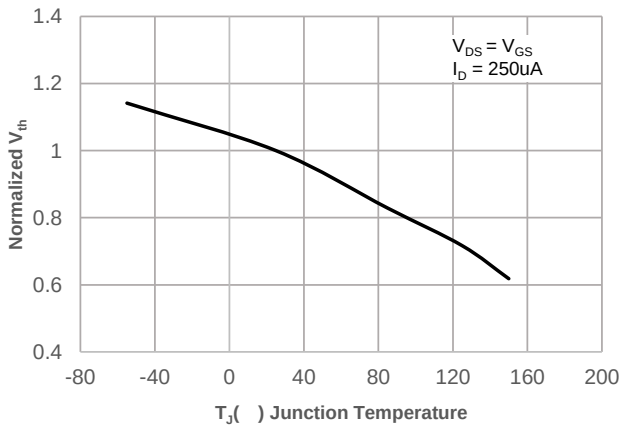


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

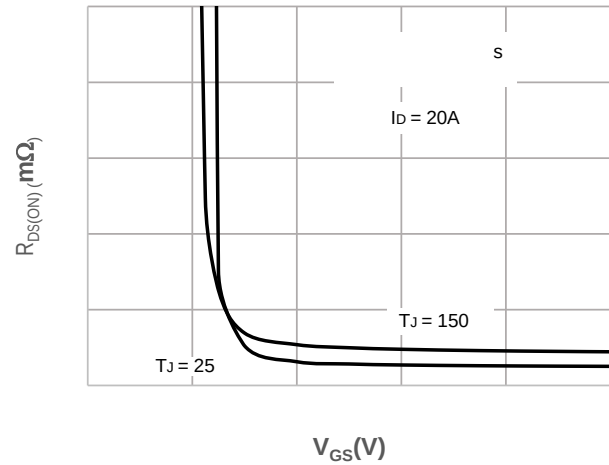
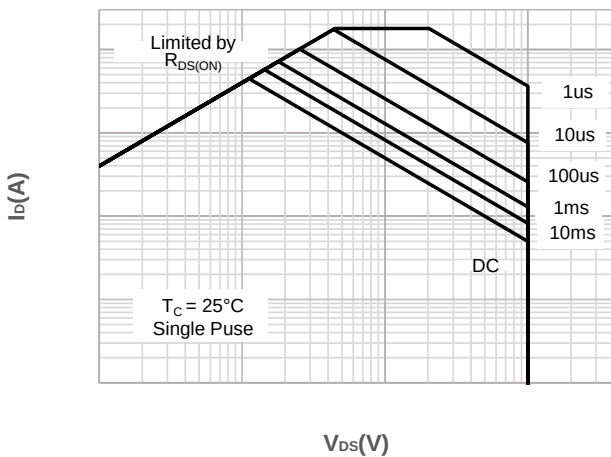


Figure 15: Maximum Safe Operating Area



Test Circuit



Figure 1: Gate Charge Test Circuit & Waveform

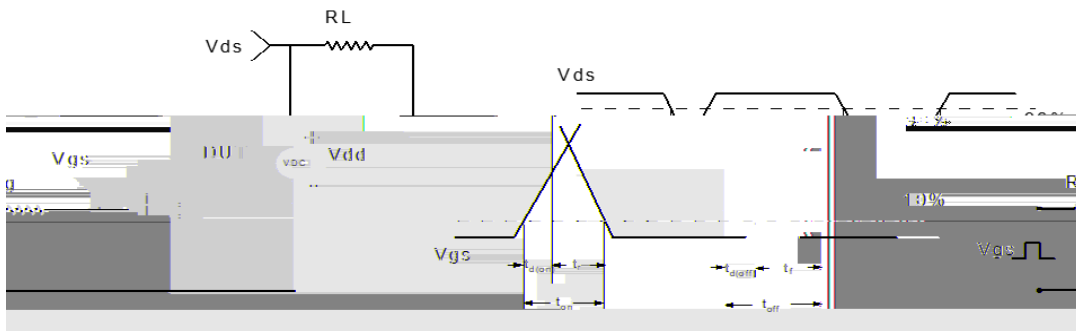


Figure 2: Resistive Switching Test Circuit & Waveform

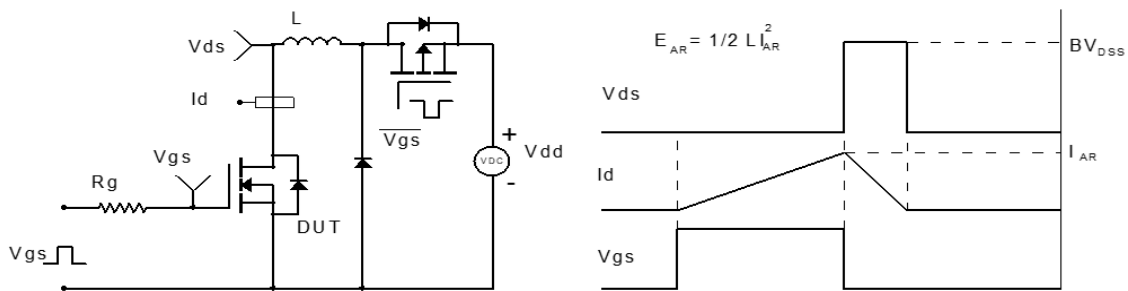


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

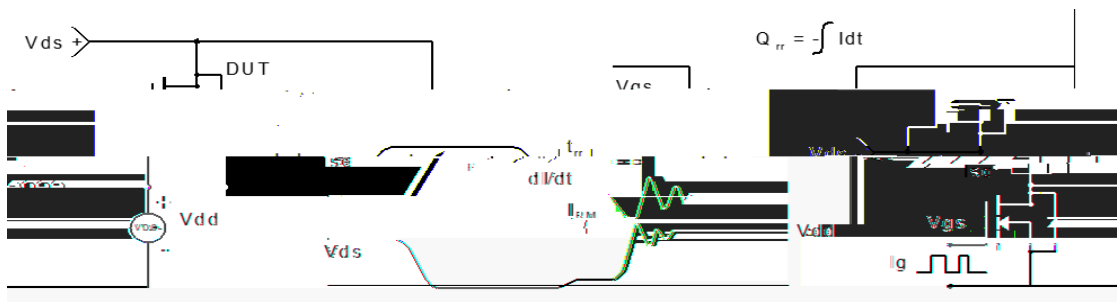
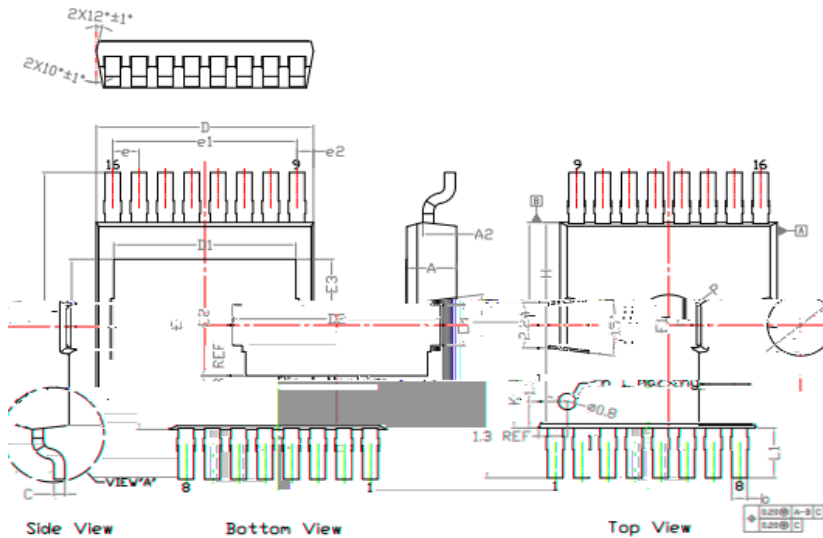


Figure 4: Diode Recovery Test Circuit & Waveform



Package Mechanical Data(TOLT)



SYMBOLS	DIMENSION IN MM			DIMENSION IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
*A	2.200	2.300	2.400	0.087	0.091	0.094
A1	0.010	—	0.050	0.0004	—	0.002
A2	1.500	1.540	1.580	0.059	0.061	0.062
*b	0.600	0.700	0.800	0.024	0.028	0.031
C	0.400	0.500	0.600	0.016	0.020	0.024
*D	9.700	9.900	10.100	0.382	0.390	0.398
D1	8.300	REF	—	0.327	REF	—
D2	9.460	REF	—	0.372	REF	—
E	14.800	15.000	15.200	0.583	0.591	0.598
*E1	10.000	10.100	10.300	0.394	0.398	0.406
E2	5.570	—	5.770	0.219	—	0.227
E3	2.240	REF	—	0.088	REF	—
E4	2.000	REF	—	0.079	REF	—
*e	1.200	BSC	—	0.047	BSC	—
e1	8.400	BSC	—	0.331	BSC	—
e2	0.750	BSC	—	0.030	BSC	—
H	4.850	5.050	5.250	0.191	0.199	0.207
K	2.570	REF	—	0.101	REF	—
*L	1.363	1.463	1.563	0.054	0.058	0.062
L1	2.250	2.450	2.650	0.089	0.096	0.104
P	2.900	3.000	3.100	0.114	0.118	0.122
φ	0°	4°	8°	—	—	—

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