

Description

The AP150P06P/T uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 6V. This device is suitable for use as a Battery protection or in other Switching application.

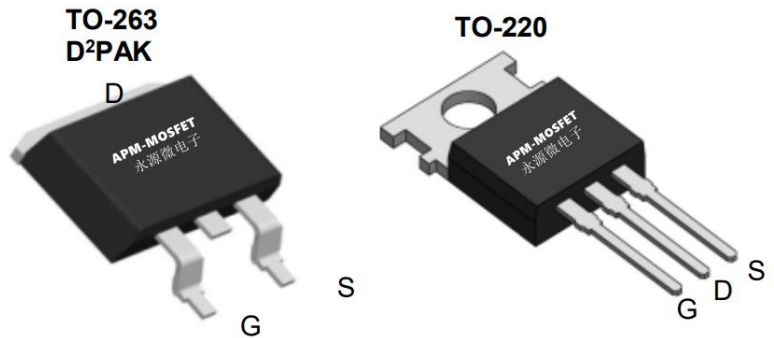
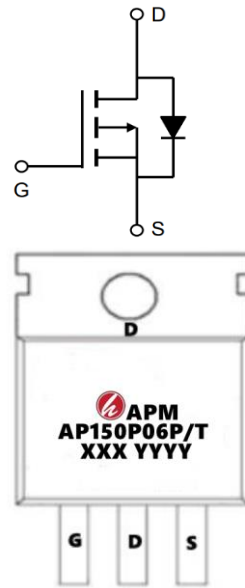
General Features

$V_{DS} = -60V$ $I_D = -150A$

$R_{DS(ON)} < -4.7m\Omega$ @ $V_{GS} = -10V$ (Type: 3.7m Ω)

Application

Lithium battery protection
Wireless impact
Mobile phone fast charging



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP150P06P	TO-220-3L	AP150P06P XXX YYYY	1000
AP150P06T	TO-263-3L	AP150P06T XXX YYYY	800

Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $-V_{GS} @ -10V^1$	-150	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $-V_{GS} @ -10V^1$	-90	A
I_{DM}	Pulsed Drain Current ²	-600	A
EAS	Single Pulse Avalanche Energy ³	1020	mJ
I_{AS}	Avalanche Current	82	A
$P_D @ T_C = 25^\circ C$	Total Power Dissipation ⁴	350	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	0.9	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	60	$^\circ C/W$

-60V P-Channel Enhancement Mode MOSFET

Electrical Characteristics (T_c=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-60	-68	---	V
ΔBVDSS/ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.035	---	V/°C
RDS(ON)	Static Drain-Source On-Resistance ²	V _{GS} =-10V, I _D =-20A	---	3.7	4.7	mΩ
		V _{GS} =-4.5V, I _D =-15A	---	5.5	6.5	
VGS(th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-1.2	-1.8	-2.5	V
ΔVGS(th)	V _{GS(th)} Temperature Coefficient		---	4.28	---	mV/°C
IDSS	Drain-Source Leakage Current	V _{DS} =-60V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =-60V, V _{GS} =0V, T _J =55°C	---	---	5	
IGSS	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
gfs	Forward Transconductance	V _{DS} =-5V, I _D =-20A	---	18	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	4.0	---	Ω
Q _g	Total Gate Charge (-4.5V)	V _{DS} =-48V, V _{GS} =-10V, I _D =-20A	---	280	---	nC
Q _{gs}	Gate-Source Charge		---	26	---	
Q _{gd}	Gate-Drain Charge		---	44	---	
Td(on)	Turn-On Delay Time	V _{DD} =-48V, V _{GS} =-10V, R _G =6Ω, I _D =-20A	---	9.0	---	ns
T _r	Rise Time		---	5.0	---	
Td(off)	Turn-Off Delay Time		---	29	---	
T _f	Fall Time		---	7.6	---	
Ciss	Input Capacitance	V _{DS} =-48V, V _{GS} =0V, f=1MHz	---	13276	---	pF
Coss	Output Capacitance		---	1900	---	
Crss	Reverse Transfer Capacitance		---	1470	---	
I _s	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	-150	A
ISM	Pulsed Source Current ^{2,5}		---	---	-480	A
VSD	Diode Forward Voltage ²	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1.2	V

Note :

- 1、The data tested by surface mounted on a 1 inch 2 FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3、The EAS data shows Max. rating . The test condition is VDD =-48V,VGS =-10V,L=0.1mH,IAS =-82A
- 4、The power dissipation is limited by 150°C junction temperature
- 5、The data is theoretically the same as I D and I DM , in real applications , should be limited by total power dissipation.

Typical Characteristics

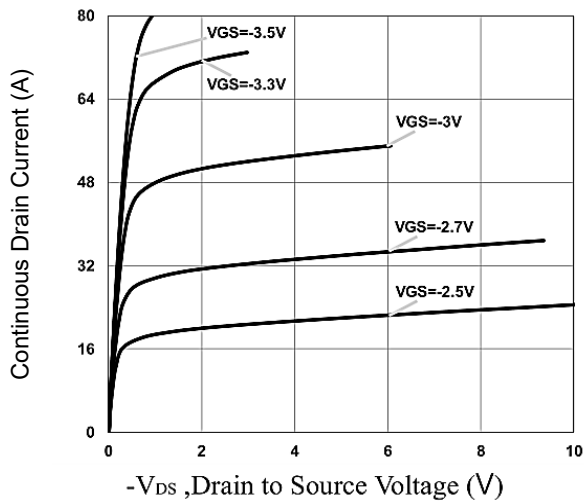


Fig.1 Typical Output Characteristics

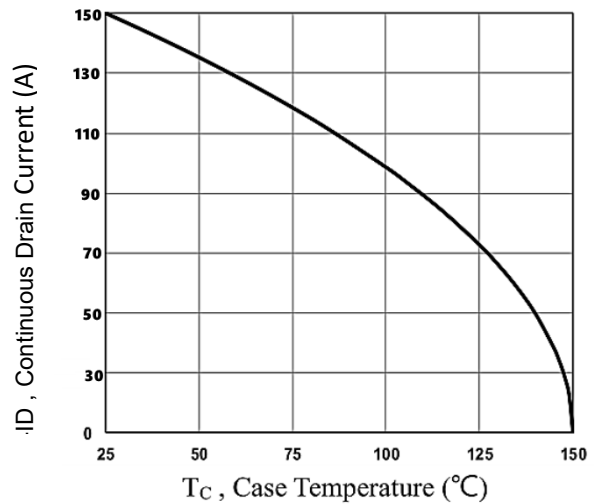


Fig.2 Continuous Drain Current vs. TC

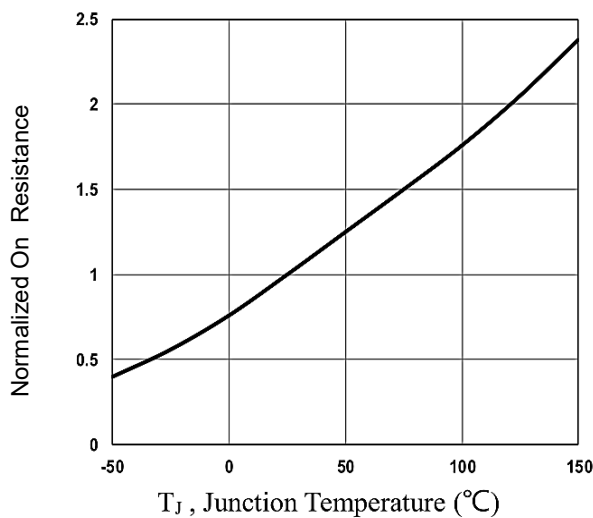


Fig.3 Normalized $R_{DS(on)}$ vs. T_J

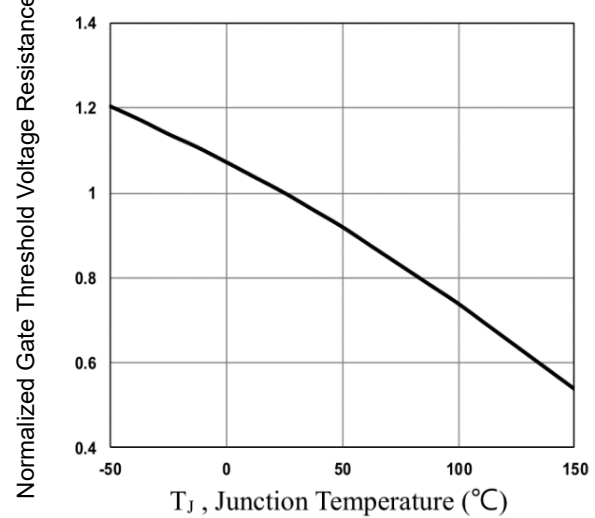


Fig.4 Normalized V_{th} vs. T_J

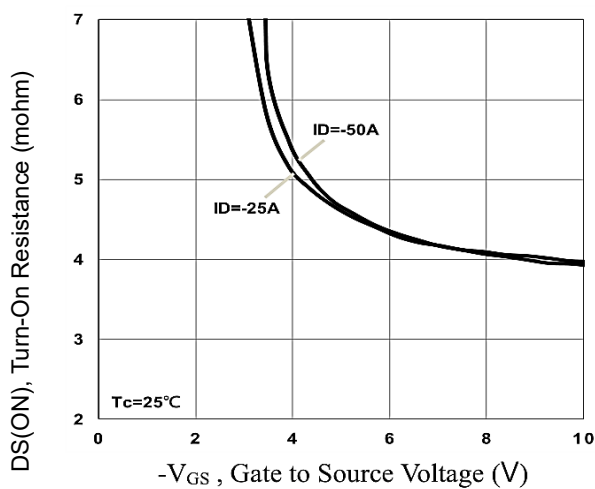


Fig.5 Turn-On Resistance vs. V_{GS}

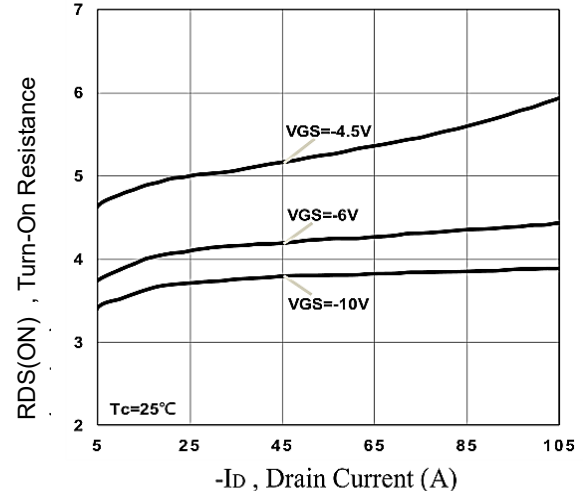


Fig.6 Turn-On Resistance vs. I_D

-60V P-Channel Enhancement Mode MOSFET

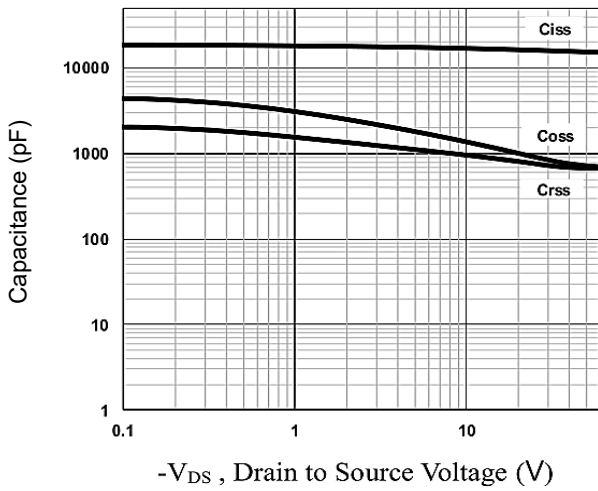


Fig.7 Capacitance Characteristics

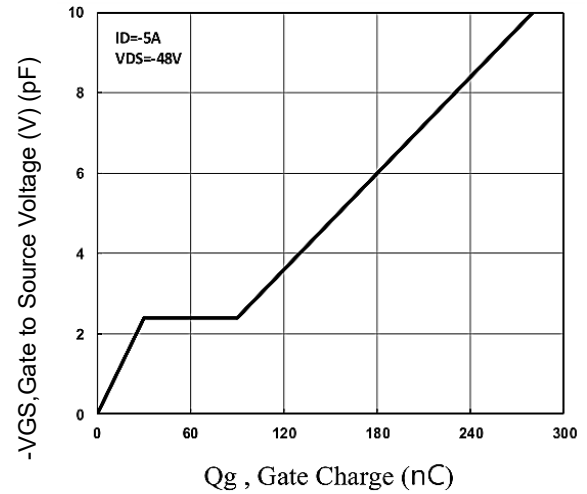


Fig.8 Gate Charge Characteristics

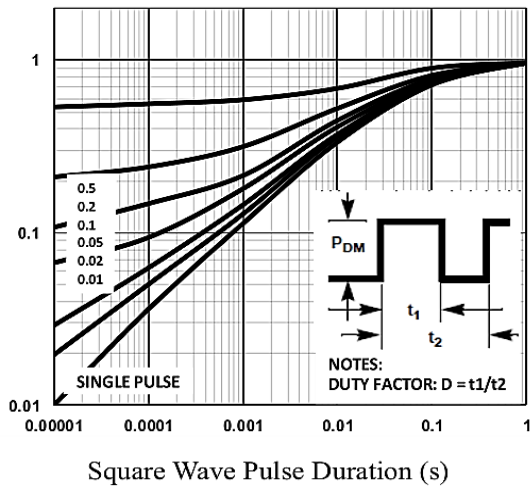


Fig.9 Normalized Transient Impedance

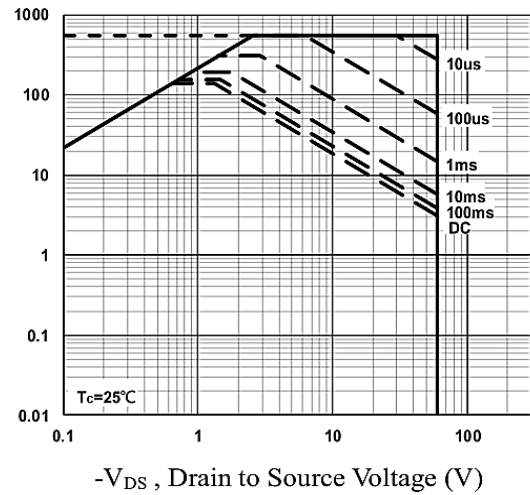


Fig.10 Maximum Safe Operation Area

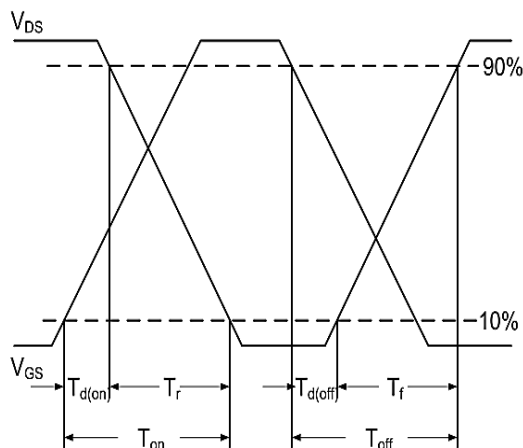


Fig.11 Switching Time Waveform

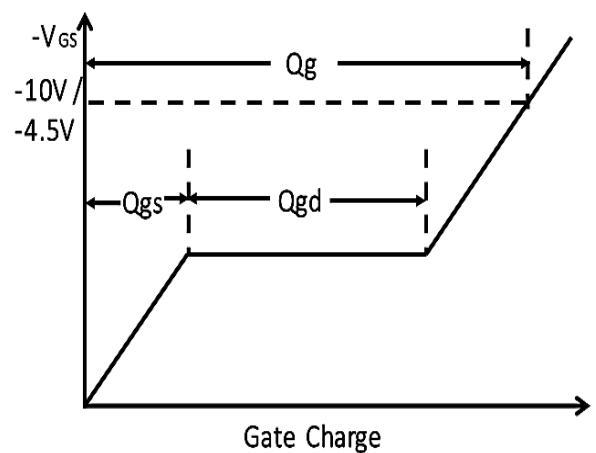
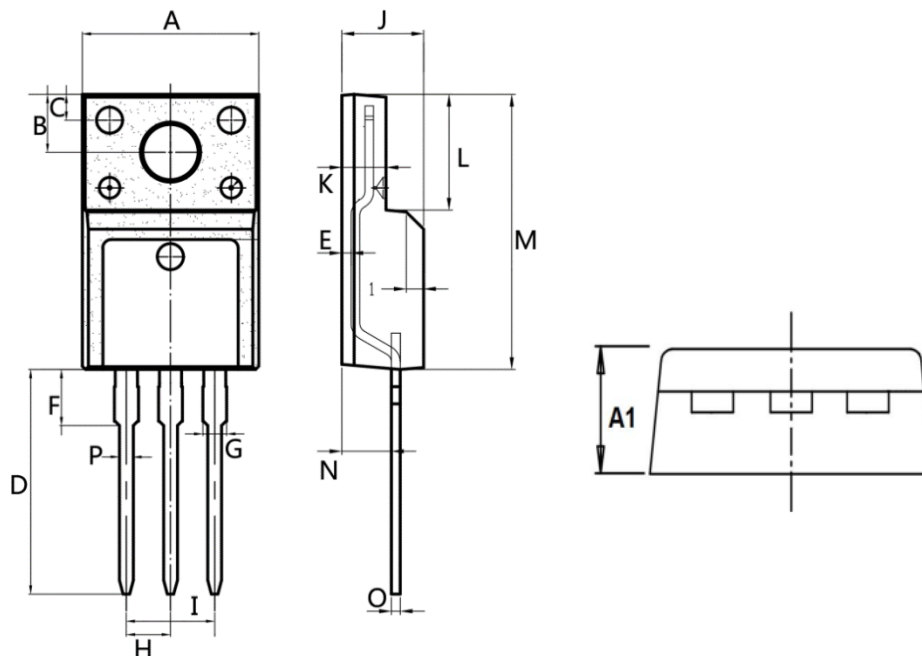


Fig.12 Gate Charge Waveform

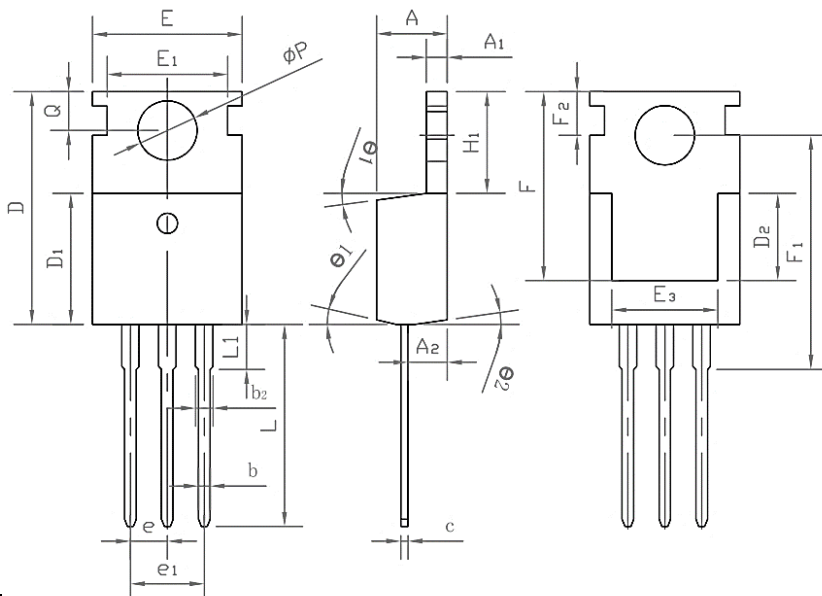
Package Mechanical Data-TO-220F-3L-DX



Symbol	Common	
	mm	
	Min.	Max.
A	9.95	10.25
A1	4.5	5.0
B	2.95	3.25
C	1.25	1.45
D	12.80	13.20
E	0.40	0.60
F	2.8	3.5
G	1.30	1.45
H	Typ 2.54	
I	Typ 5.08	
J	4.60	4.75
K	2.45	2.65
L	6.5	6.8
M	15.4	16.0
N	2.75	3.05
O	0.45	0.55

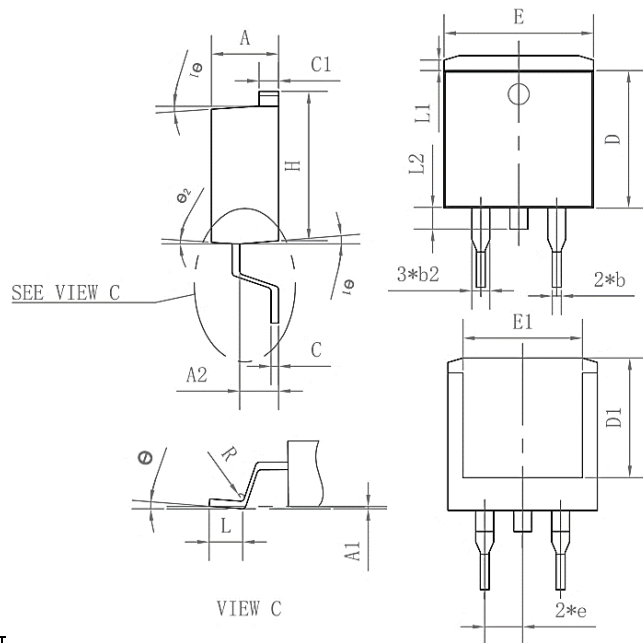
P	0.70	0.90
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Package Mechanical Data-TO-220-3L-SLK



Symbol	mm		
	Mim	Nom	Max
A	4.27	4.57	4.87
A1	1.15	1.30	1.45
A2	2.10	2.40	2.70
b	0.70	0.80	1.00
b2	1.17	1.27	1.50
D	0.40	0.50	0.65
D1	8.80	9.10	9.40
D2	5.70	6.70	7.00
E	9.70	10.00	10.30
E1	-	8.70	-
E2	9.63	10.00	10.35
E3	7.00	8.00	8.40
e		0.37	
e1		0.10	
H1	6.00	6.50	6.85
L	12.75	13.50	13.90
L1	-	3.10	3.40
Φ_p	3.45	3.60	3.75
Q	2.60	2.80	3.00
θ_1	4°	7°	10°
θ_2	0°	3°	6°
F	13.30	13.50	13.70
F1	15.50	15.90	16.30
F2	2.80	3.00	3.20

Package Mechanical Data-TO-263-3L-SLK



Symbol	mm		
	Mim	Nom	Max
A	4.35	4.47	4.60
A1	0.09	0.10	0.11
A2	2.30	2.40	2.70
b	0.70	0.80	1.00
b2	1.25	1.36	1.50
C	0.45	0.50	0.65
C1	1.29	1.30	9.40
D	9.10	9.20	9.30
D1	7.90	8.00	8.10
E	9.85	10.00	10.20
E1	7.90	8.00	8.10
H	15.30	15.50	15.70
e	-	2.54	-
L	2.34	2.54	2.74
L1	1.00	1.10	1.20
L2	1.30	1.40	1.50
R	0.24	0.25	0.26
θ	0°	4°	8°
θ_1	4°	7°	10°
θ_2	0°	3°	6°

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Edition	Date	Change
Rve1.0	2020/2/31	Initial release

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