

Features

- Uses PingWei advanced PerfectMOS technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g \times R_{DS(on)}$ product(FOM)
- Excellent Low Ciss
- Qualified according to JEDEC criteria

Beneficts

- High robustness and reliability
- Increases maximum current capability
- Low power loss, high power density
- Easy paralleling



100% DVDS Tested
100% Avalanche Tested

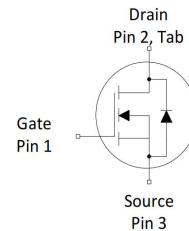
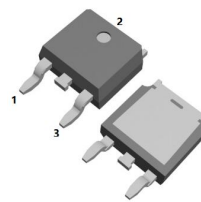
Applications

- Synchronous Rectification for AC/DC Quick Charger
- Battery management
- UPS (Uninterruptible Power Supplies)

Product Summary

V_{DS}	-40V
$R_{DS(on)}@10V_{typ}$	10.5mΩ
$R_{DS(on)}@4.5V_{typ}$	14.2mΩ
I_D	-47A

TO-252-2L



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
PW150P04GL	150P04GL	TO-252-2L	Tape&Reel	13 inches	16mm	2500pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	-40	V
Continuous drain current $T_C = 25^\circ\text{C}$ (Silicon limit) $T_C = 25^\circ\text{C}$ (Package limit) $T_C = 100^\circ\text{C}$ (Silicon limit)	I_D	-47 -58 -30	A
Pulsed drain current ($T_C = 25^\circ\text{C}$, $t_p = 100\mu\text{s}$)	$I_{D \text{ pulse}}$	-188	A
Avalanche energy, single pulse ($L=0.5\text{mH}$, $V_{ds}=-32\text{V}$)	E_{AS}	83	mJ
Gate-Source voltage	V_{GS}	± 20	V
Power dissipation $T_C = 25^\circ\text{C}$	P_{tot}	55	W
Operating junction and storage temperature	T_j, T_{stg}	-55...+150	$^\circ\text{C}$
Soldering temperature, wave soldering only allowed at leads (1.6mm from case for 10s)	T_{sld}	260	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case.	RthJC	-	-	2.27	°C/W	-
Thermal resistance, junction - ambient(min. footprint)	RthJA	-	-	61	°C/W	-

Electrical Characteristic (at Tj = 25 °C, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		

Static Characteristic

Drain-source breakdown voltage	BV _{DSS}	-40	-	-	V	V _{GS} =0V, I _D = -250uA
Gate threshold voltage	V _{GS(th)}	-1.0	-	-2.5	V	V _{DS} =V _{GS} , I _D = -250uA
Zero gate voltage drain current	I _{DSS}	-	-	-1	μA	V _{DS} = -40V, V _{GS} =0V T _j =25°C T _j =150°C
Gate-source leakage current	I _{GSS}	-	±10	±100	nA	V _{GS} = ±20V, V _{DS} =0V
Drain-source on-state resistance	R _{DS(on)}	-	10.5	15	mΩ	V _{GS} = -10V, I _D = -8A
		-	14.2	20		V _{GS} = -4.5V, I _D = -8A
Transconductance	g _{fs}	-	28	-	S	V _{DS} = -5V, I _D = -8A

Dynamic Characteristic

Input Capacitance	C _{iss}	-	3144	-	pF	V _{GS} =0V, V _{DS} = -20V, f=1MHz
Output Capacitance	C _{oss}	-	285	-		
Reverse Transfer Capacitance	C _{rss}	-	244	-		
Gate Total Charge	Q _G	-	28	-	nC	V _{DS} = -20V, I _D = -8A , V _{GS} = -10V
Gate-Source charge	Q _{gs}	-	8	-		
Gate-Drain charge	Q _{gd}	-	8.5	-		
Turn-on delay time	t _{d(on)}	-	38	-	ns	V _{GS} = -10V, V _{DD} = -15V, R _{G_ext} =3Ω, I _D = -8A
Rise time	t _r	-	31.0	-		
Turn-off delay time	t _{d(off)}	-	90	-		
Fall time	t _f	-	9.2	-		
Gate resistance	R _G	-	9.2	-	Ω	V _{GS} =0V, V _{DS} =0V, f=1MHz

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	-0.88	-1.2	V	$V_{GS}=0V, I_{SD}=-20A$
Body Diode Continuous Forward Current	I_S	-	-	-47	A	TC = 25°C
Body Diode Pulsed Current	I_S pulse	-	-	-188	A	TC = 25°C
Body Diode Reverse Recovery Time	t_{rr}	-	-	-	ns	-
Body Diode Reverse Recovery Charge	Q_{rr}	-	-	-	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

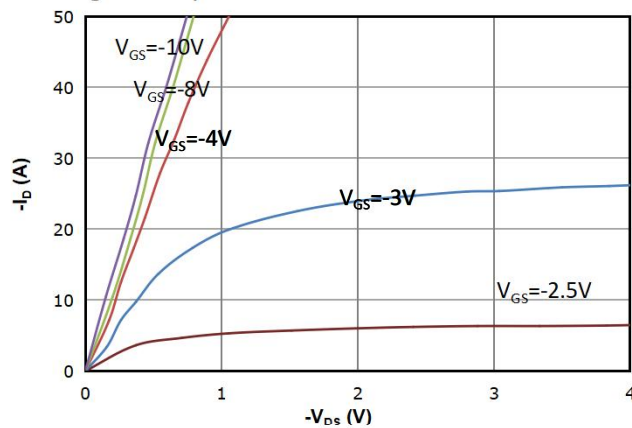


Fig 2: Transfer Characteristics

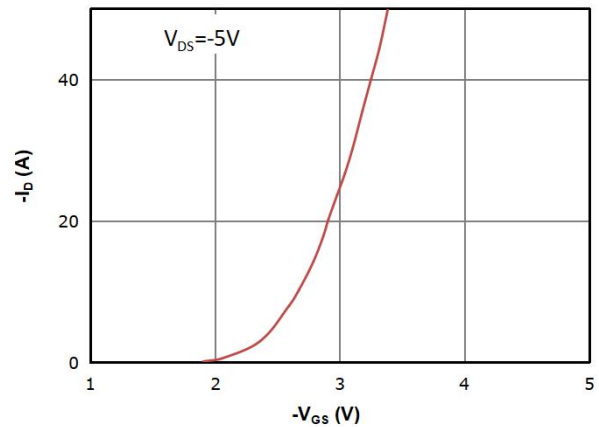


Fig 3: R_{DS(on)} vs Drain Current and Gate Voltage

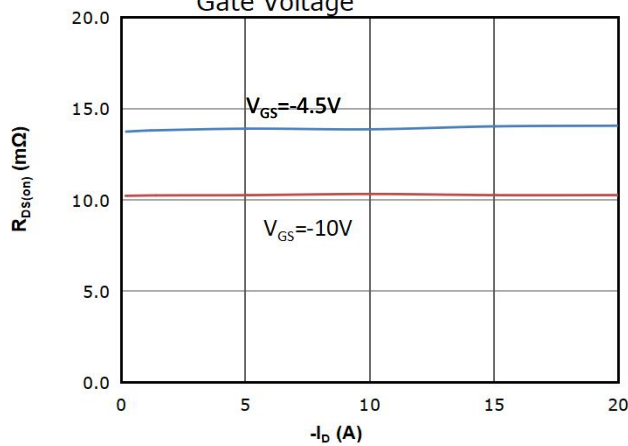


Fig 4: R_{DS(on)} vs Gate Voltage

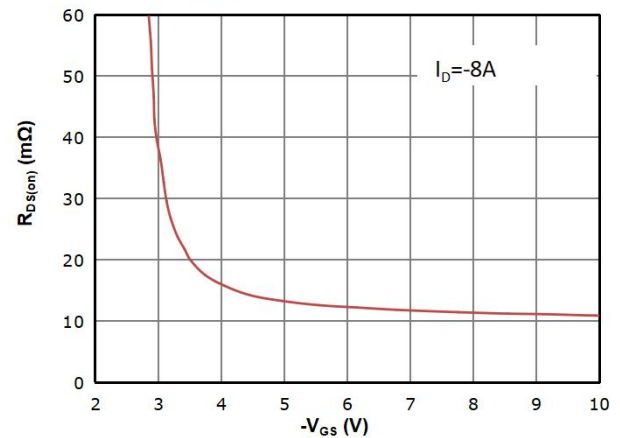


Fig 5: R_{DS(on)} vs. Temperature

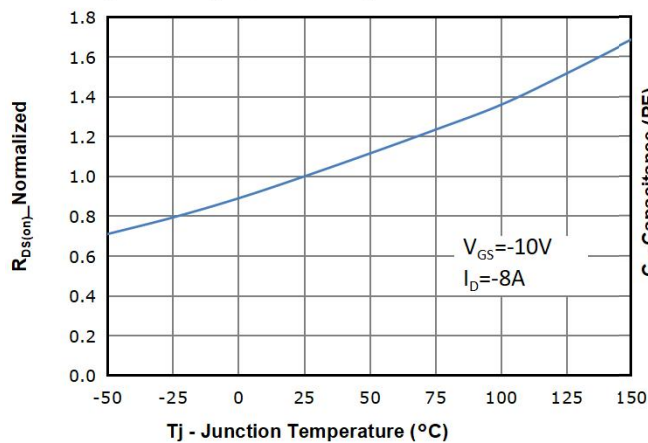


Fig 6: Capacitance Characteristics

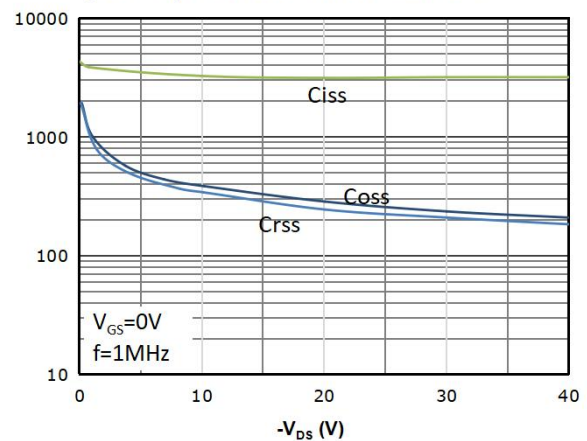


Fig7: Gate Charge Characteristics

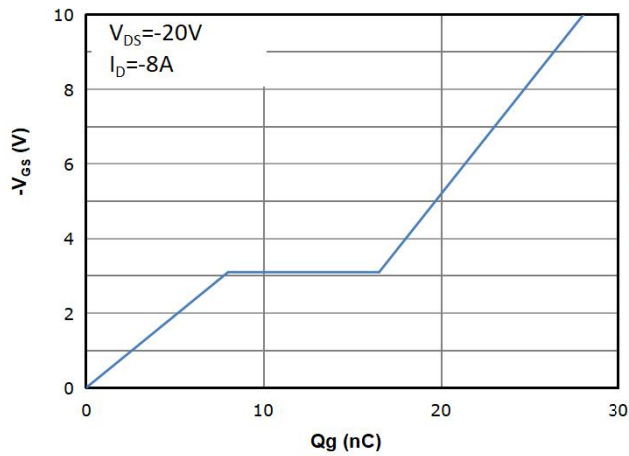


Fig 8: Body-diode Forward Characteristics

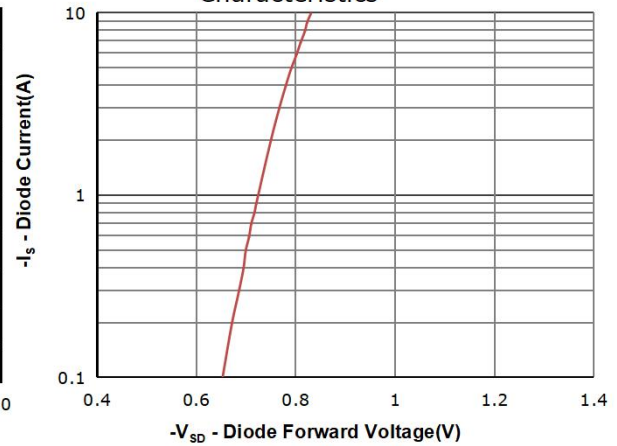


Fig 9: Power Dissipation

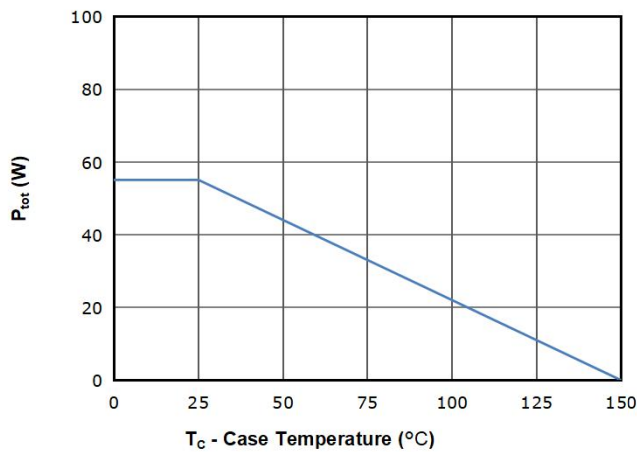


Fig 10: Drain Current Derating

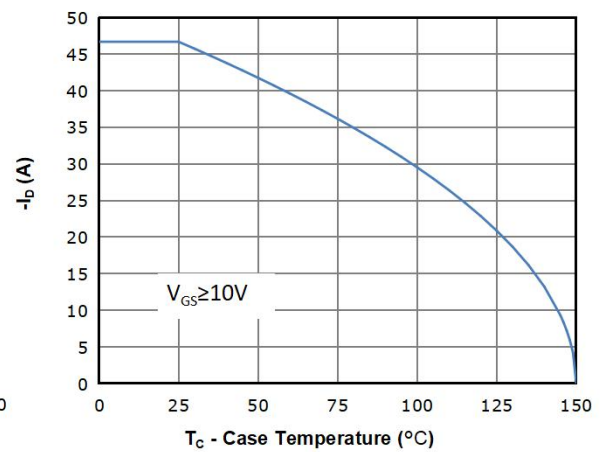


Fig 11: Safe Operating Area

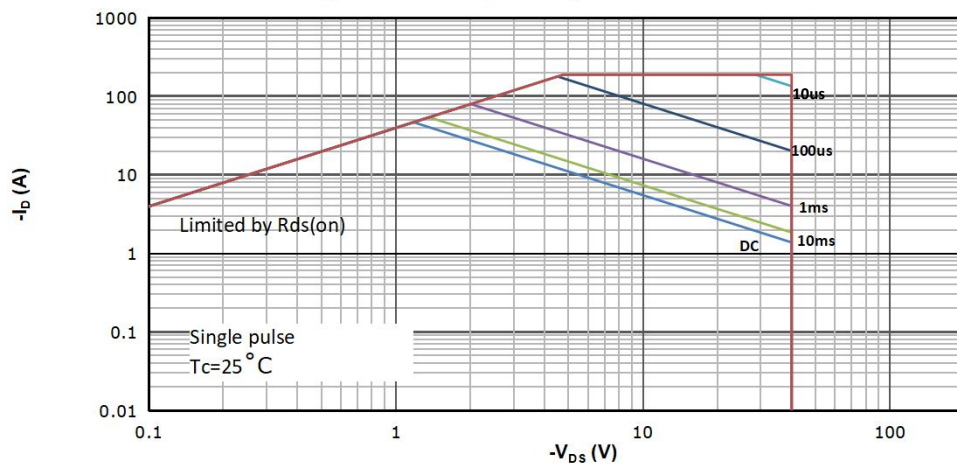
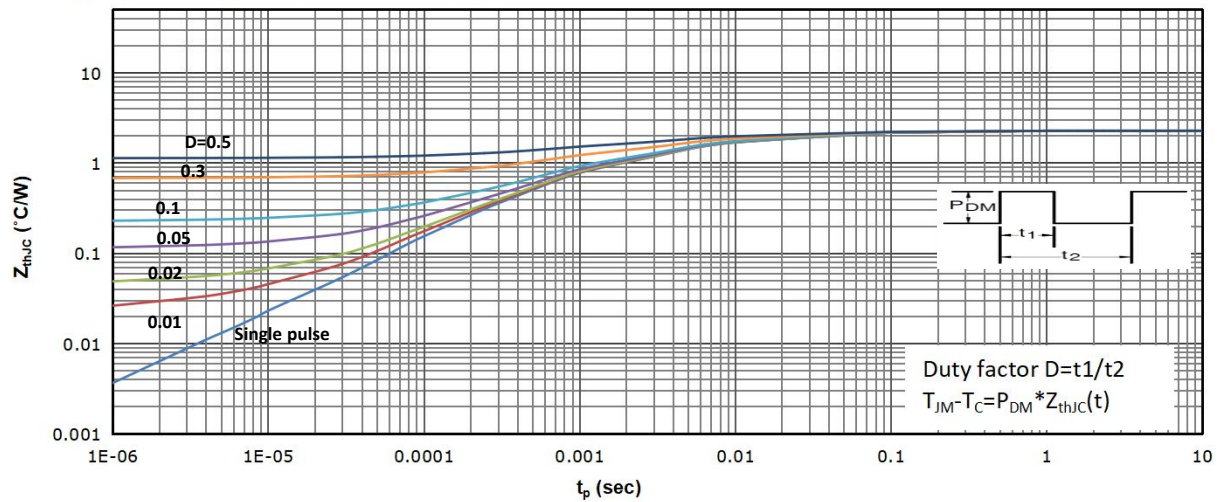
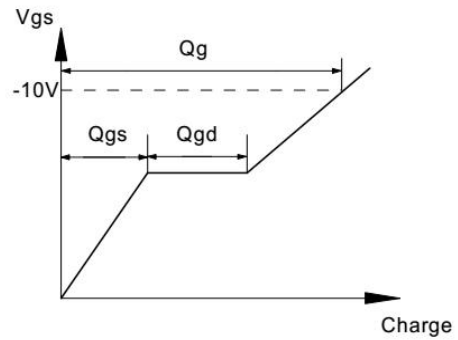
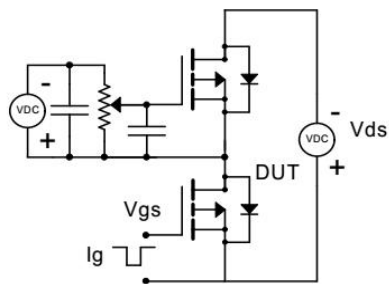


Fig 12: Max. Transient Thermal Impedance

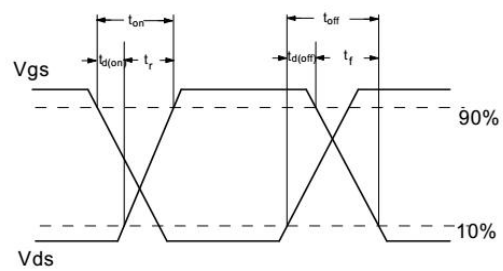
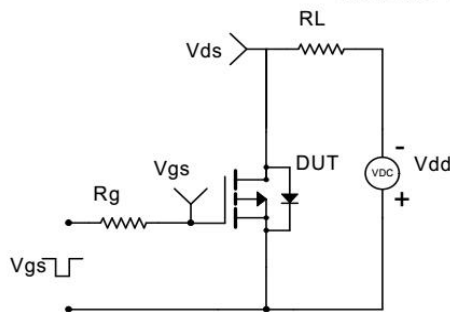


Test Circuit & Waveform

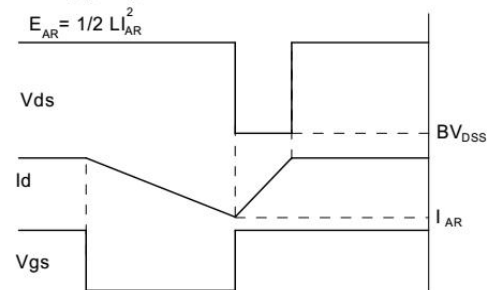
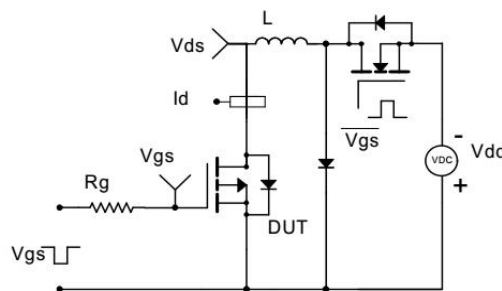
Gate Charge Test Circuit & Waveform



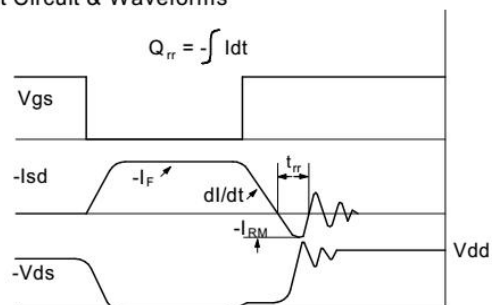
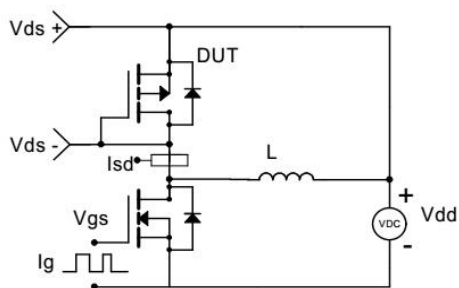
Resistive Switching Test Circuit & Waveforms

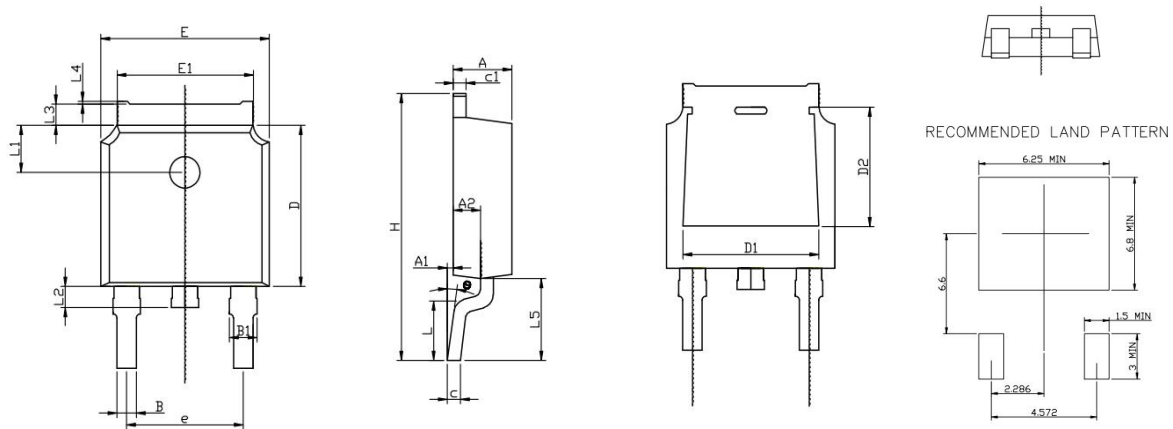


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-252-2L

UNIT: mm

SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.15	2.45	0.085	0.096
A1	0.05	0.20	0.002	0.008
A2	0.91	1.22	0.036	0.048
B	0.66	0.86	0.026	0.034
B1	0.93	1.23	0.037	0.048
C	0.40	0.60	0.016	0.024
C1	0.40	0.60	0.016	0.024
D	5.95	6.25	0.234	0.246
D1	4.80		0.189	
D2	3.80		0.150	
E	6.45	6.75	0.254	0.266
E1	5.12	5.52	0.202	0.217
L	1.65		0.065	
L1	1.58	1.98	0.062	0.078
L2	0.60	1.00	0.024	0.039
L3	0.70	1.00	0.028	0.039
L4	0.00	0.20	0.000	0.008
L5	2.80	3.40	0.110	0.134
H	9.80	10.40	0.386	0.409
θ	0.00	8.00	0.000	0.315
e	4.57		0.180	



Revision History

Revision	Date	Major changes
1.0	2023/3/7	Release of Formal Version.

Disclaimer

Any and all semiconductor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are solely responsible for providing adequate safe measures when design their systems.

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