CRTD125P06LQ

Trench P-MOSFET -60V, 9.2mΩ, -72A

Features

- Uses CRM(CQ) advanced Trench technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent Q_gx$R_{DS(on)}$ product(FOM)
- AEC-Q101 Qualified
- MSL1 up to 260°C peak reflow

Product Summary

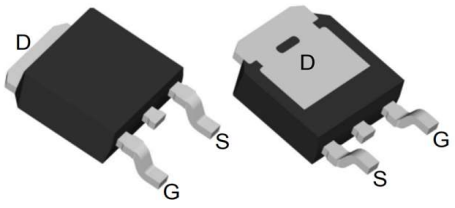
V_{DS}	-60V
$R_{DS(on)@10V\ typ}$	9.2mΩ
I_D	-72A

Applications

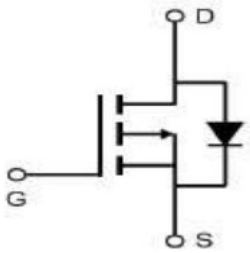
- Motor control and drive
- Battery management
- UPS (Uninterrupible Power Supplies)

100% DVDS Tested

100% Avalanche Tested



CRTD125P06LQ



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRTD125P06LQ	125P06LQ	TO-252	Tape&reel	N/A	N/A	2500pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	-60	V
Continuous drain current T_C = 25°C (Silicon limit) T_C = 25°C (Package limit) T_C = 100°C (Silicon limit)	I_D	 -72 -90 -51	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	-289	A
Avalanche energy, single pulse (ID=-30A, Rg=25Ω)[1]	E_{AS}	225	mJ
Gate-Source voltage	V_{GS}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	135	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+175	°C
Soldering temperature, wave soldering only allowed at leads (1.6mm from case for 10s)	Tsold	260	°C

Notes:1.EAS was tested at Tj = 25℃, L = 0.5mH, IAS = -30A, Vgs=-10V.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case (junction-heat-spreader)	R_{thJC}	1.11	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	62	
Thermal resistance, junction – plastic case	$R_{thJ\text{-}pc}$	34	

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}	-60	-	-	V	V_{GS}=0V, I_D=-250uA
		-60	-	-	V	V_{GS}=0V, I_D=-1mA
Gate threshold voltage	$V_{GS(th)}$	-1	-	-2.5	V	V_{DS}=V_{GS},I_D=-250uA
Zero gate voltage drain current	I_{DSS}	-	-	-1	μA	V_{DS}=-60V,V_{GS}=0V T_j=25°C
		-	-	-100		T_j=125°C
Gate-source leakage current	I_{GSS}	-	-	±100	nA	V_{GS}=±20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	9.2	12.5	mΩ	V_{GS}=-10V, I_D=-30A
			11.7	21		VGS=-4.5V, ID=-24A
Transconductance	g_{fs}	26	52	104	S	V_{DS}=-5V,I_D=-25A
Dynamic Characteristic						
Input Capacitance	C_{iss}	3518	7035	14070	pF	V_{GS}=0V, V_{DS}=-30V, f=1MHz
Output Capacitance	C_{oss}	84	421	2105		
Reverse Transfer Capacitance	C_{rss}	68	341	1705		
Gate Total Charge	Q_G	66	133	265	nC	V_{GS}=-10V, V_{DS}=-30V, I_D=-25A, f=1MHz
Gate-Source charge	Q_{gs}	13	27	54		
Gate-Drain charge	Q_{gd}	12	25	49		
Turn-on delay time	$t_{d(on)}$	12	24	47	ns	V_{GS}=-10V, V_{DS}=-30V, R_{G_ext}=3Ω, Id=-25A
Rise time	t_r	44	87	175		
Turn-off delay time	$t_{d(off)}$	47	94	188		
Fall time	t_f	54	109	217		
Gate resistance	R_G	-	1.73	8	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}	-	-0.8	-1.3	V	V_{GS}=0V,I_{SD}=-30A
Body Diode Reverse Recovery Time	t_{rr}	15	31	61	ns	I_F=-25A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	10	20	39	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

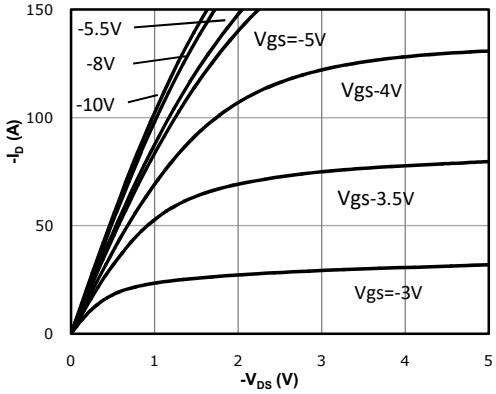


Fig 2: Transfer Characteristics

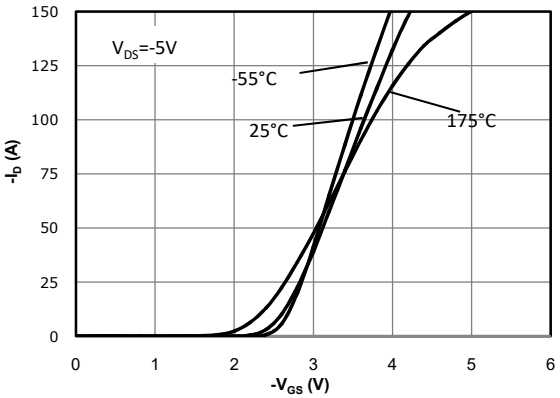


Fig 3: Rds(on) vs Drain Current and Gate Voltage

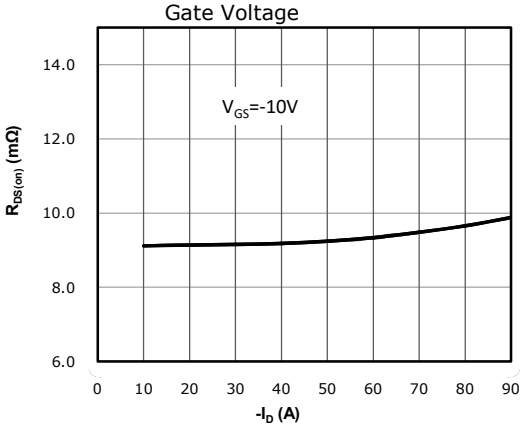


Fig 4: Rds(on) vs Gate Voltage

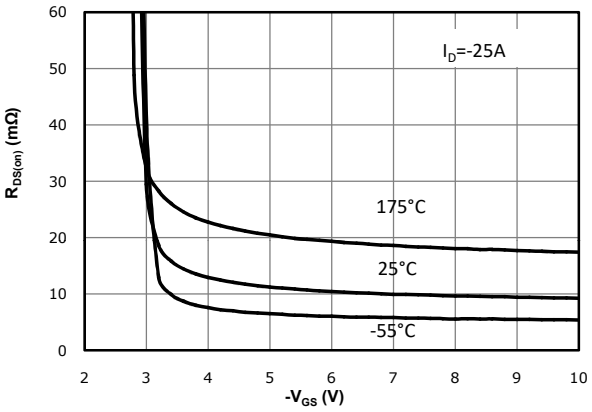


Fig 5: Rds(on) vs. Temperature

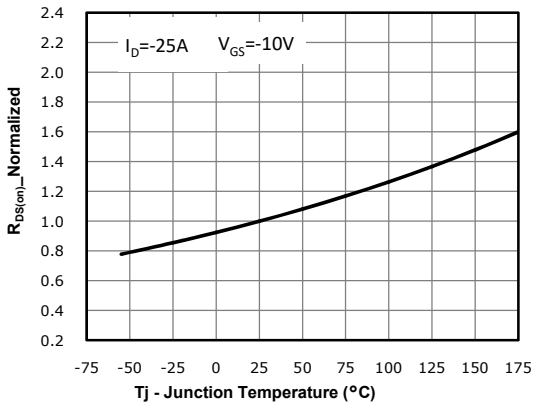


Fig 6: Vgs(th) vs. Temperature

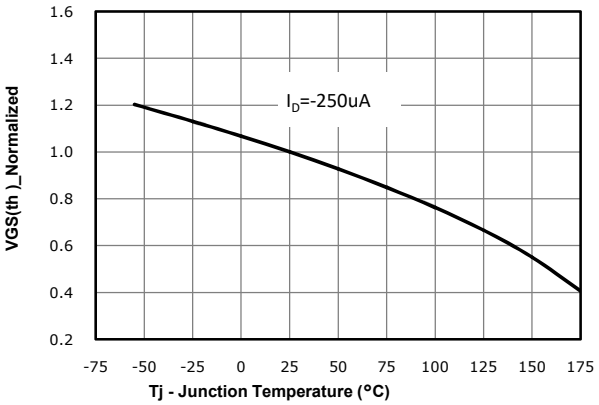


Fig 7: BVds vs. Temperature

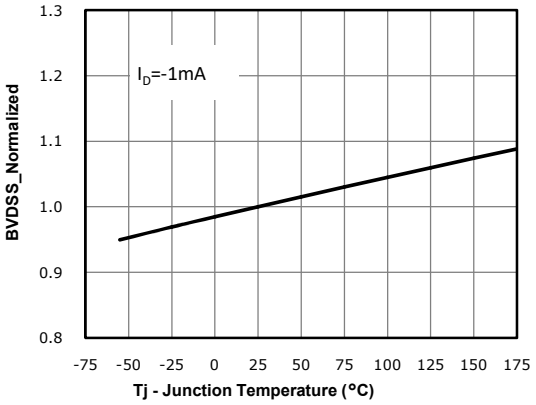


Fig 8: Capacitance Characteristics

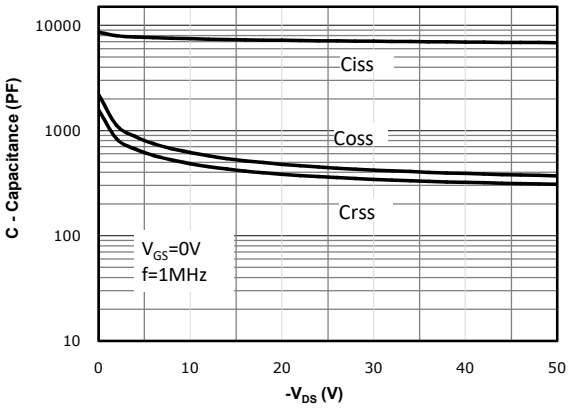


Fig 9: Gate Charge Characteristics

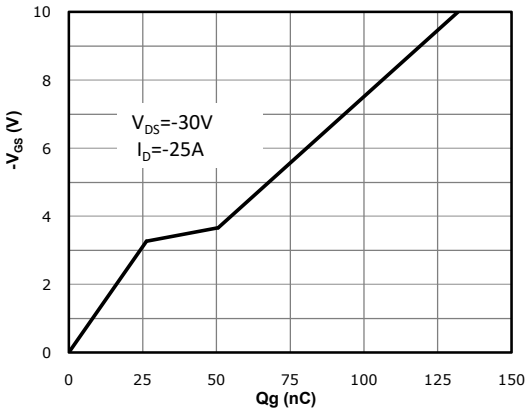


Fig 10: Body-diode Forward Characteristics

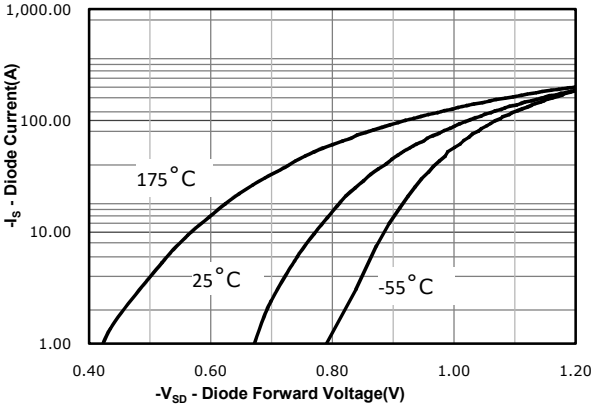


Fig 11: Power Dissipation

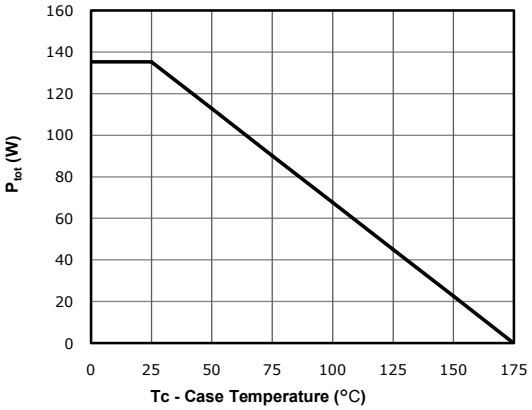


Fig 12: Drain Current Derating

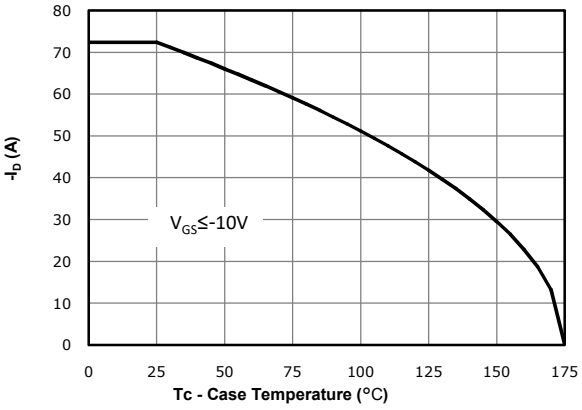


Fig 13: Safe Operating Area

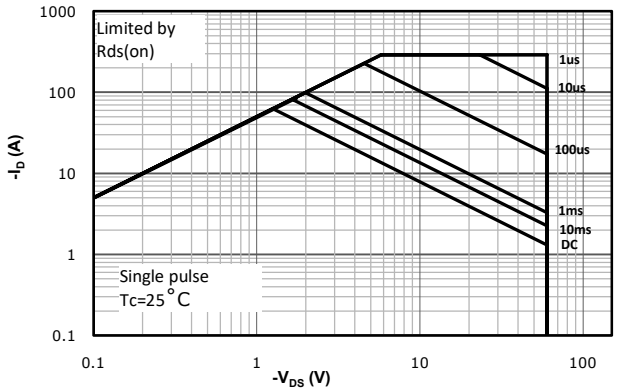
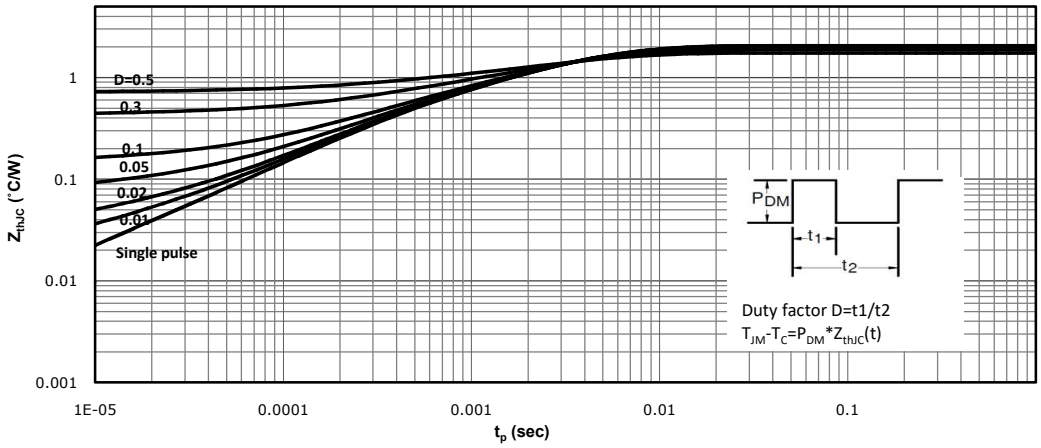
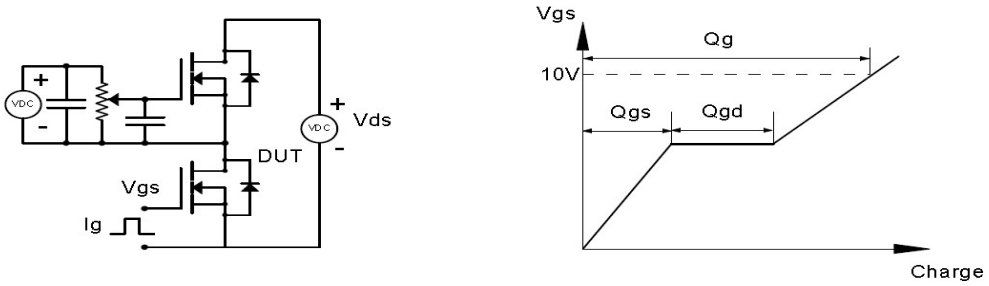


Fig 14: Max. Transient Thermal Impedance

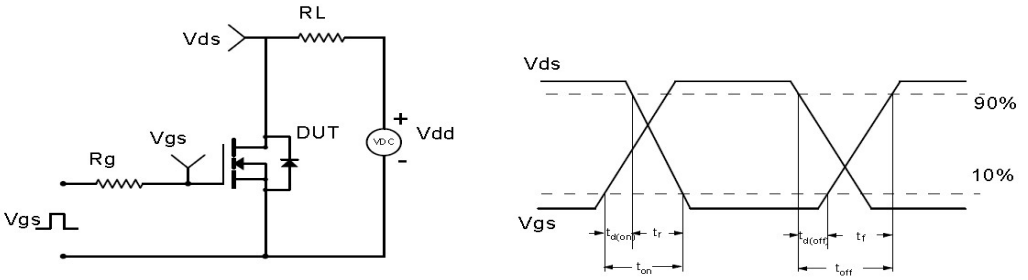


Test Circuit & Waveform

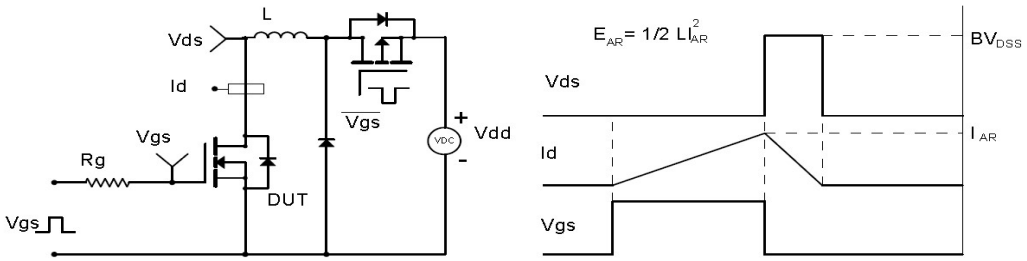
Gate Charge Test Circuit & Waveform



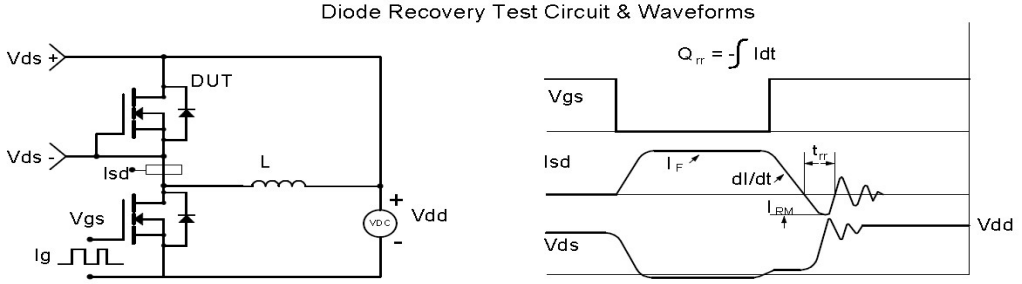
Resistive Switching Test Circuit & Waveforms



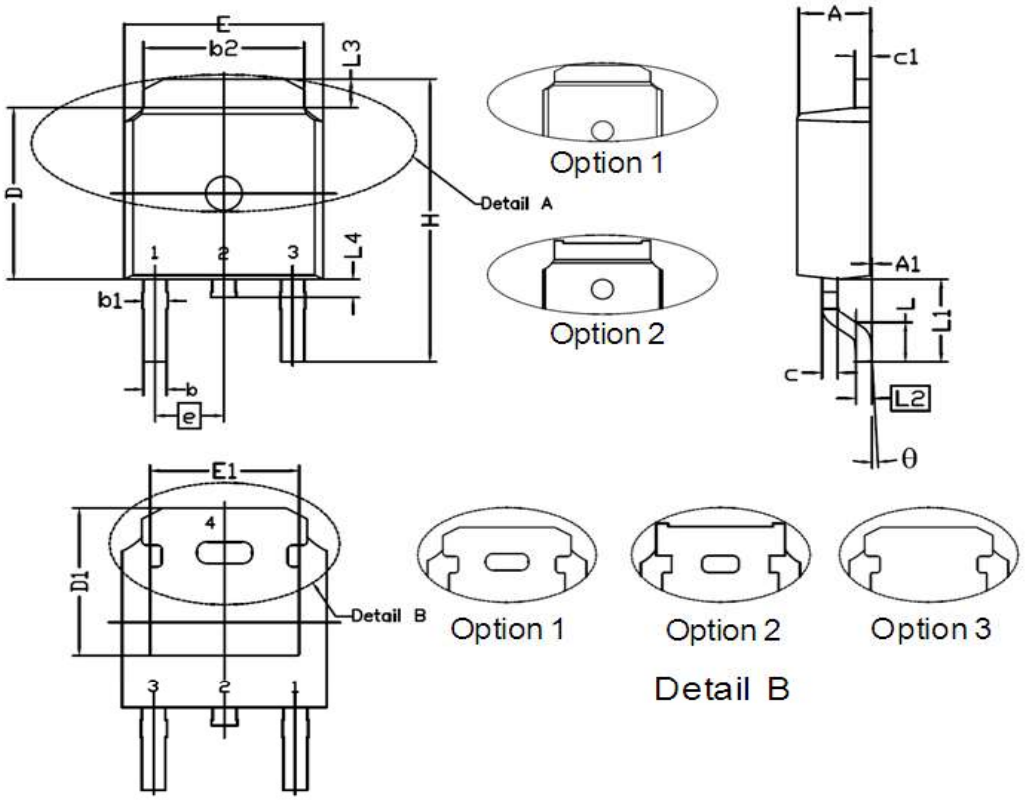
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-252



Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	2.15	2.30	2.38
A1	0.00	0.07	0.15
b	0.60	0.76	0.91
b1	0.65	--	1.15
b2	5.00	5.33	5.50
c	0.45	0.50	0.61
c1	0.36	0.50	0.66
D	5.80	6.10	6.22
D1	5.21	5.25	5.65
e		2.29 BSC.	
E	6.30	6.50	6.65
E1	4.75	5.10	5.45
H	9.40	9.90	10.40
L	1.38	1.52	1.78
L1		2.92 REF	
L2		0.508 BSC.	
L3	0.72	1.01	1.35
L4	0.60	0.75	1.20
θ	0°	--	8°

Marking

NOTE:
XAAAAAAA-Y
X —Assembly location code
AAAAAAA —Assembly lot NO. last 7 digits
Y —Bin code

Revision History

Revision	Date	Major changes
1.0	2023/8/24	Release of preliminary 1.0 version.
1.1	2023/11/10	Update POD 尺寸
1.2	2024/1/11	Update VTH SPEC

Disclaimer

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