

Features

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

Applications

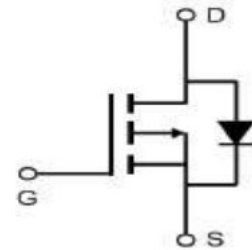
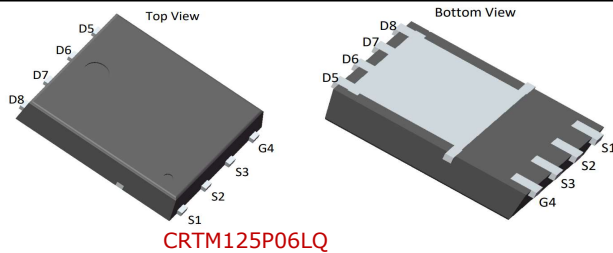
- Motor control and drive
- Battery management
- UPS (Uninterruptible Power Supplies)

Product Summary

V_{DS}	-60V
$R_{DS(on)}@10V$ typ	9mΩ
I_D	-67A

100% DVDS Tested

100% Avalanche Tested



Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
CRTM125P06LQ	TM125P06LQ	DFN5*6	Tape&reel	N/A	N/A	4000pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	-60	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	-67 -80 -48	A
Pulsed drain current ($T_C = 25^\circ\text{C}$, t_p limited by T_{jmax})	$I_{D \text{ pulse}}$	-270	A
Avalanche energy, single pulse ($I_D = -35A$, $R_g = 25\Omega$) ^[1]	E_{AS}	306	mJ
Gate-Source voltage	V_{GS}	± 20	V
Power dissipation ($T_C = 25^\circ\text{C}$)	P_{tot}	94	W
Operating junction and storage temperature	T_j, T_{stg}	-55...+175	$^\circ\text{C}$
Soldering temperature, wave soldering only allowed at leads (1.6mm from case for 10s)	T_{sld}	260	$^\circ\text{C}$

Notes: 1. EAS was tested at $T_j = 25^\circ\text{C}$, $L = 0.5\text{mH}$, $I_{AS} = -35A$, $V_{gs} = -10V$.

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case (junction-heat-spreader)	R_{thJC}	1.59	$^\circ\text{C/W}$
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	52	

Electrical Characteristic (at T_j = 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
		-	-	-100		T _j =25°C
						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	12.5	mΩ	V _{GS} =-10V, I _D =-30A
			11.8	24		V _{GS} =-4.5V, ID=-24A
Transconductance	g _{fs}	43.5	87	174	S	V _{DS} =-5V,I _D =-30A

Dynamic Characteristic

Input Capacitance	C _{iss}	3491	6981	13962	pF	V _{GS} =0V, V _{DS} =-30V, f=1MHz
Output Capacitance	C _{oss}	82	408	2040		
Reverse Transfer Capacitance	C _{rss}	65	327	1635		
Gate Total Charge	Q _G	66	132	264	nC	V _{GS} =-10V, V _{DS} =-30V, I _D =-30A, f=1MHz
Gate-Source charge	Q _{gs}	16	31	62		
Gate-Drain charge	Q _{gd}	-	25	49		
Turn-on delay time	t _{d(on)}	-	18	36	ns	V _{GS} =-10V, V _{DS} =-30V, R _{G_ext} =3Ω, I _D =-30A
Rise time	t _r	49	98	196		
Turn-off delay time	t _{d(off)}	47	93	186		
Fall time	t _f	57	113	226		
Gate resistance	R _G	-	1.85	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}	-	23	46	ns	I _F =-30A, dI/dt=100A/μs
Body Diode Reverse Recovery Charge	Q _{rr}	-	10	20	nC	

Typical Performance Characteristics

Fig 1: Output Characteristics

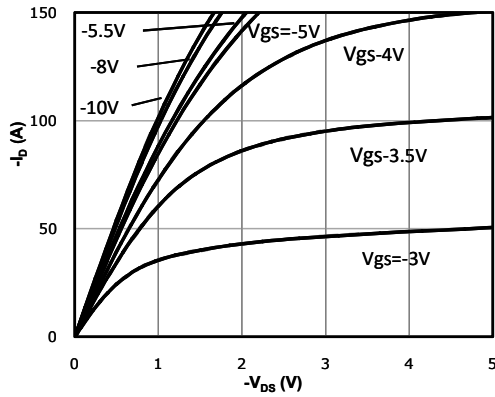


Fig 2: Transfer Characteristics

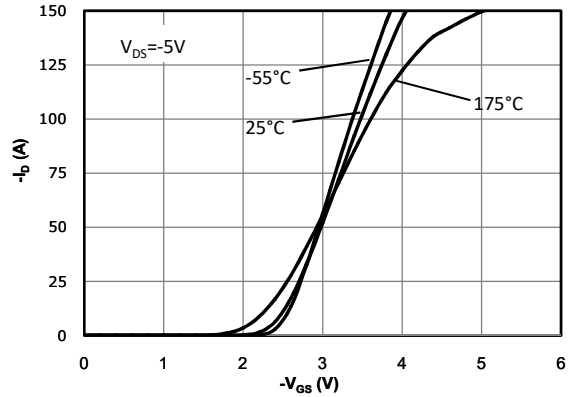


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

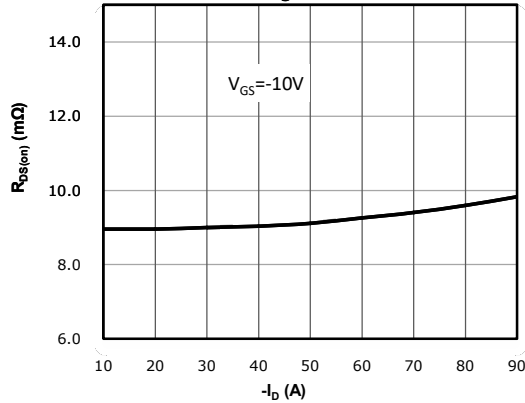


Fig 4: $R_{DS(on)}$ vs Gate Voltage

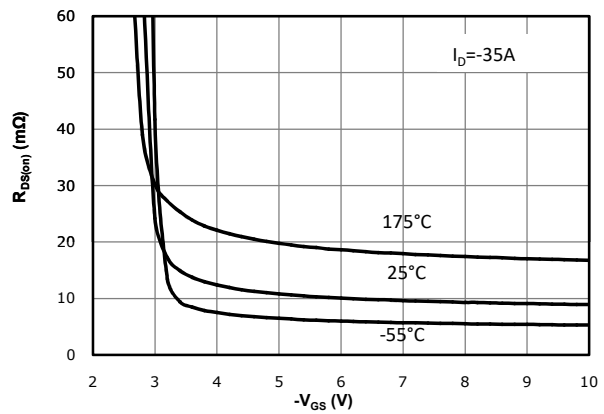


Fig 5: $R_{DS(on)}$ vs. Temperature

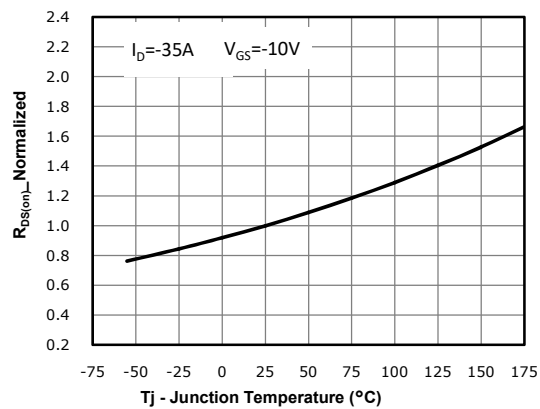


Fig 6: $V_{GS(th)}$ vs. Temperature

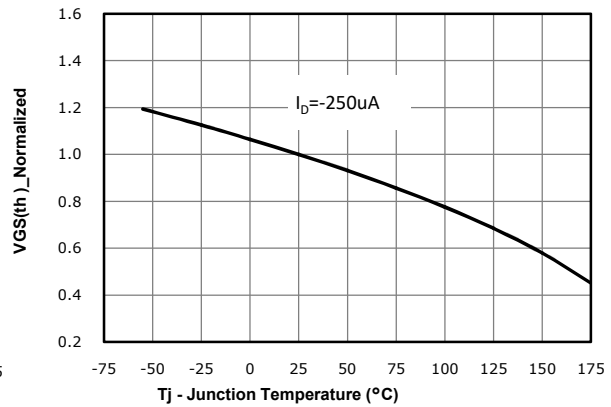


Fig 7: BVds vs. Temperature

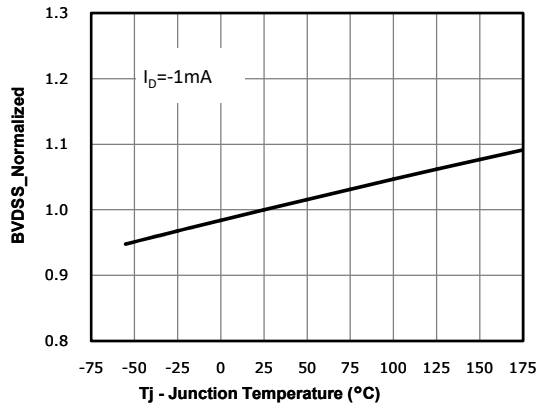


Fig 8: Capacitance Characteristics

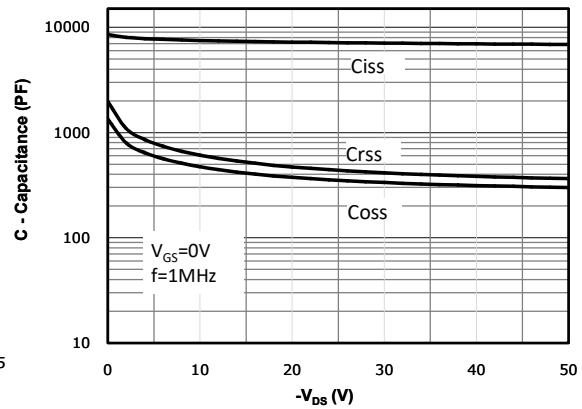


Fig 9: Gate Charge Characteristics

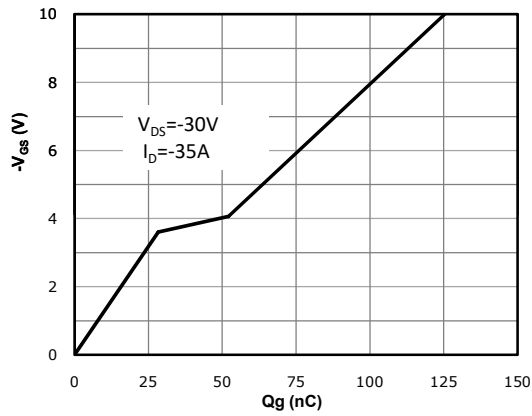


Fig 10: Body-diode Forward Characteristics

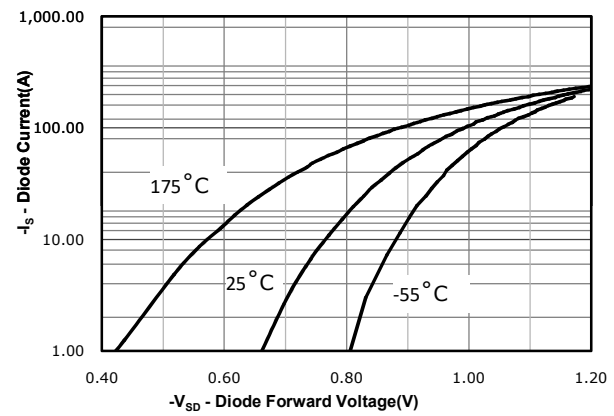


Fig 11: Power Dissipation

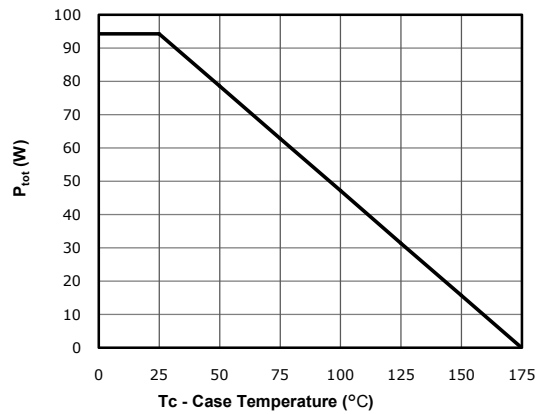


Fig 12: Drain Current Derating

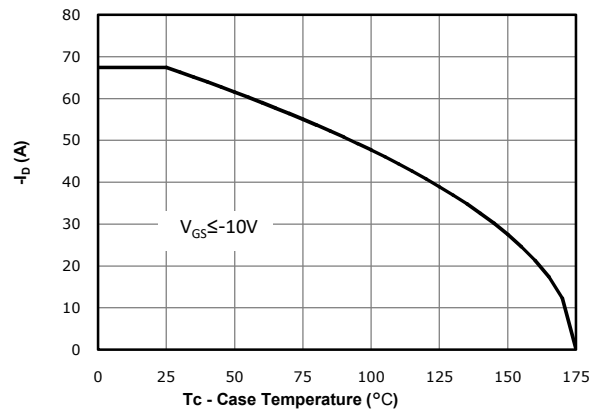


Fig 13: Safe Operating Area

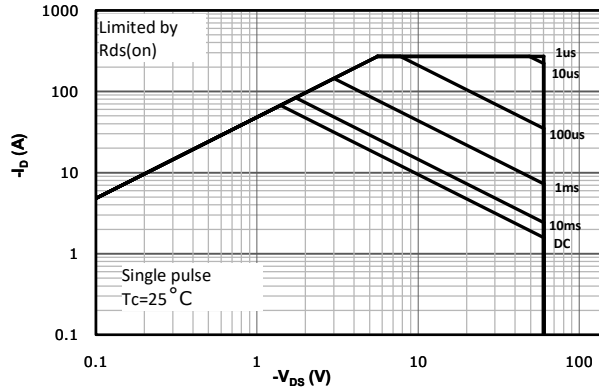
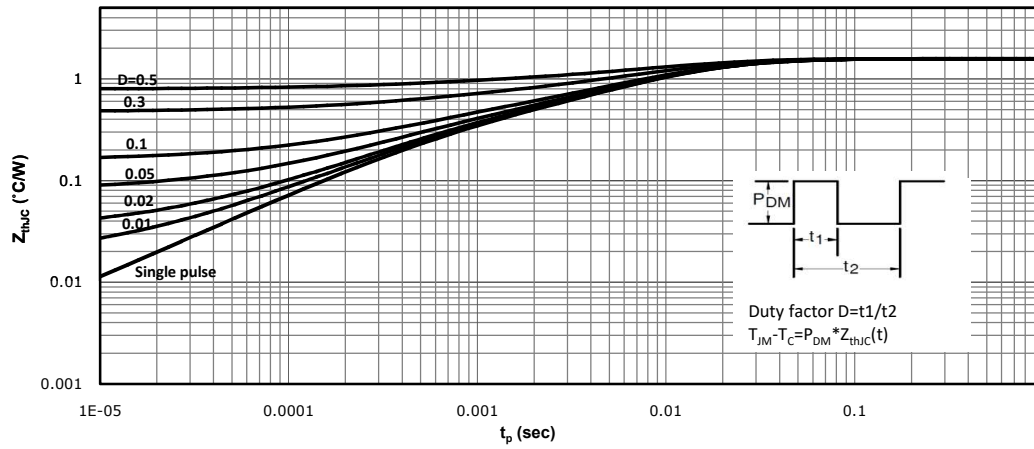
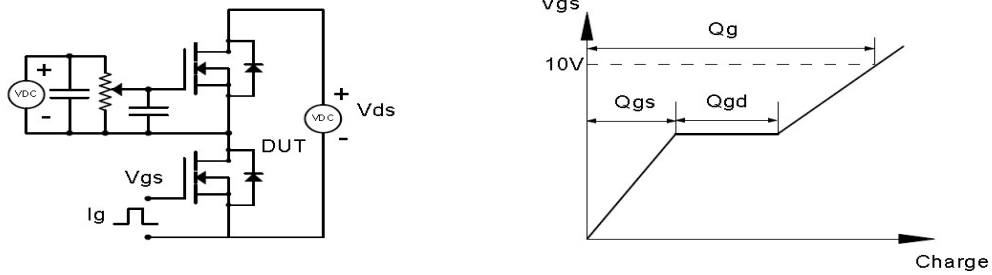


Fig 14: Max. Transient Thermal Impedance

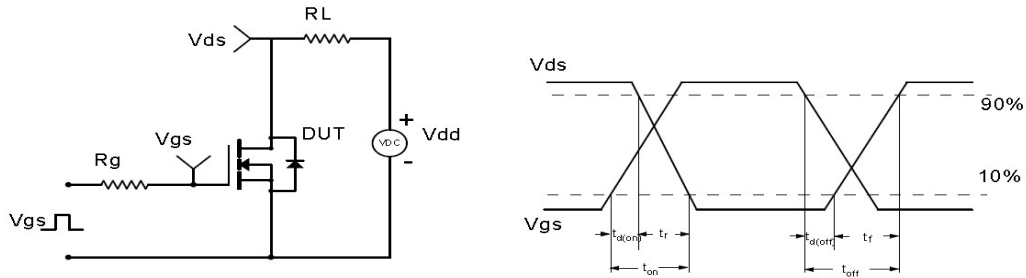


Test Circuit & Waveform

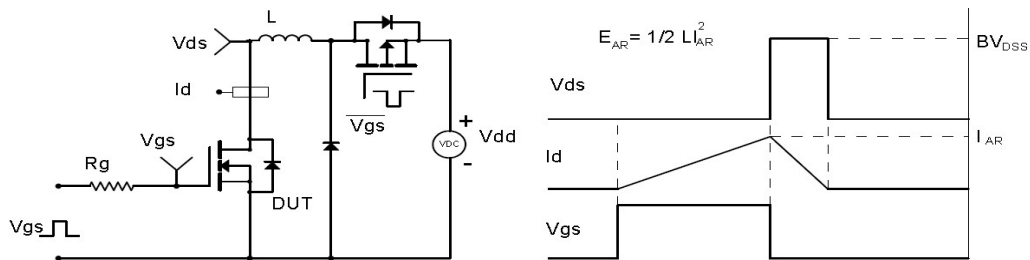
Gate Charge Test Circuit & Waveform



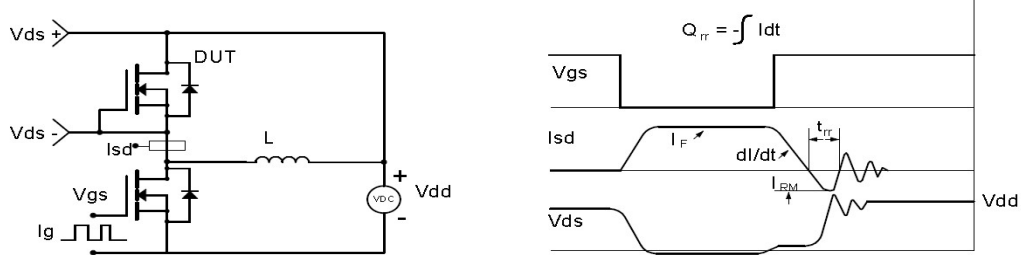
Resistive Switching Test Circuit & Waveforms



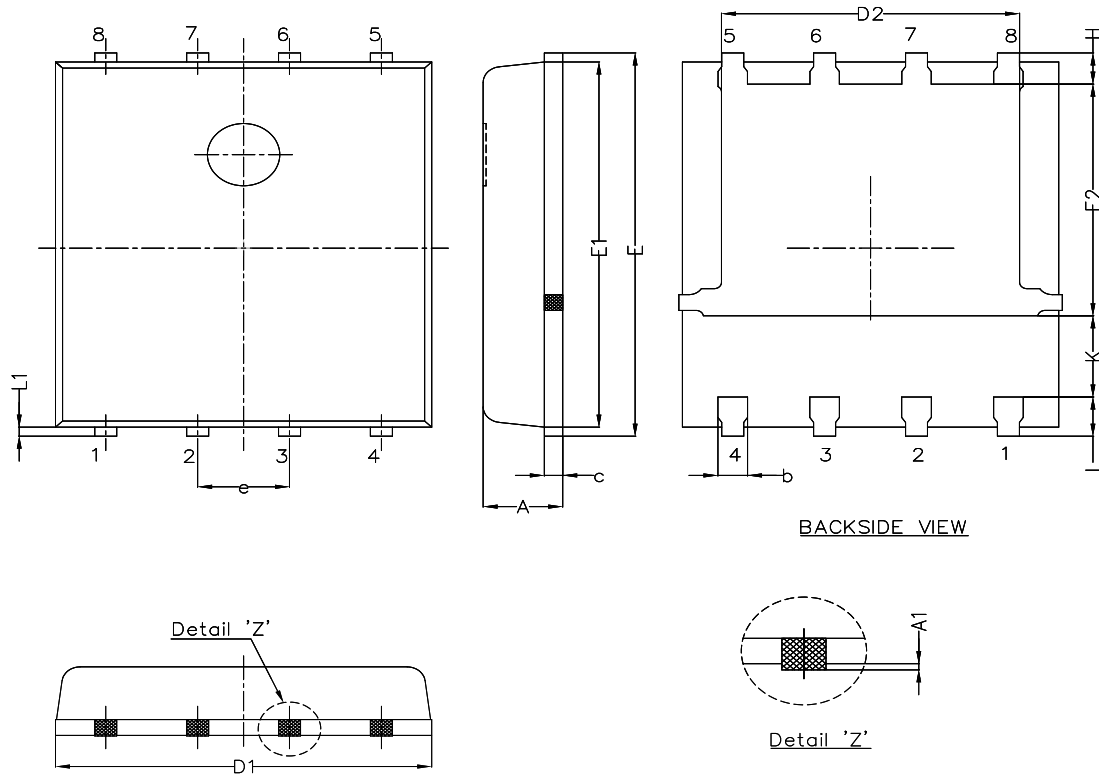
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: PDFN5X6 Type X



Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	1.00	1.10	1.20
A1	0.00	-	0.05
b	0.30	0.40	0.50
c	0.20	0.25	0.30
D1	5.00	5.20	5.40
D2	3.80	4.10	4.30
E	6.00	6.15	6.30
E1	5.76	5.86	5.96
E2	3.52	3.72	3.92
e	1.27 BSC		
H	0.40	0.50	0.60
K	1.10	-	-
L	0.50	0.60	0.71
L1	0.05	0.15	0.25

Marking**NOTE:**

XAAAAAAAA-Y

X	—Assembly location code
AAAAAAA	—Assembly lot NO. last 7 digits
Y	—Bin code

Revision History

Revision	Date	Major changes
1.0	2023/11/15	Release of preliminary 1.0 version.
1.1	2024/1/15	Update VTH SPEC
1.2	2024/3/13	Update Marking

Disclaimer

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