30V 22A Dual N-Channel Enhancement Mode Power MOSFET

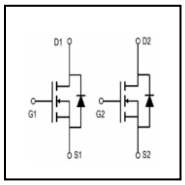
General Description

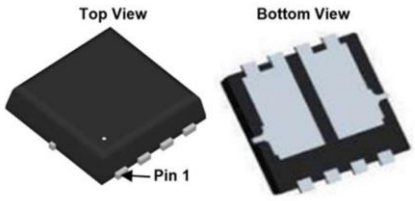
This Power MOSFET has been developed using advanced trench process, which is specifically designed to minimize input capacitance and gate charge. This renders the device suitable for use as primary switch in advanced high-efficiency isolated DC-DC converters for telecom and computer applications, and applications with low gate charge driving requirements.

FEATURES

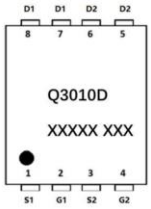
- RDSON≤13mΩ @Vgs=10V, Id=15A
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

SYMBOL





PDFN3.3X3.3-8L(Dual)



Marking and pin Assignment

ASSEMBLY MESSAGE

Product Name	Marking	Package	Packaging
BXT130N03E	Q3010D	PDFN3.3X3.3-8L	Reel

ABSOLUTE MAXIMUM RATINGS (T_C=25°C unless otherwise noted)

Parameter		Symbol	Rating	Unit
			PDFN3.3X3.3-8L	
Drain-Source Voltage		V_{DSS}	30	V
Drain Current	Continuous (T_C = 25°C)	I_D	22	A
	Continuous (T_C = 100°C)		14	A
Drain Current	Pulsed (Note1)	I_{DM}	88	A
Gate-Source Voltage		V_{GSS}	±20	V
Power Dissipation	T_C =25°C	P_D	9.8	W
Maximum Junction Temperature		T_J	150	°C
Storage Temperature Range		T_{STG}	-55 to 150	°C

Note： 1. Repetitive Rating: Pulse width limited by maximum junction temperature

THERMAL CHARACTERISTICS

Parameter	Symbol	Max.	Unit
		PDFN3.3X3.3-8L	
Thermal Resistance, Junction to Case	$R_{\theta JC}$	12.8	°C / W

ELECTRICAL CHARACTERISTICS（T_J=25℃,unless otherwise Noted）

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	VGS=0V, ID=250μA	30			V
Zero Gate Voltage Drain Current	I_{DSS}	VDS=30V, VGS=0V			1	uA
Gate-Body Leakage Current, Forward	I_{GSS}	VGS=20V			100	nA
Gate-Body Leakage Current, Reverse		VGS=-20V			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	VDS=VGS, ID=250μA	1.0	1.5	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	VGS=10V, ID=15A		10	13	mΩ
		VGS=4.5V, ID=10A		14	19	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	VDS=15V, VGS=0V, f=1.0MHz		545		pF
Output Capacitance	C_{OSS}			235		pF
Reverse Transfer Capacitance	C_{RSS}			33		pF
SWITCHING PARAMETERS						
Turn-ON Delay Time	$t_{D(ON)}$	VDD=15V, ID=20A, VGS = 10V, RG=3Ω		6		ns
Turn-ON Rise Time	t_R			5		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			25		ns
Turn-OFF Fall-Time	t_F			7		ns
Total Gate Charge(Note2)	Q_G	VDS =15V, VGS =10V, ID =10A		19		nC
Gate Source Charge	Q_{GS}			6.3		nC
Gate Drain Charge	Q_{GD}			4.5		nC
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage	V_{SD}	IS=22A, VGS=0V			1.2	V
Diode Continuous Forward Current	I_S				22	A
Maximum Pulsed Drain to Source Diode Forward Current	I_{SM}				88	A
Body Diode Reverse Recovery Time	trr	IF=10A,dI/dt=100A/μs		7		ns
Body Diode Reverse Recovery Charge	Qrr			6.3		nC

Note： 2. Essentially independent of operating temperature

TYPICAL CHARACTERISTICS

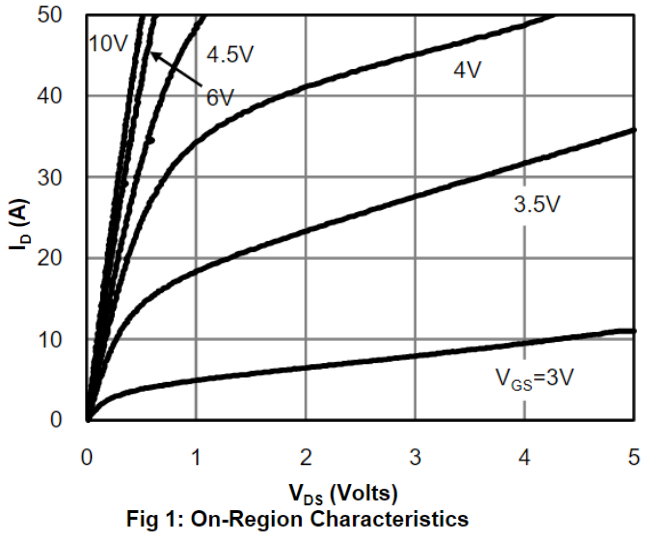


Fig 1: On-Region Characteristics

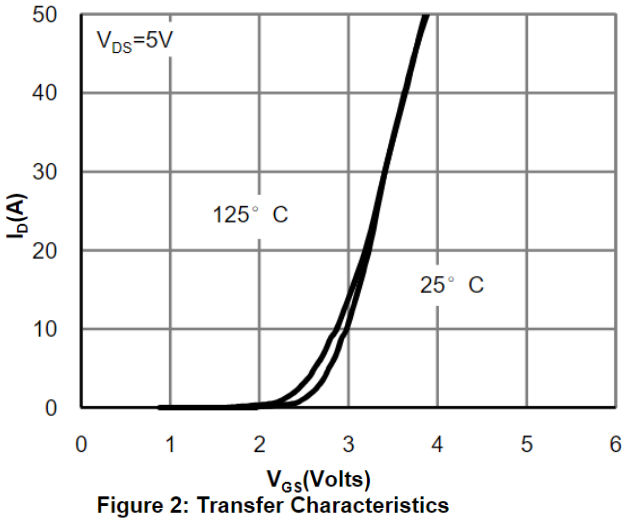


Figure 2: Transfer Characteristics

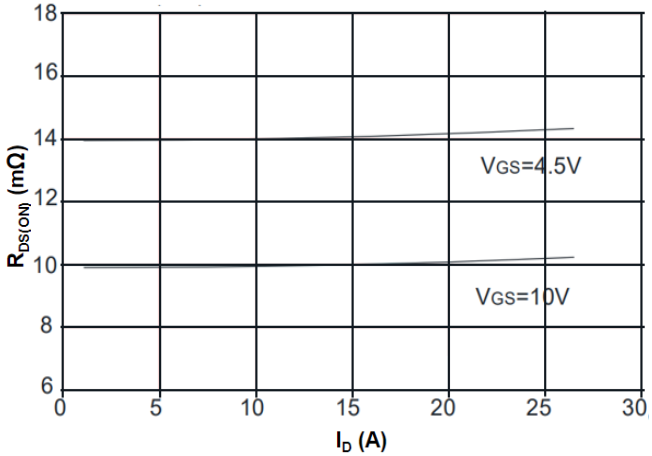


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

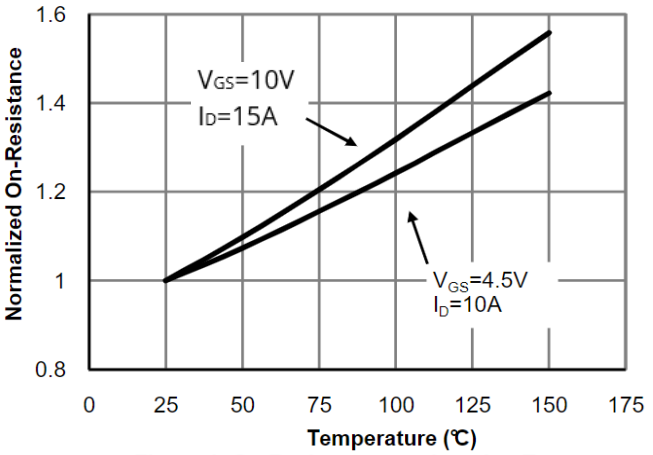


Figure 4: On-Resistance vs. Junction Temperature

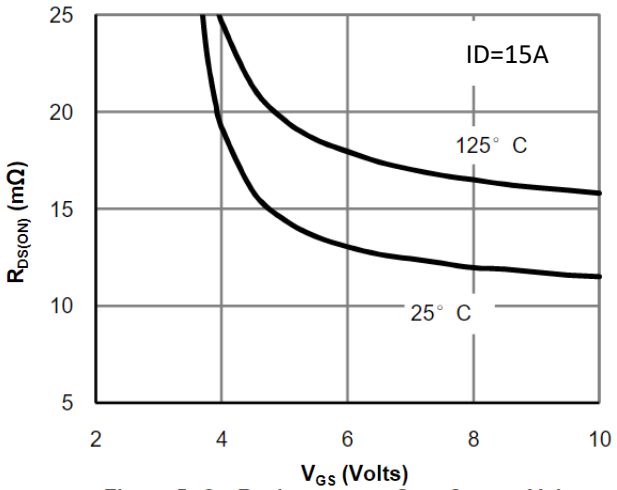


Figure 5: On-Resistance vs. Gate-Source Voltage

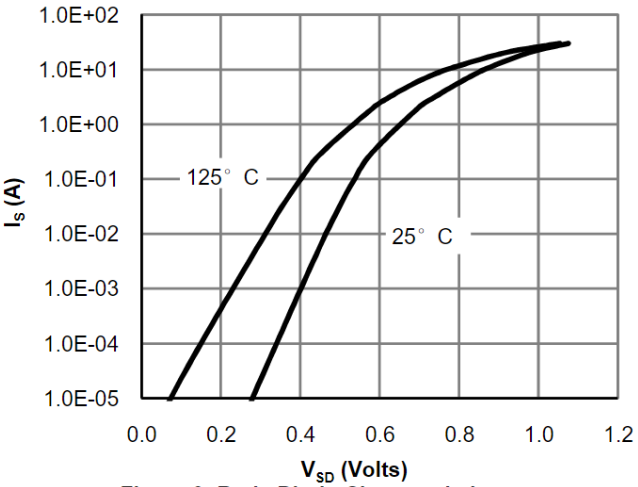


Figure 6: Body-Diode Characteristics

TYPICAL CHARACTERISTICS(Cont.)

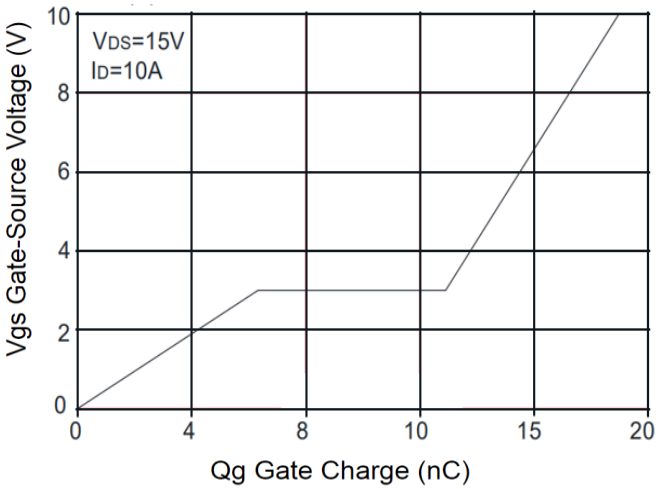


Figure 7: Gate-Charge Characteristics

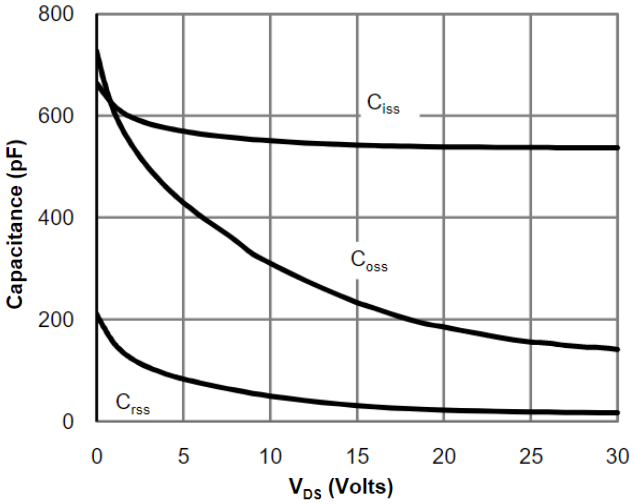


Figure 8: Capacitance Characteristics

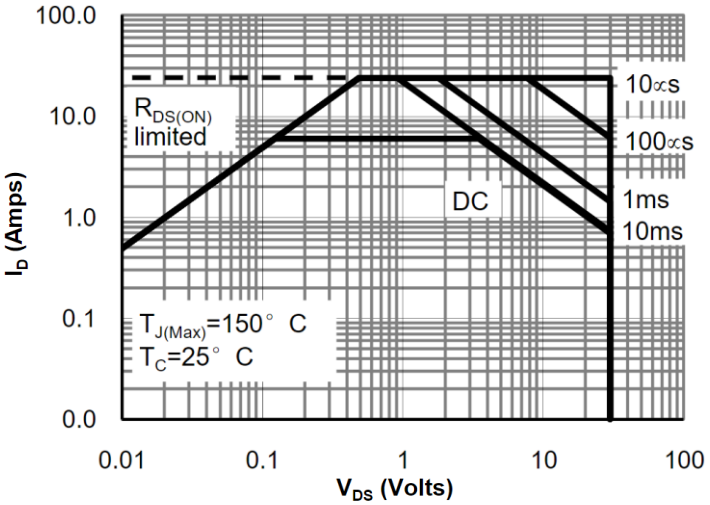
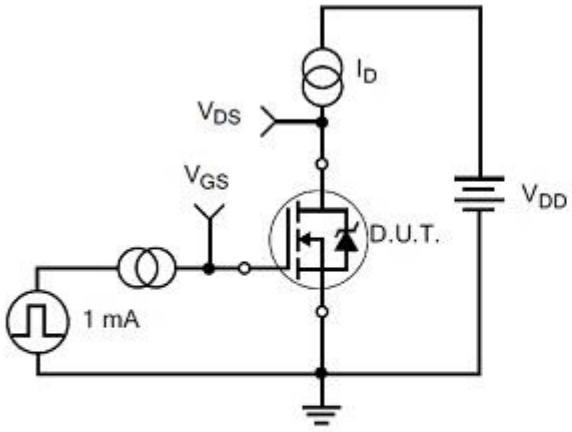
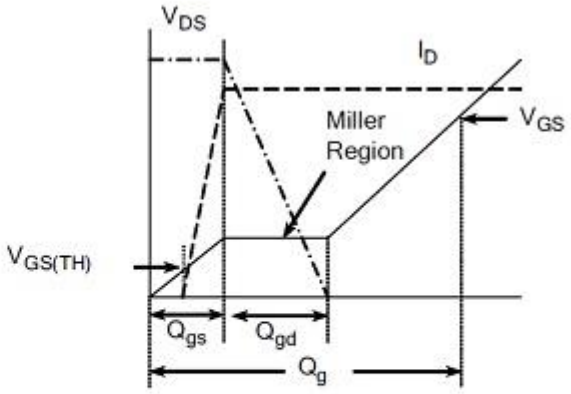


Figure 9: Maximum Forward Biased Safe Operating Area

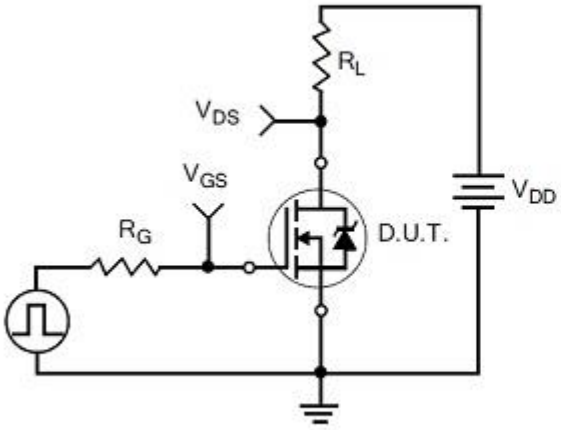
TEST CIRCUITS AND WAVEFORMS



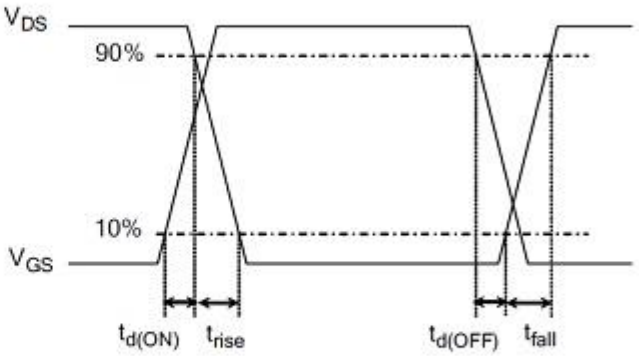
Gate Charge Test Circuit



Gate Charge Waveform

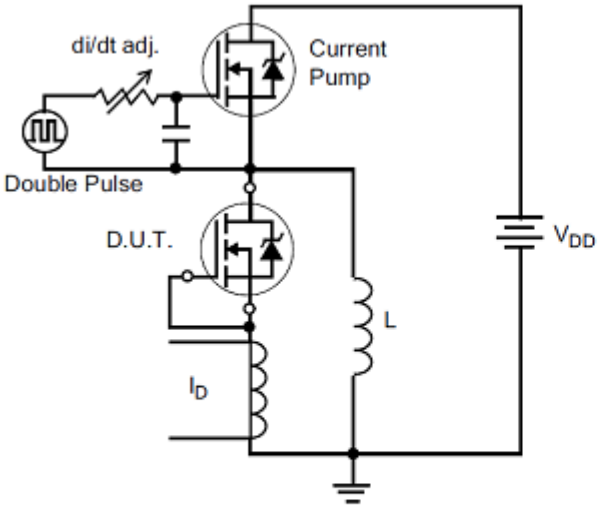


Resistive Switching Test Circuit

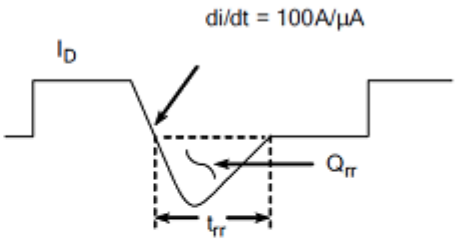


Resistive Switching Waveforms

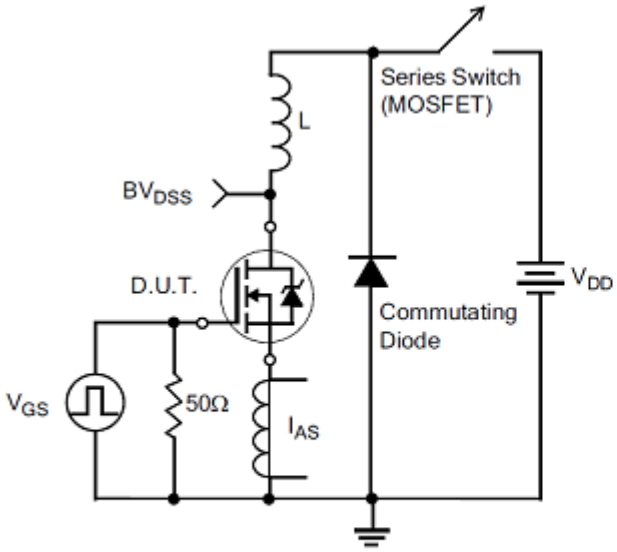
TEST CIRCUITS AND WAVEFORMS(Cont.)



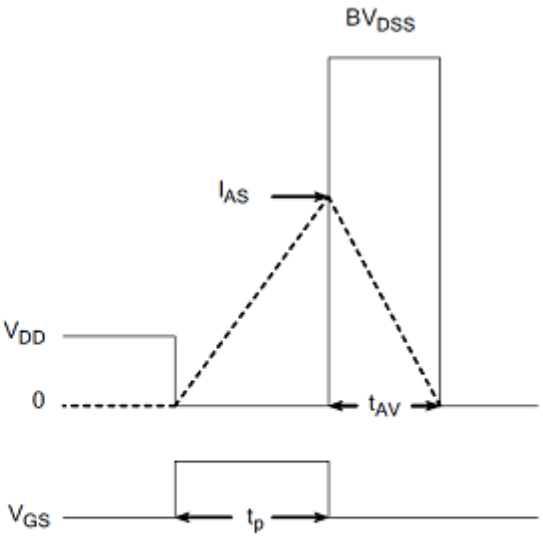
Diode Reverse Recovery Test Circuit



Diode Reverse Recovery Waveform



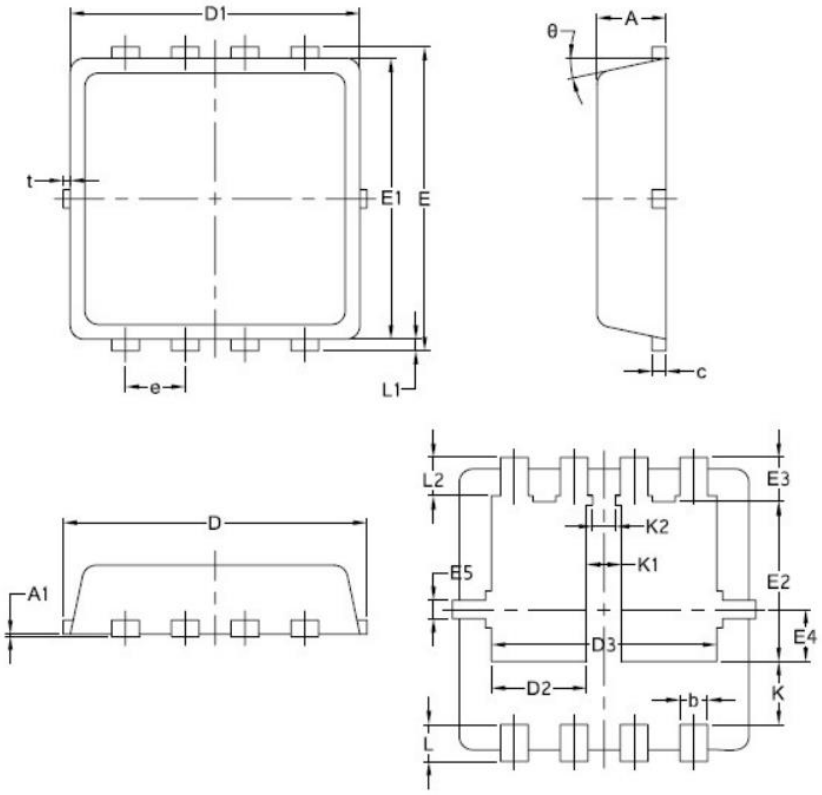
Unclamped Inductive Switching Test Circuit



$$E_{AS} = \frac{I_{AS}^2 L}{2}$$

Unclamped Inductive Switching Waveforms

PDFN3.3X3.3-8L Package



SYMBOL	COMMON MM		
	MIN	NOM	MAX
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.25	0.30	0.39
c	0.14	0.152	0.20
D	3.20	3.30	3.45
D1	3.05	3.15	3.25
D2	0.84	1.04	1.24
D3	2.30	2.45	2.60
E	3.20	3.30	3.40
E1	2.95	3.05	3.15
E2	1.60	1.74	1.90
⚠2 E3	0.28	0.48	0.65
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.50	0.69	0.80
K1	0.30	0.38	0.53
K2	0.15	0.25	0.35
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
L2	0.27	0.42	0.57
t	0	0.075	0.13
θ	10°	12°	14°

Revision history

Document revision history

Date	Revision	Changes
20-Mar-2021	1.0	First release

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