NCE Automotive N-Channel Enhancement Mode Power MOSFET

Description

The NCEA4095AG uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

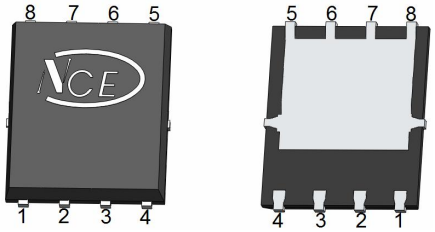
Application

- Automotive application
- DC/DC Converter
- Motor control
- Power switching

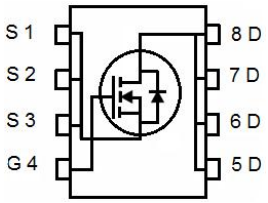
General Features

- V_{DS} = 40 V,I_D = 95 A
  $R_{DS(ON)}$=3.0mΩ , typical@ V_{GS}=10V
- High density cell design for ultra low Rdson
- Good stability and uniformity with high E_{AS}
- 175°C operating temperature
- Pb-free lead plating
- 100% UIS tested
- 100% ΔVds tested
- **AEC-Q101 qualified**

DFN5X6-8L



Top View　　Bottom View



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
A4095AG	NCEA4095AG	DFN5X6-8L	Ø330mm	12mm	5000units

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±25	V
Drain Current-Continuous (Silicon Limited)	(T_C=25℃)	I_D	100	A
Drain Current-Continuous (Package Limited)	(T_C=25℃)	I_D	95	A
Drain Current-Continuous	(T_C=100℃)	I_D	71	A
Pulsed Drain Current		I_{DM}	380	A
Maximum Power Dissipation		P_D	68	W
De-rating factor			0.45	W/℃
Single pulse avalanche energy (Note 1)		E_{AS}	484	mJ
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55 To 175	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	2.2	℃/W
Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	50	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

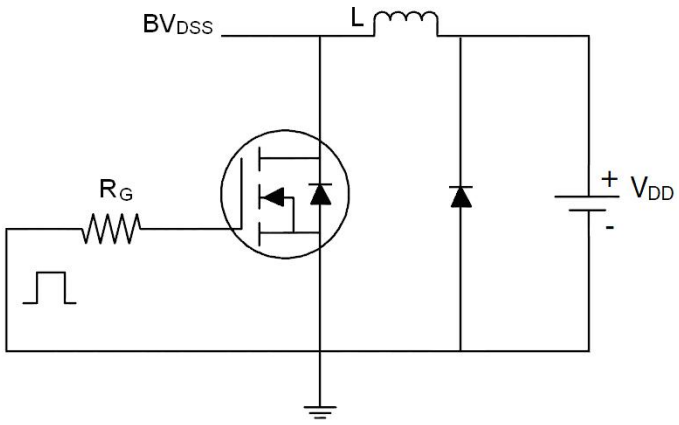
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=40V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±25V,V_{DS}=0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	2.0	3.0	4.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	3.0	3.5	mΩ
Forward Transconductance	g_{FS}	V_{DS}=15V,I_D=20A	-	40	-	S
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=20V,V_{GS}=0V, F=1.0MHz	-	4970	-	pF
Output Capacitance	C_{oss}		-	523	-	pF
Reverse Transfer Capacitance	C_{rss}		-	432	-	pF
Switching Characteristics (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=20V,R_L=1Ω V_{GS}=10V,R_G=3Ω	-	13	-	nS
Turn-on Rise Time	t_r		-	33	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	45	-	nS
Turn-Off Fall Time	t_f		-	23	-	nS
Total Gate Charge	Q_g	V_{DS}=20V,I_D=20A, V_{GS}=10V	-	92.5	-	nC
Gate-Source Charge	Q_{gs}		-	21.8	-	nC
Gate-Drain Charge	Q_{gd}		-	29.4	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=20A	-	-	1.2	V
Diode Forward Current	I_S		-	-	95	A
Reverse Recovery Time	t_{rr}	T_J=25°C,I_F=20A di/dt=100A/μs	-	44	-	nS
Reverse Recovery Charge	Qrr		-	75	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

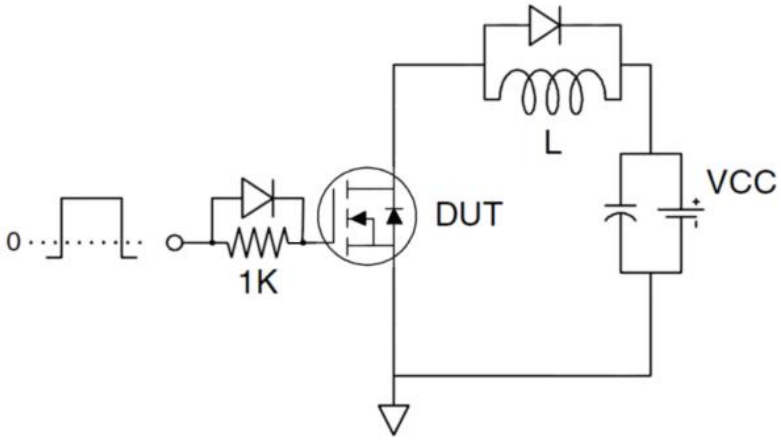
1. EAS condition : Tj=25℃,V_{DD}=30V,V_G=10V,L=0.5mH,Rg=25Ω.
2. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C. The maximum allowed junction temperature of 175°C. The value in any given application depends on the user's specific board design, and the maximum temperature of 175°C may be used if the PCB allows it.
3. Guaranteed by design, not subject to production.
4. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heat sink, assuming a maximum junction temperature of $T_{J(MAX)}$=175°C. The SOA curve provides a single pulse rating.

Test Circuit

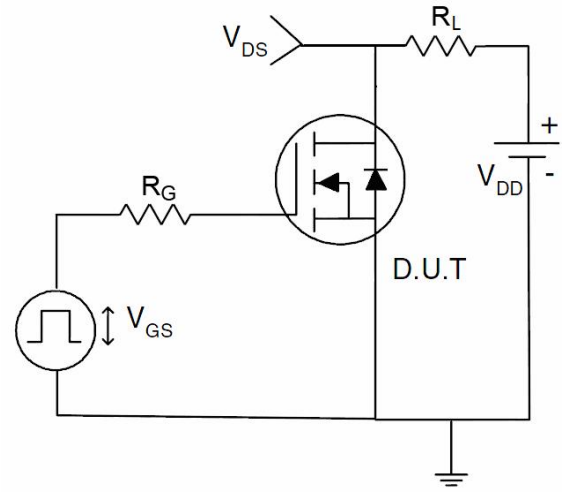
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

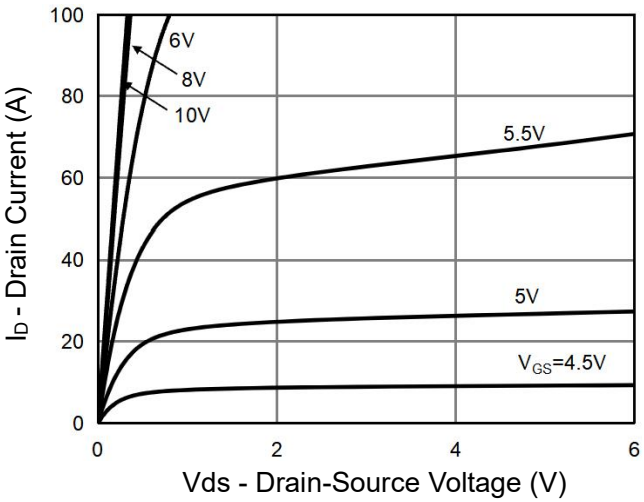


Figure 1 Output Characteristics

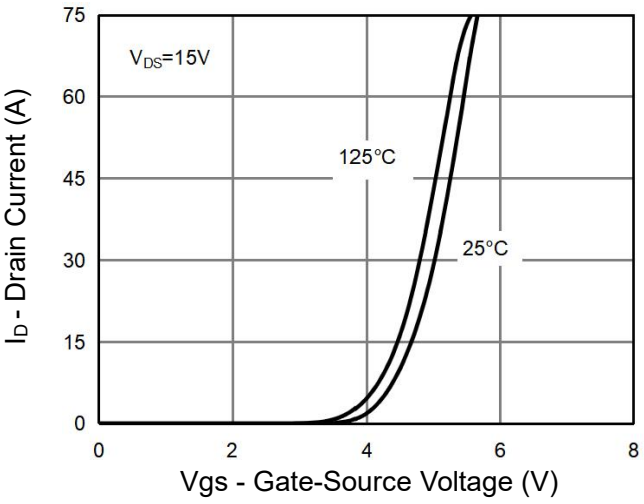


Figure 2 Transfer Characteristics

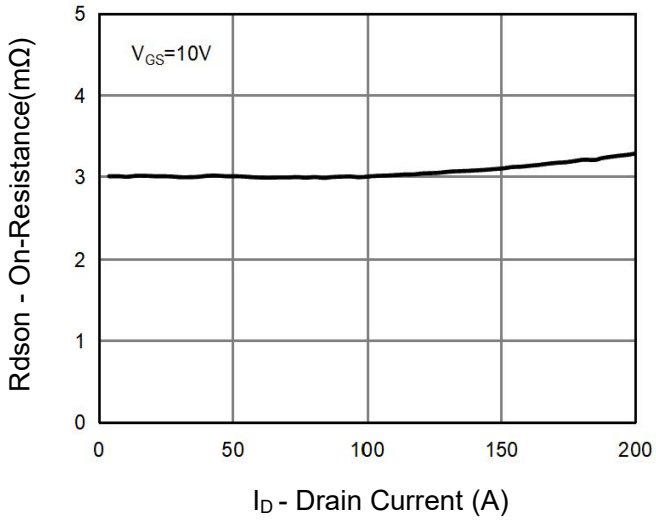


Figure 3 Rdson vs Drain Current

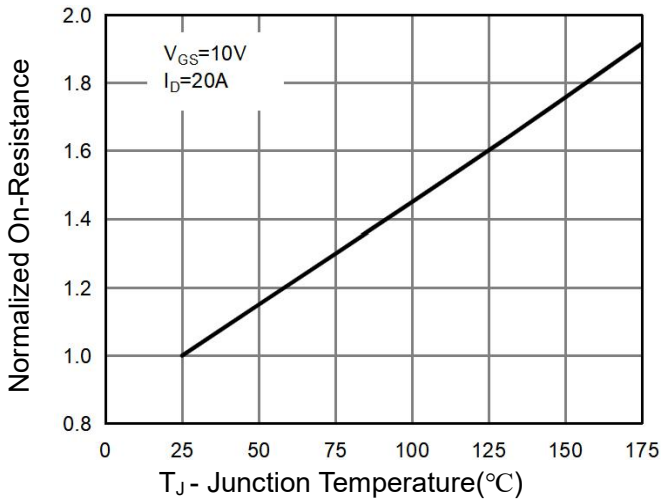


Figure 4 Rdson vs Junction Temperature

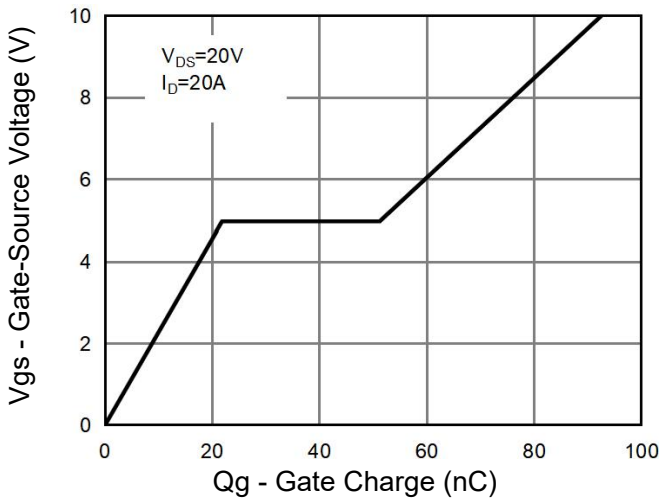


Figure 5 Gate Charge

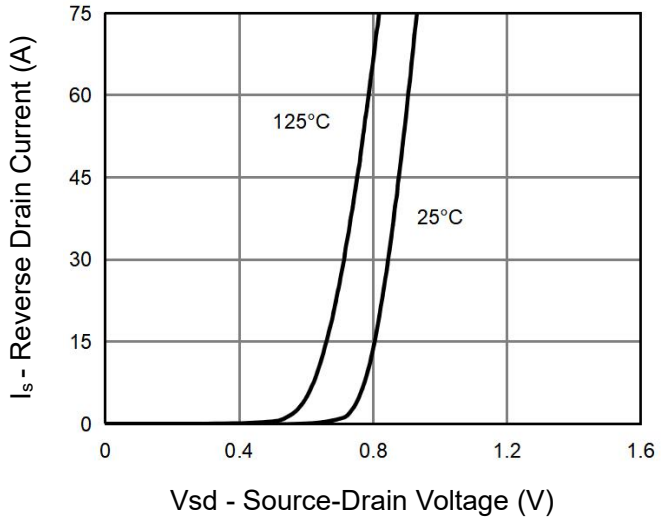


Figure 6 Source-Drain Diode Forward

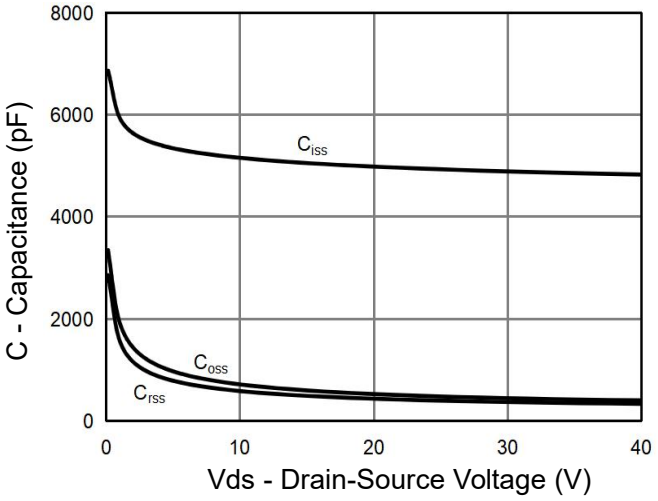


Figure 7 Capacitance vs Vds

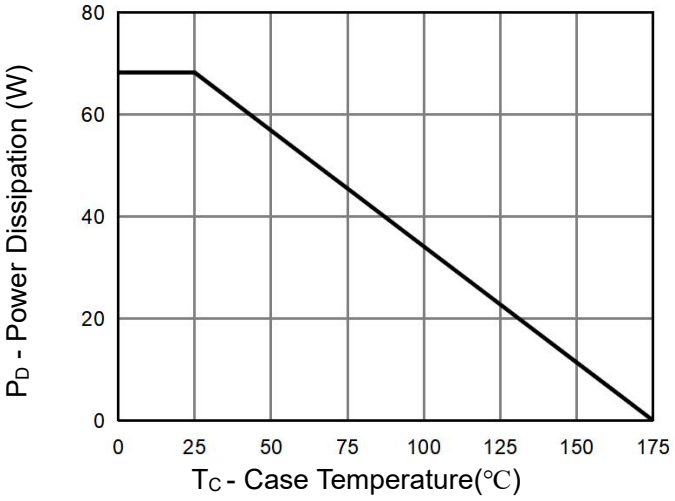


Figure 9 Power De-rating

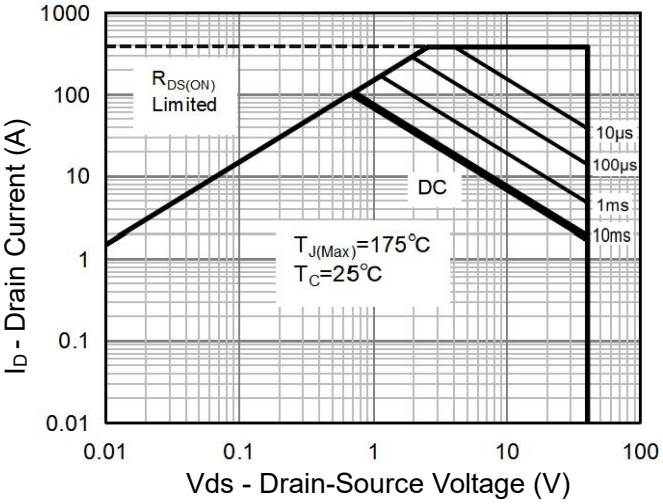


Figure 8 Safe Operation Area (Note4)

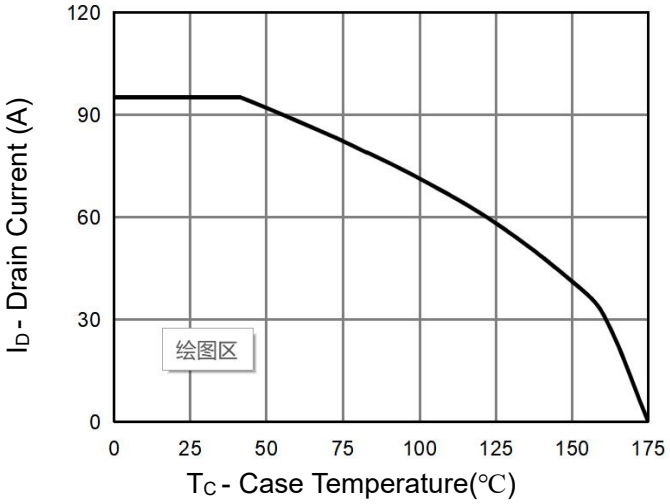


Figure10 Drain Current De-rating

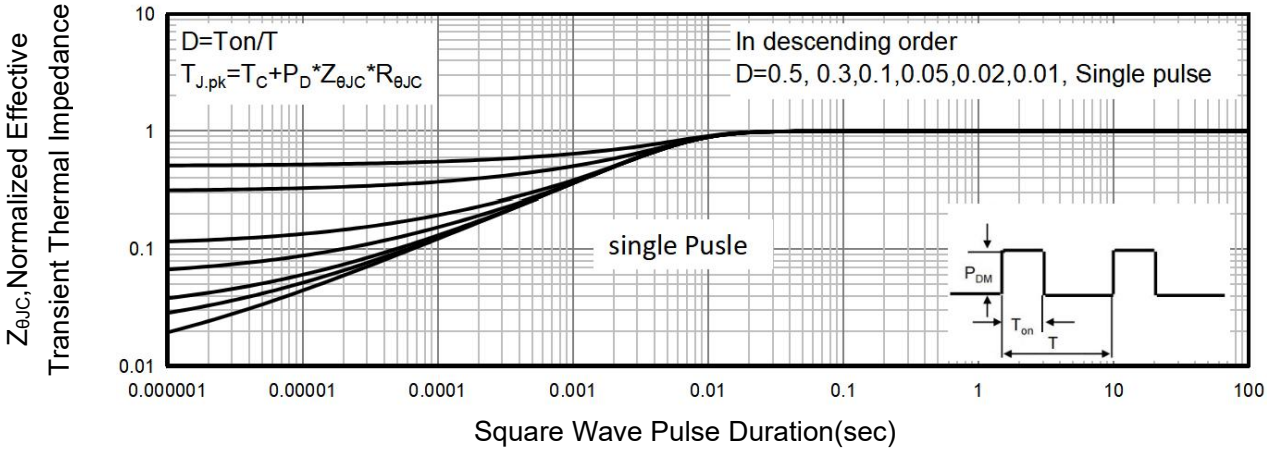
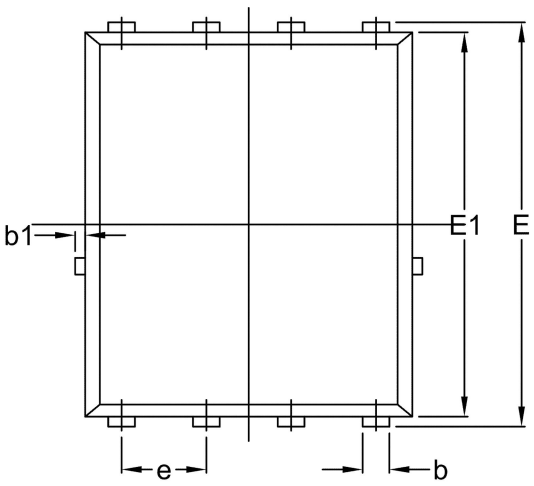
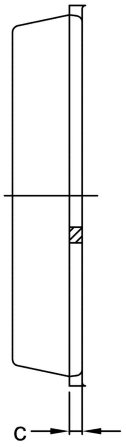
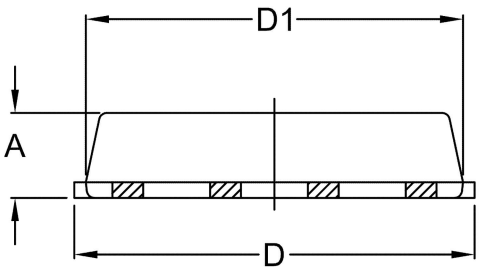


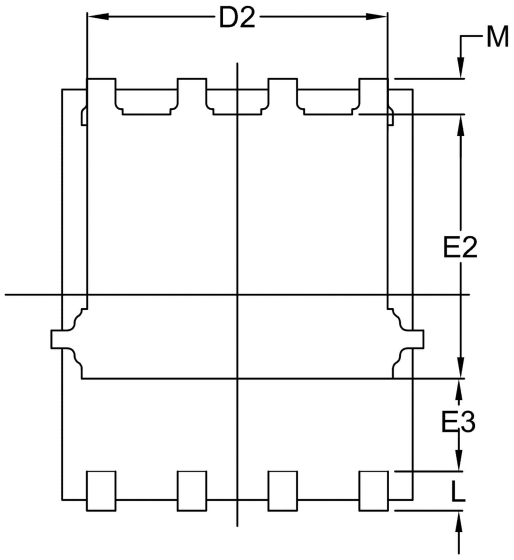
Figure 11 Normalized Maximum Transient Thermal Impedance

DFN5X6-8L Package Information









DIM	MILLIMETERS		
	MIN	NOM	MAX
A	1.00	1.10	1.20
b	0.30	0.40	0.50
b1	0.02	0.15	0.22
c	0.15	0.20	0.35
D	4.95	5.15	5.35
D1	4.80	4.90	5.00
D2	4.00	4.20	4.40
E	5.95	6.05	6.25
E1	5.65	5.75	5.85
E2	3.50	3.70	3.90
E3	1.10	/	/
e	1.27		
L	0.40	0.55	0.70
M	0.35	0.50	0.65

Revision History

Revision	Date	Subjects
V1.0	2026.07.20	Product data sheet.

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