

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max $T_A = 25^\circ C$
30V	12m Ω @ $V_{GS} = 10V$	10A
	16m Ω @ $V_{GS} = 4.5V$	8.5A

Description and Applications

This MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Battery Management Application
- Power Management Functions
- DC-DC Converters

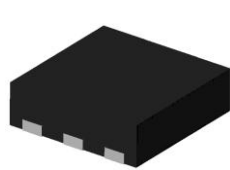
Features and Benefits

- 0.6mm profile – Ideal for Low Profile Applications
- PCB Footprint of 4mm²
- Low Gate Threshold Voltage
- Low On-Resistance
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

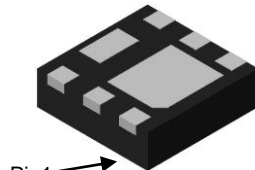
Mechanical Data

- Case: U-DFN2020-6 (Type F)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208 (4)
- Weight: 0.0065 grams (Approximate)

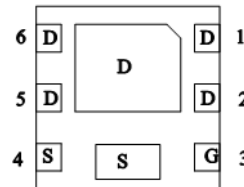
U-DFN2020-6 (Type F)



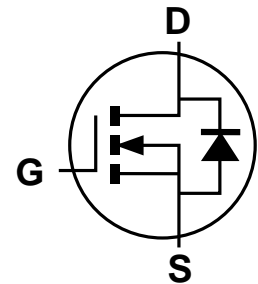
Top View



Bottom View



Pin Out
Bottom View



Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3016LFDF-7	U-DFN2020-6 (Type F)	3,000/Tape & Reel
DMN3016LFDF-13	U-DFN2020-6 (Type F)	10,000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



NZ = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: D = 2016)
 M = Month (ex: 9 = September)

Date Code Key

Year	2016	2017	2018	2019	2020	2021	2022	2023
Code	D	E	F	G	H	I	J	K

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	30	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current (Note 6) V _{GS} = 10V	Steady State T _A = +25°C T _A = +70°C	10 8	A
	t<10s T _A = +25°C T _A = +70°C	12 9	A
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	2.5	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	50	A
Avalanche Current (Note 7) L = 0.1mH	I _{AR}	22	A
Avalanche Energy (Note 7) L = 0.1mH	E _{AR}	24	mJ

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	T _A = +25°C	0.73
		T _A = +70°C	0.47
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	Steady State	174
		t<10s	121
Total Power Dissipation (Note 6)	P _D	T _A = +25°C	2.02
		T _A = +70°C	1.30
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	Steady State	66
		t<10s	42
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	11.6	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	30	-	-	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current	I _{DSS}	-	-	1	µA	V _{DS} = 30V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	-	-	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	1.4	-	2.0	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	-	8	12	mΩ	V _{GS} = 10V, I _D = 11A
		-	12	16		V _{GS} = 4.5V, I _D = 9A
Diode Forward Voltage	V _{SD}	-	0.70	1.0	V	V _{GS} = 0V, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	-	1415	-	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	-	119	-		
Reverse Transfer Capacitance	C _{rss}	-	82	-		
Gate Resistance	R _g	-	2.6	-	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	-	11.3	-	nC	V _{DS} = 15V, I _D = 12A
Total Gate Charge (V _{GS} = 10V)	Q _g	-	25.1	-		
Gate-Source Charge	Q _{gs}	-	3.5	-		
Gate-Drain Charge	Q _{gd}	-	3.6	-		
Turn-On Delay Time	t _{D(ON)}	-	4.8	-	ns	V _{DD} = 15V, V _{GS} = 10V, R _L = 1.25Ω, R _g = 3Ω
Turn-On Rise Time	t _R	-	16.5	-		
Turn-Off Delay Time	t _{D(OFF)}	-	26.1	-		
Turn-Off Fall Time	t _F	-	5.6	-		
Reverse Recovery Time	t _{RR}	-	12.3	-	ns	I _F = 12A, di/dt = 500A/µs
Reverse Recovery Charge	Q _{RR}	-	10.4	-	nC	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

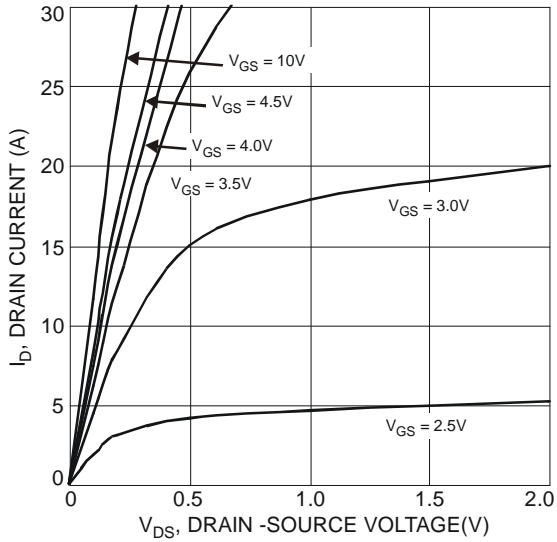


Fig. 1 Typical Output Characteristics

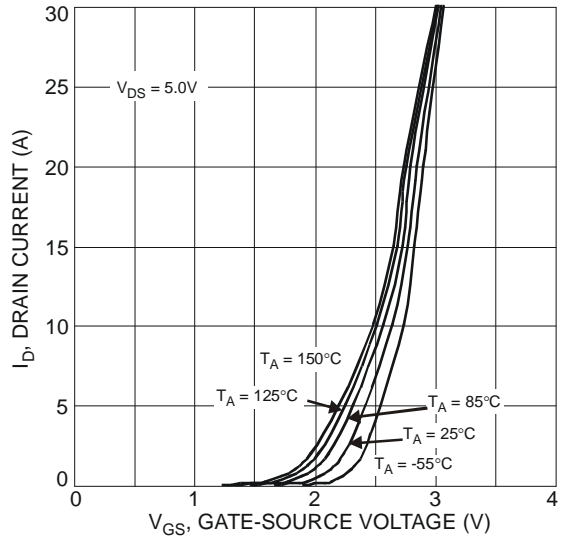


Fig. 2 Typical Transfer Characteristics

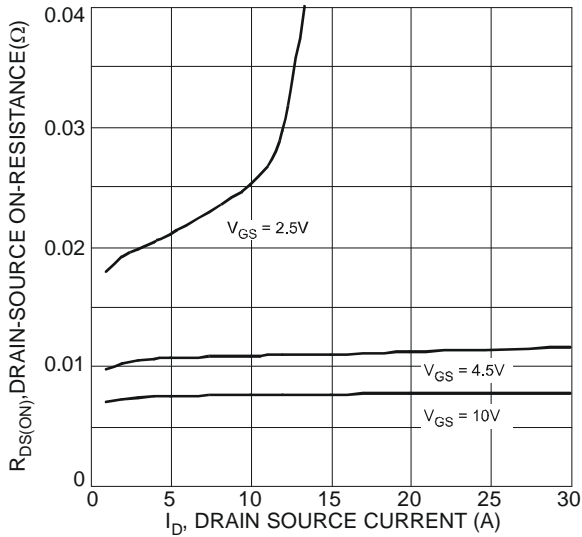


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

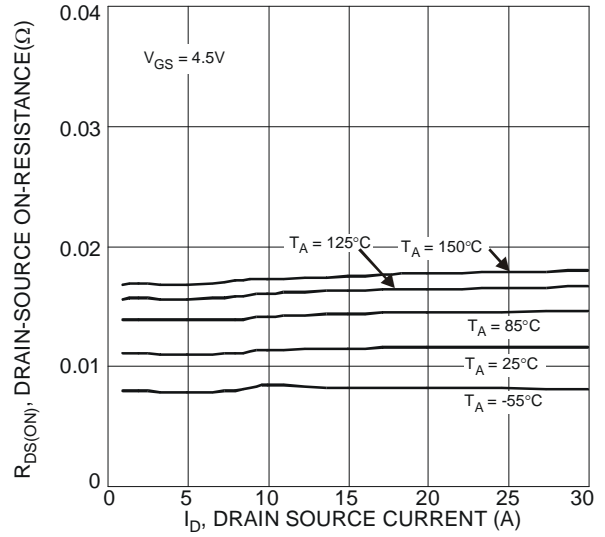


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

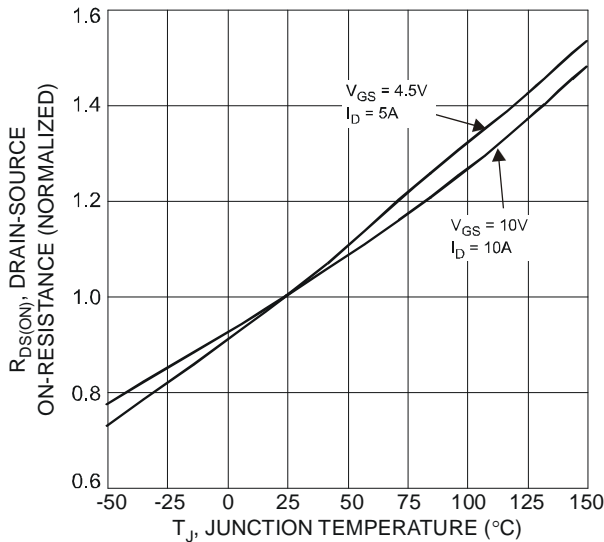


Fig. 5 On-Resistance Variation with Temperature

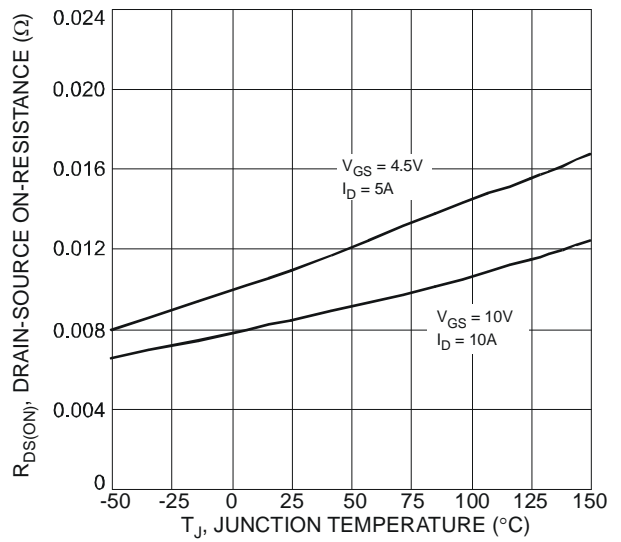


Fig. 6 On-Resistance Variation with Temperature

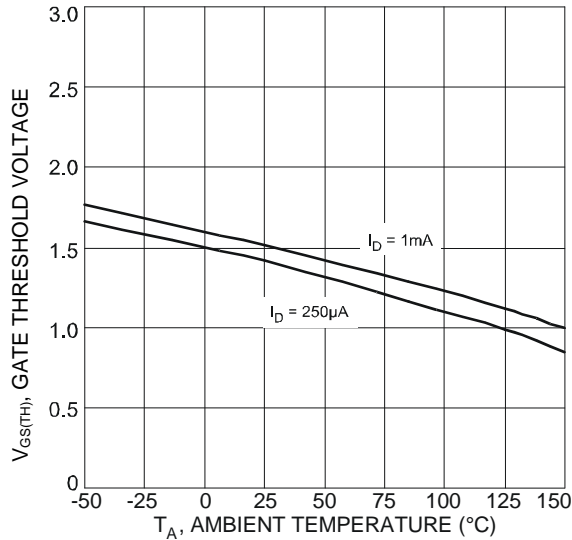


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

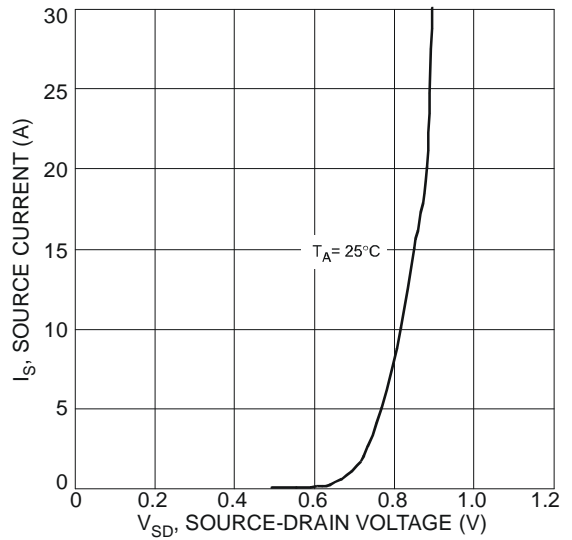


Fig. 8 Diode Forward Voltage vs. Current

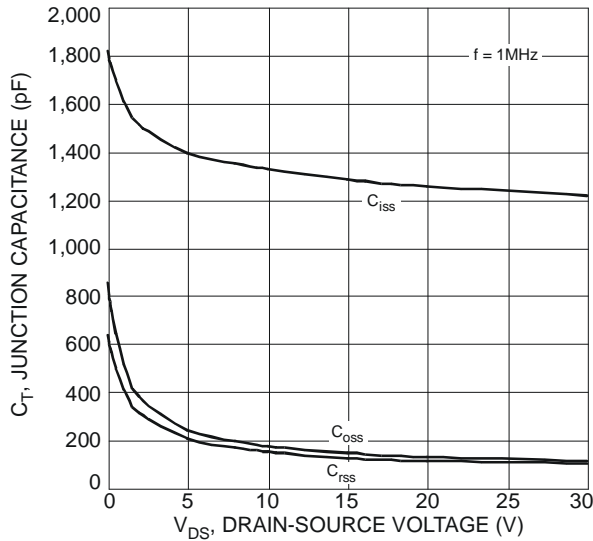


Fig. 9 Typical Junction Capacitance

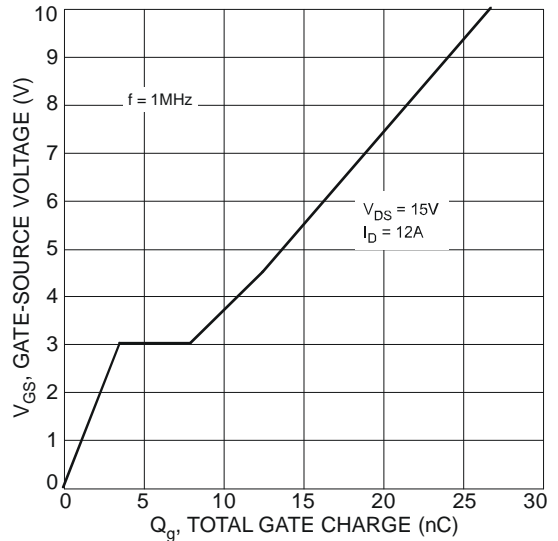


Fig. 10 Gate-Charge Characteristics

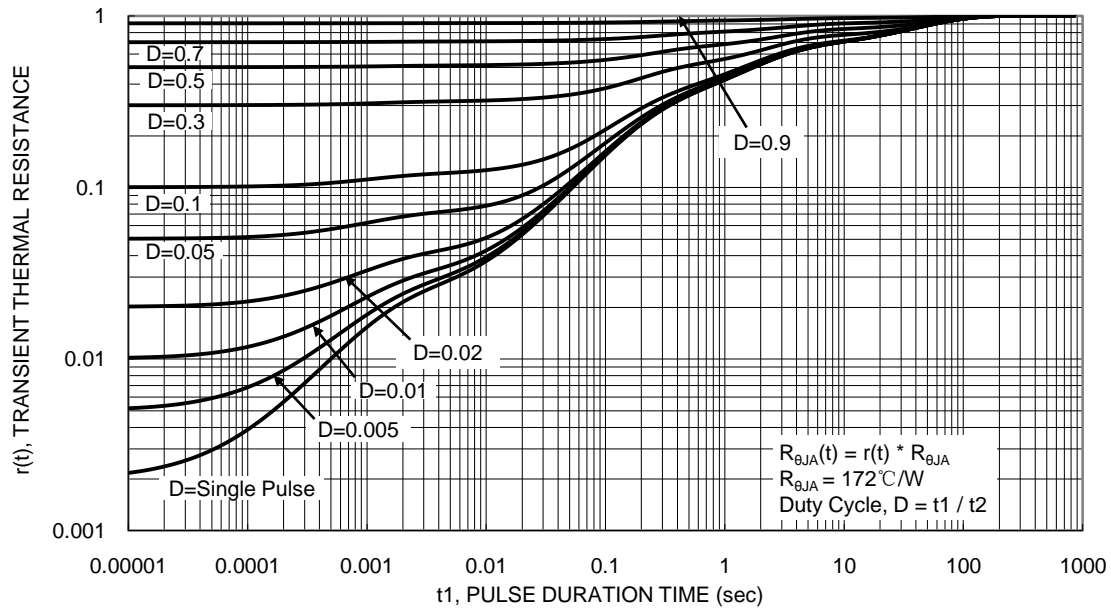
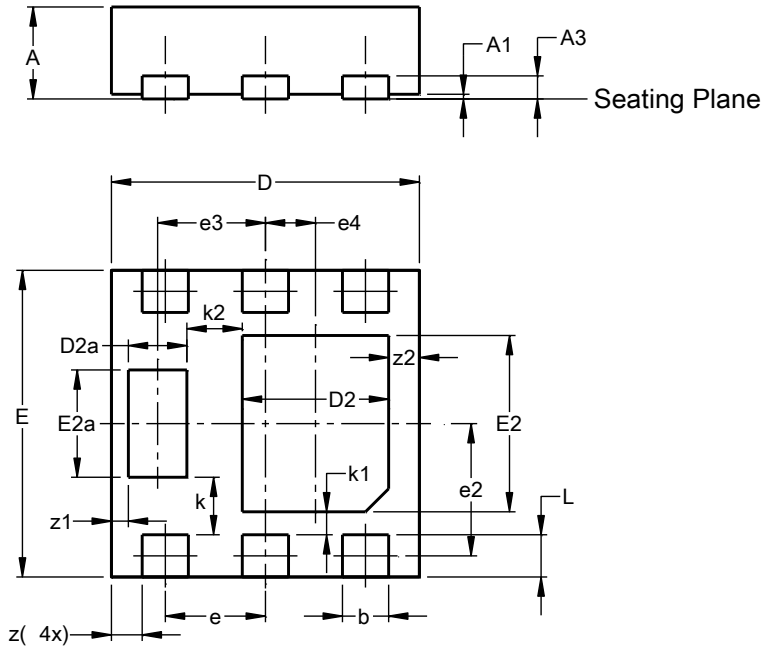


Figure 11. Transient Thermal Resistance

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

U-DFN2020-6 (Type F)

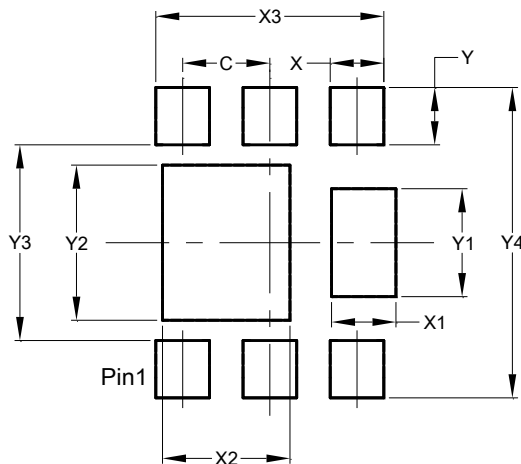


U-DFN2020-6 (Type F)			
Dim	Min	Max	Typ
A	0.57	0.63	0.60
A1	0.00	0.05	0.03
A3	-	-	0.15
b	0.25	0.35	0.30
D	1.95	2.05	2.00
D2	0.85	1.05	0.95
D2a	0.33	0.43	0.38
E	1.95	2.05	2.00
E2	1.05	1.25	1.15
E2a	0.65	0.75	0.70
e	0.65 BSC		
e2	0.863 BSC		
e3	0.70 BSC		
e4	0.325 BSC		
k	0.37 BSC		
k1	0.15 BSC		
k2	0.36 BSC		
L	0.225	0.325	0.275
z	0.20 BSC		
z1	0.110 BSC		
z2	0.20 BSC		
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

U-DFN2020-6 (Type F)



Dimensions	Value (in mm)
C	0.650
X	0.400
X1	0.480
X2	0.950
X3	1.700
Y	0.425
Y1	0.800
Y2	1.150
Y3	1.450
Y4	2.300

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