

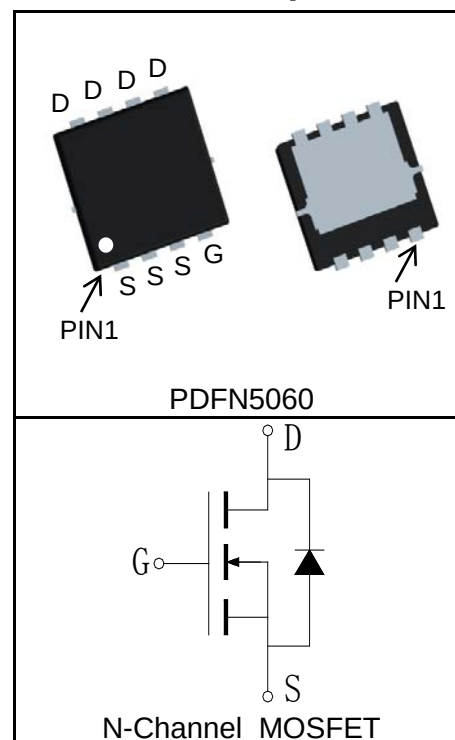
Features

- 40V/120A,
 $R_{DS(ON)} = 2.7m\Omega(Typ.)@V_{GS}=10V$
- Super High Dense Cell Design
- Ultra Low On-Resistance
- Fast Switching Speed
- 100% avalanche tested
- Lead Free and Green Devices Available (RoHS Compliant)

Applications

- DC/DC Converters
- Power Supply

Pin Description



Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T _C =25°C Unless Otherwise Noted)				
V _{DSS}	Drain-Source Voltage		40	V
V _{GSS}	Gate-Source Voltage		±20	
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	°C
I _S	Diode Continuous Forward Current	T _C =25°C	50	A
Mounted on Large Heat Sink				
I _{DP} ^①	300μs Pulse Drain Current Tested	T _C =25°C	480	A
I _D ^②	Continuous Drain Current@T _C (V _{GS} =10V)	T _C =25°C	120	A
		T _C =100°C	75	
	Continuous Drain Current@T _A (V _{GS} =10V) ^③	T _A =25°C	21	
		T _A =70°C	17	
P _D	Maximum Power Dissipation@T _C	T _C =25°C	96	W
		T _C =100°C	38	
	Maximum Power Dissipation@T _A ^③	T _A =25°C	4.2	
		T _A =70°C	2.7	

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	1.3	°C/W
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	30	°C/W
Drain-Source Avalanche Ratings			
$E_{AS}^{④}$	Avalanche Energy, Single Pulsed	400	mJ

Electrical Characteristics ($T_C=25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Condition	RU40120M			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V			1	μA
			T _J =125°C		30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	2		4	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
R _{DS(ON)} ^⑤	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =60A		2.7	4.5	mΩ
Diode Characteristics						
V _{SD} ^⑤	Diode Forward Voltage	I _{SD} =60A, V _{GS} =0V			1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} =60A, dI _{SD} /dt=100A/μs		33		ns
Q _{rr}	Reverse Recovery Charge			30		nC
Dynamic Characteristics ^⑥						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,F=1MHz		1.8		Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, Frequency=1.0MHz		3700		pF
C _{oss}	Output Capacitance			680		
C _{rss}	Reverse Transfer Capacitance			345		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =20V,I _{DS} =60A, V _{GEN} =10V,R _G =4.7Ω		36		ns
t _r	Turn-on Rise Time			205		
t _{d(OFF)}	Turn-off Delay Time			85		
t _f	Turn-off Fall Time			45		
Gate Charge Characteristics ^⑥						
Q _g	Total Gate Charge	V _{DS} =32V, V _{GS} =10V, I _{DS} =60A		90		nC
Q _{gs}	Gate-Source Charge			32		
Q _{gd}	Gate-Drain Charge			37		

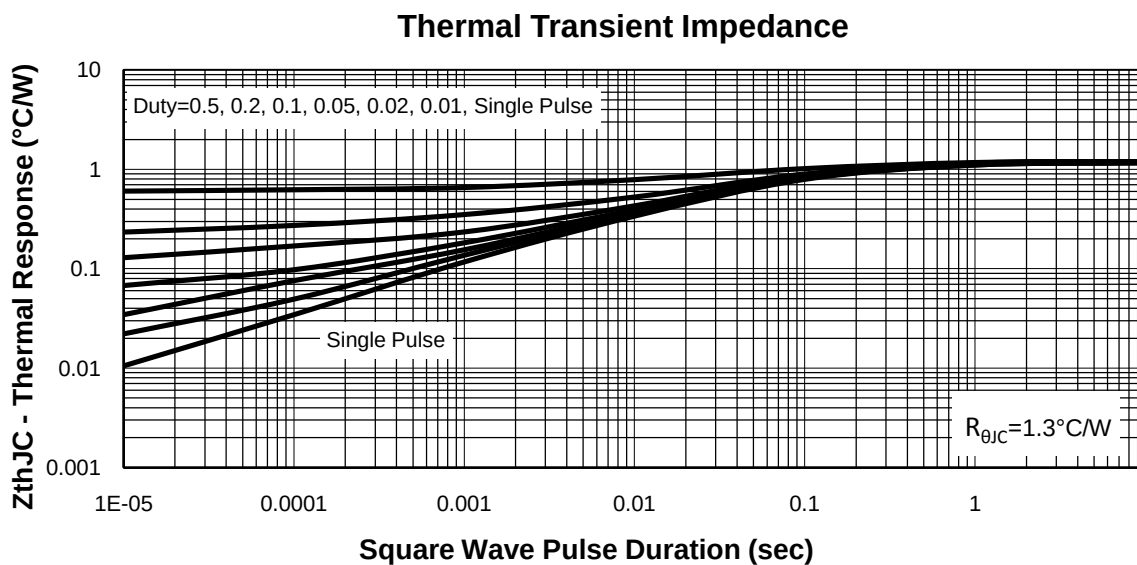
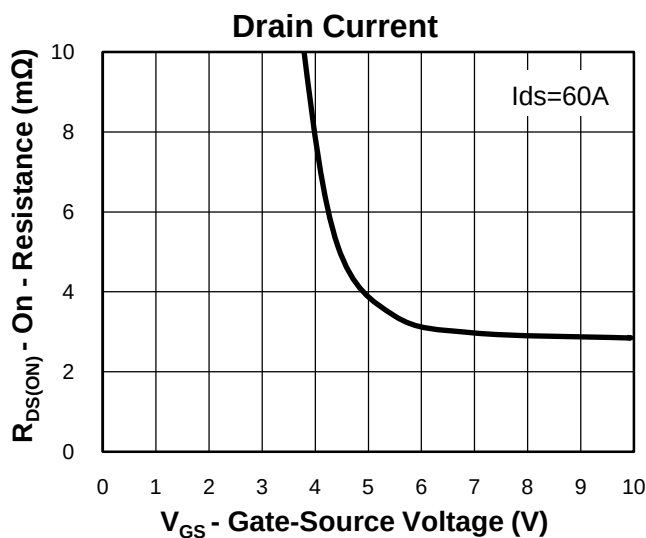
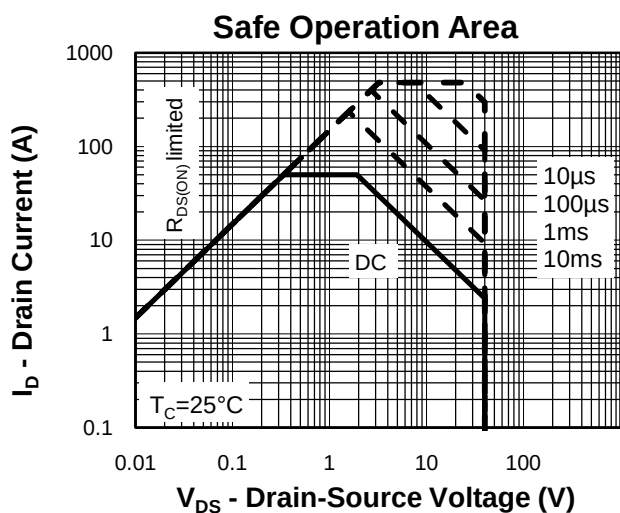
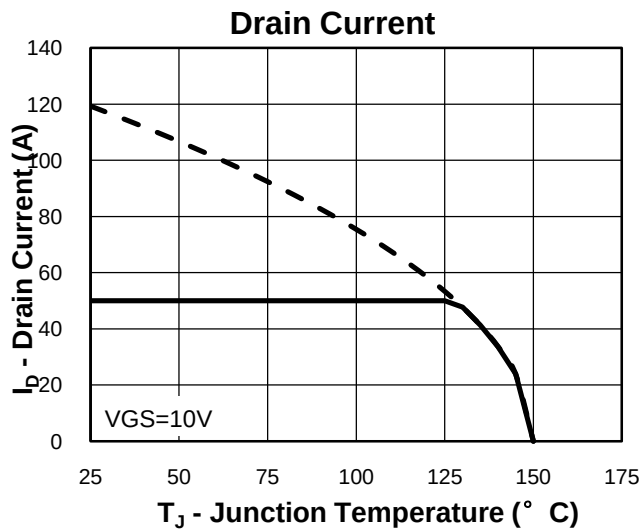
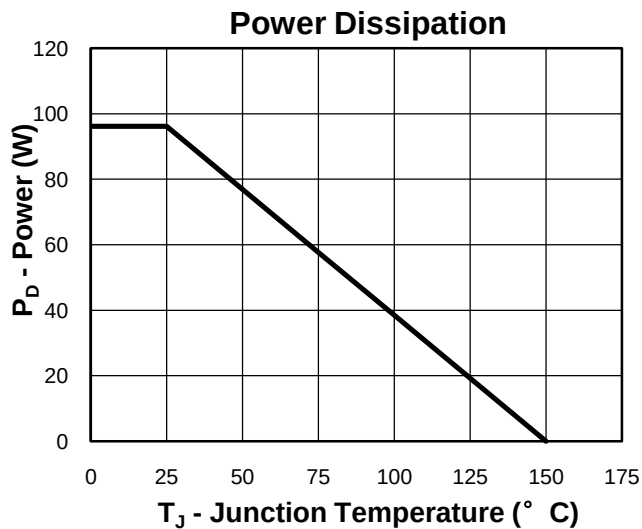
Notes:

- ①Pulse width limited by safe operating area.
- ②Calculated continuous current based on maximum allowable junction temperature. The package limitation current is 50A.
- ③When mounted on 1 inch square copper board, $t \leq 10\text{sec}$.
- ④Limited by $T_{J\max}$, $I_{AS} = 40\text{A}$, $V_{DD} = 32\text{V}$, $R_G = 50\Omega$, Starting $T_J = 25^\circ\text{C}$.
- ⑤Pulse test; Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
- ⑥Guaranteed by design, not subject to production testing.

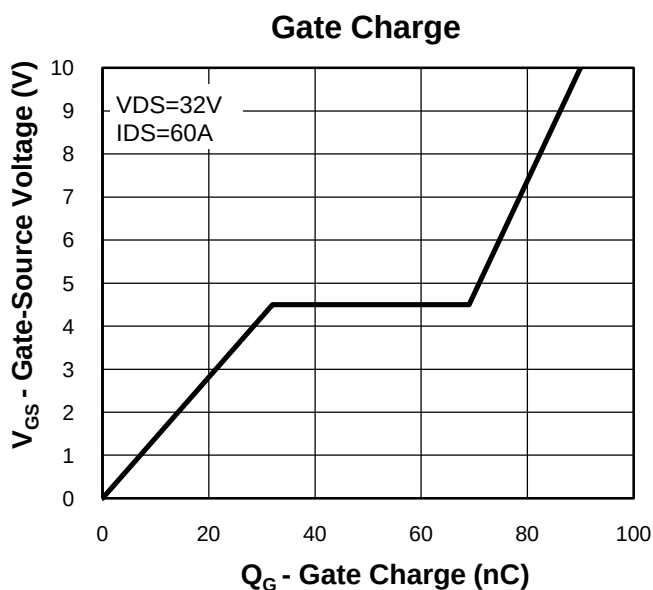
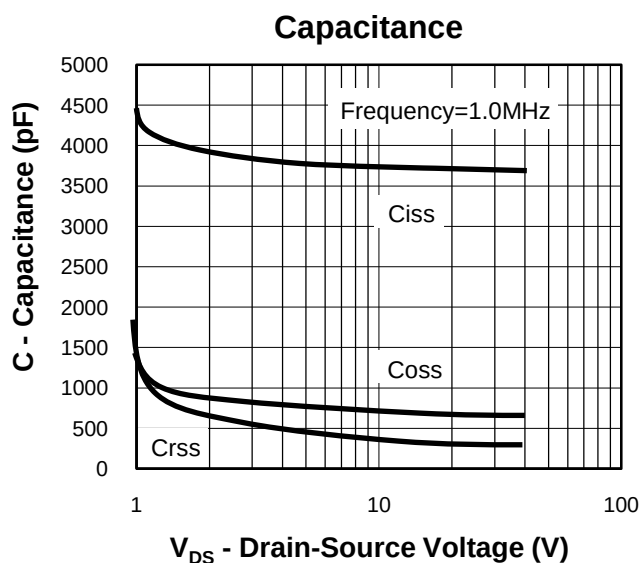
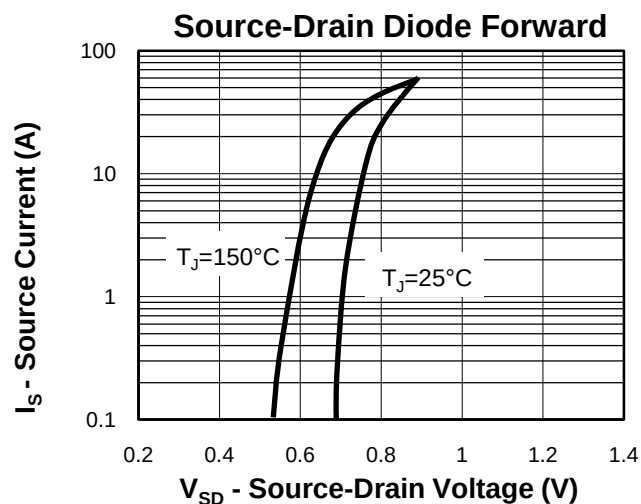
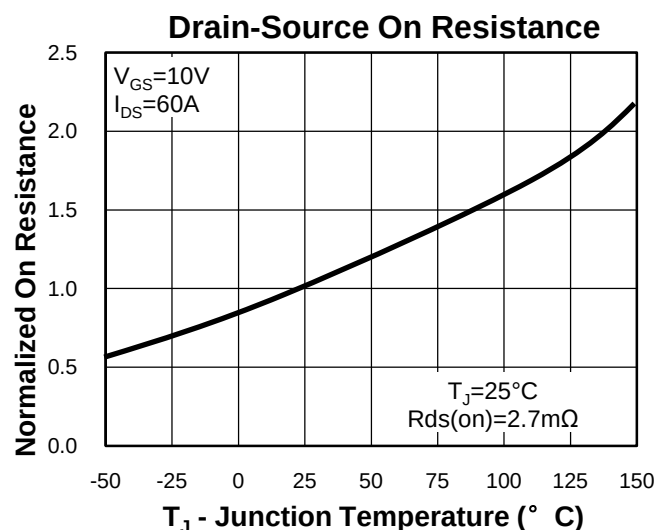
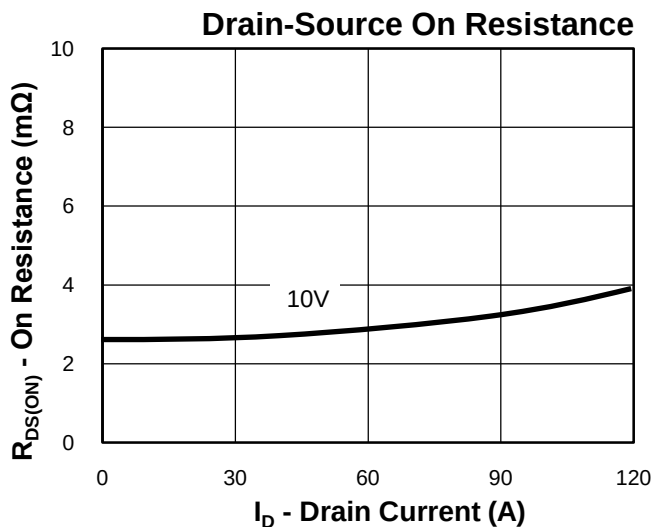
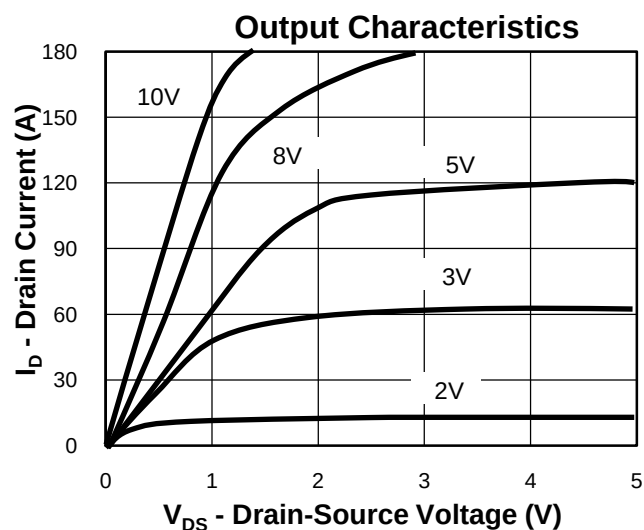
Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RU40120M	RU40120M	PDFN5060	Tape&Reel	3000	13"	12mm

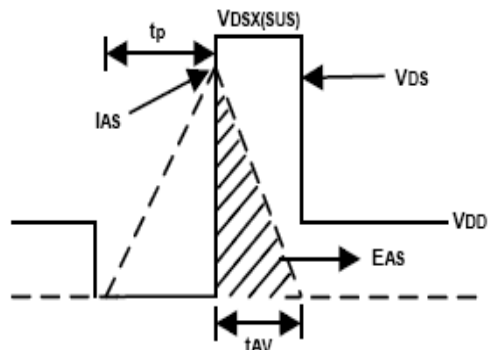
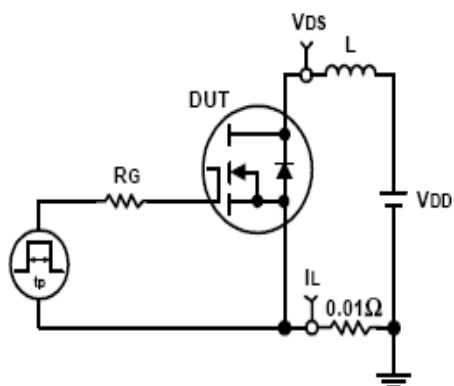
Typical Characteristics



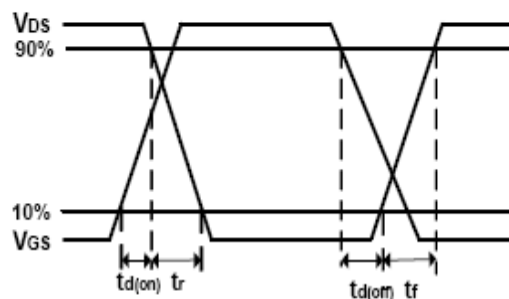
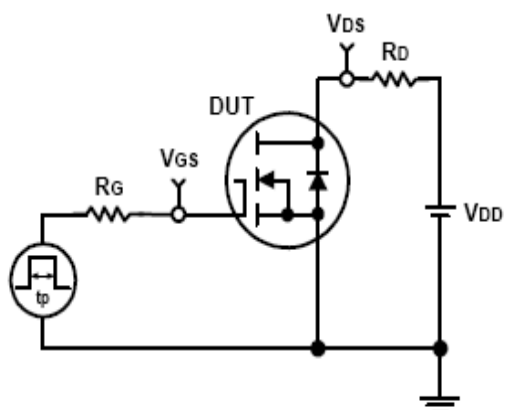
Typical Characteristics



Avalanche Test Circuit and Waveforms

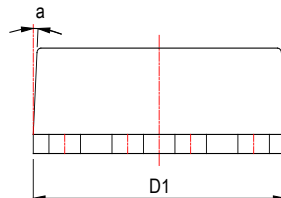
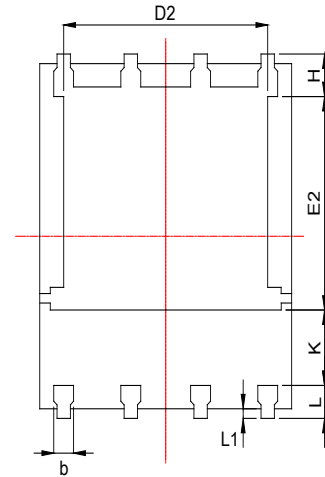
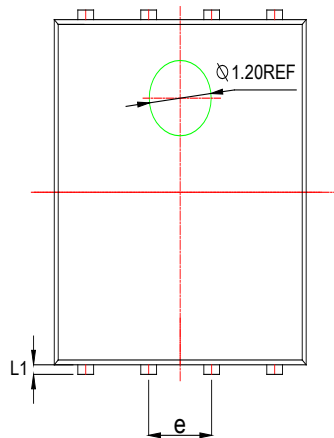
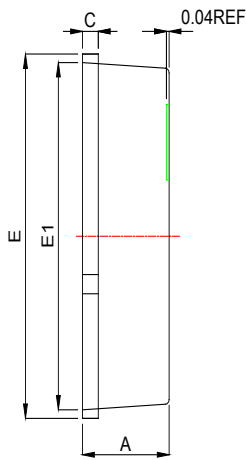


Switching Time Test Circuit and Waveforms

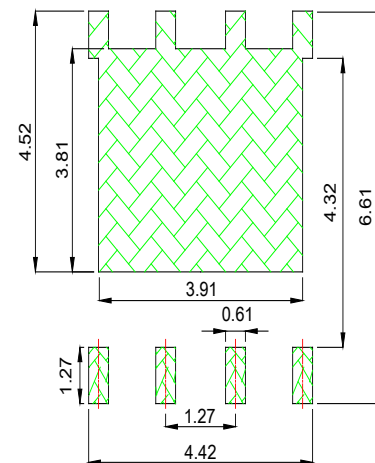


Package Information

PDFN5060



Land Pattern
(Only for Reference)



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	1.00	1.10	0.035	0.039	0.043
b	0.33	0.42	0.51	0.013	0.017	0.020
c	0.20	0.25	0.30	0.008	0.010	0.012
D1	4.80	4.90	5.00	0.189	0.193	0.197
D2	3.61	3.79	3.96	0.142	0.149	0.156
E	5.90	6.00	6.10	0.232	0.236	0.240
E1	5.65	5.75	5.85	0.222	0.226	0.230
E2	3.38	3.58	3.78	0.133	0.141	0.149
e	1.27 BSC			0.005 BSC		
H	0.41	0.51	0.61	0.016	0.020	0.024
k	1.10			0.043		
L	0.51	0.61	0.71	0.020	0.024	0.028
L1	0.06	0.13	0.20	0.002	0.005	0.008
a	0°		12°	0°		12°

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