

NCE N-Channel Enhancement Mode Power MOSFET

DESCRIPTION

The NCE3010S 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.

GENERAL FEATURES

- $V_{DS} = 30V, I_D = 10A$
 $R_{DS(ON)} < 13.5m\Omega @ V_{GS} = 10V$
 $R_{DS(ON)} < 20m\Omega @ V_{GS} = 4.5V$
- High density cell design for ultra low R_{dson}
- Fully characterized Avalanche voltage and current

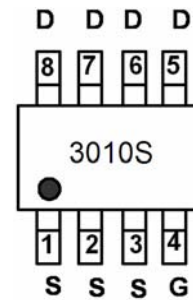
Application

- Power switching application
- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply

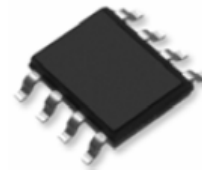
100% UIS TESTED!



Schematic diagram



Marking and pin Assignment



SOP-8 top view

Package Marking And Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
3010S	NCE3010S	SOP-8	Ø330mm	12mm	2500 units

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	10	A
Drain Current-Continuous($T_C=100^\circ C$)	$I_D(100^\circ C)$	6	A
Pulsed Drain Current	I_{DM}	50	A
Maximum Power Dissipation	P_D	2.5	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Case(Note 2)	$R_{\theta JC}$	50	°C/W
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Electrical Characteristics (TA=25°C unless otherwise noted)

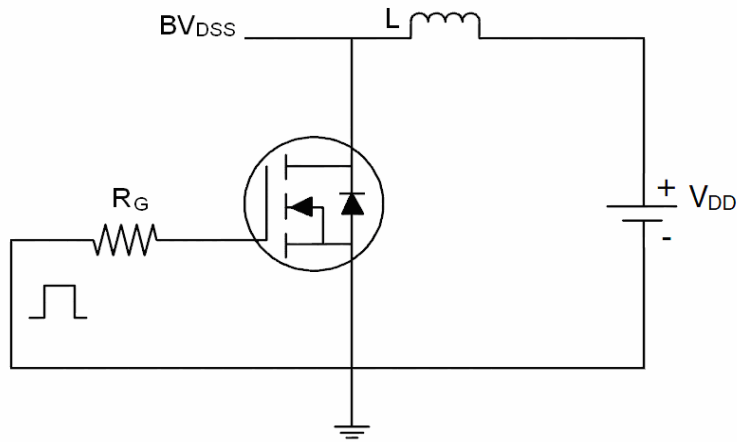
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$			1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1		3	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=10A$		11	13.5	m Ω
		$V_{GS}=4.5V, I_D=5A$		16.5	20	
Forward Transconductance	g_{FS}	$V_{DS}=15V, I_D=10A$	15			S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$		1550		PF
Output Capacitance	C_{oss}			300		PF
Reverse Transfer Capacitance	C_{rss}			180		PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=25V, I_D=1A$ $V_{GS}=10V, R_{GEN}=6\Omega$		30		nS
Turn-on Rise Time	t_r			20		nS
Turn-Off Delay Time	$t_{d(off)}$			100		nS
Turn-Off Fall Time	t_f			80		nS
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=10A,$ $V_{GS}=5V$		13		nC
Gate-Source Charge	Q_{gs}			5.5		nC
Gate-Drain Charge	Q_{gd}			3.5		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=10A$			1.2	V
Diode Forward Current (Note 2)	I_S				10	A

Notes:

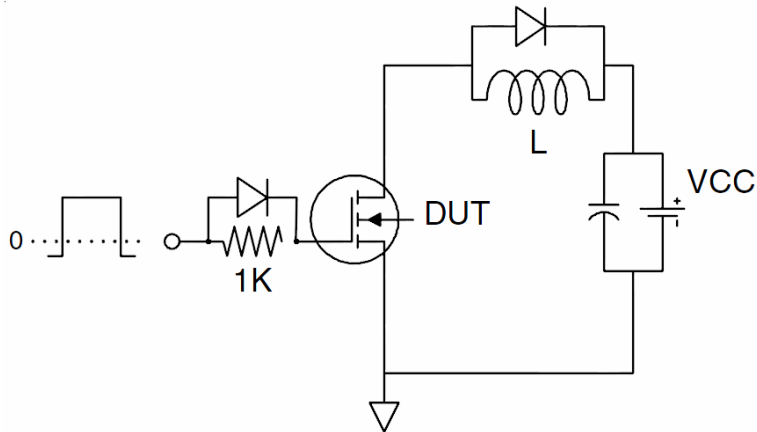
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Test circuit

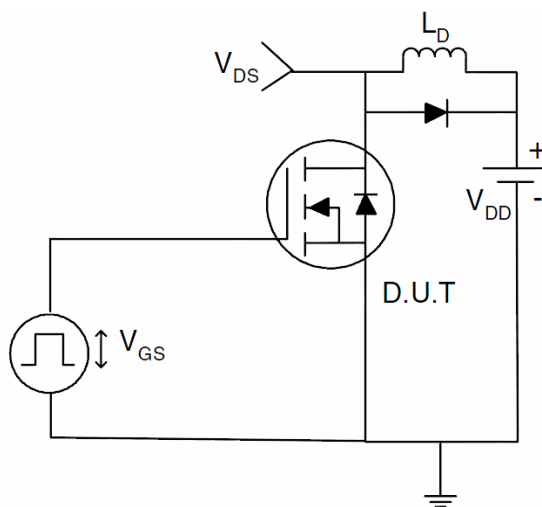
1) E_{AS} test Circuits



2) Gate charge test Circuit:



3) Switch Time Test Circuit:



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

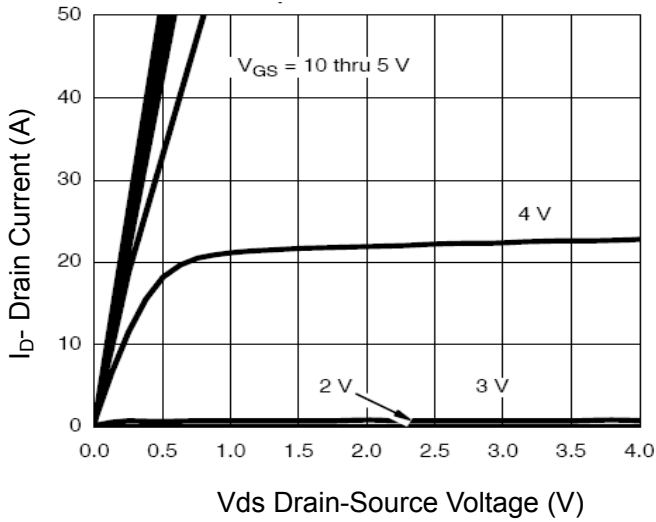


Figure 1 Output Characteristics

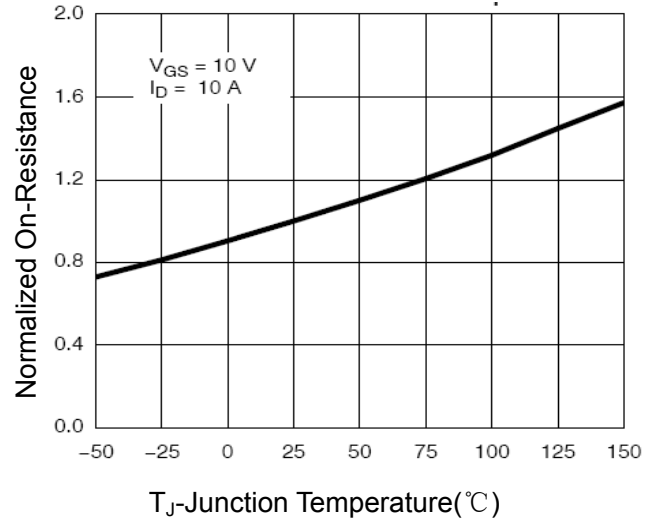


Figure 4 R_{dson} -Junction Temperature

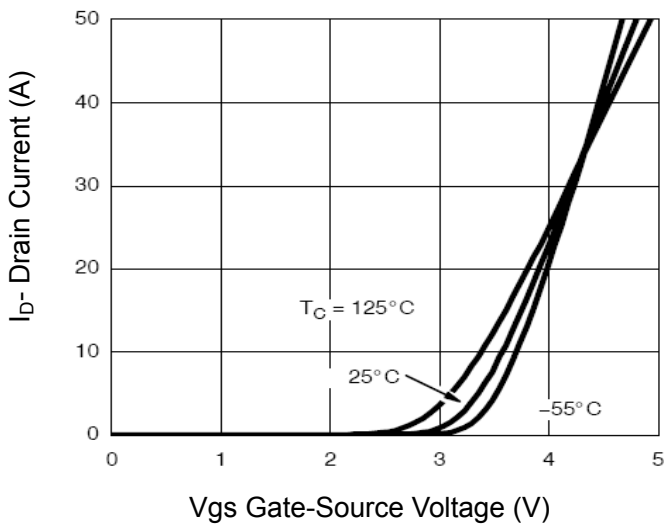


Figure 2 Transfer Characteristics

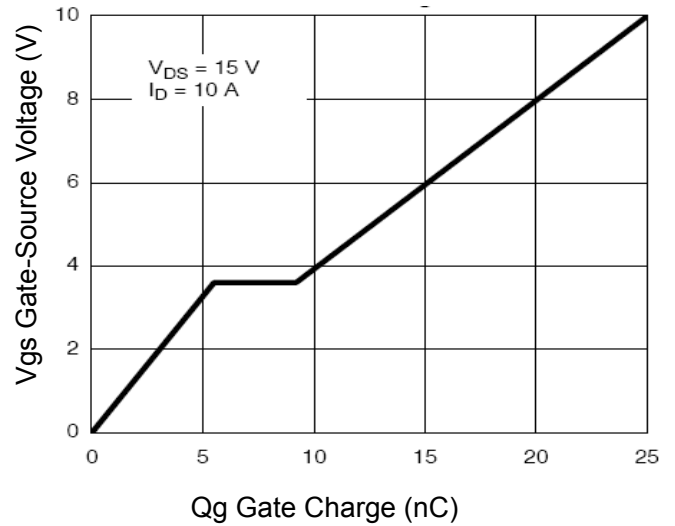


Figure 5 Gate Charge

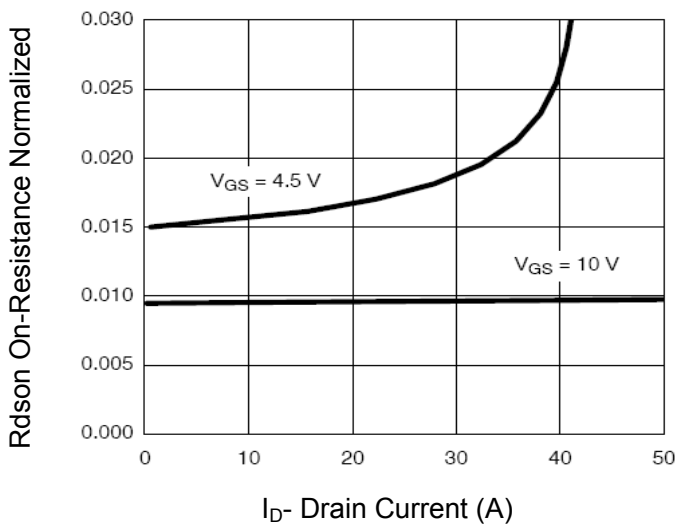


Figure 3 R_{dson} - Drain Current

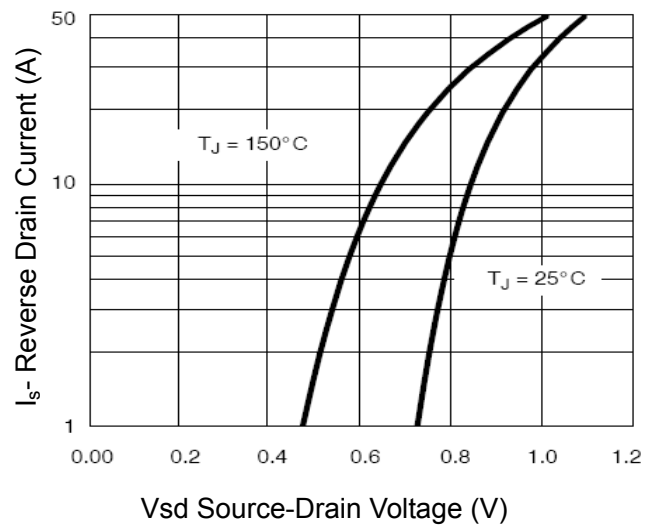
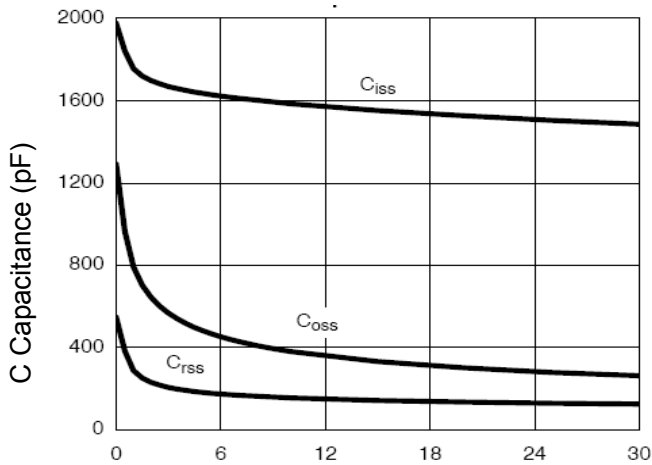
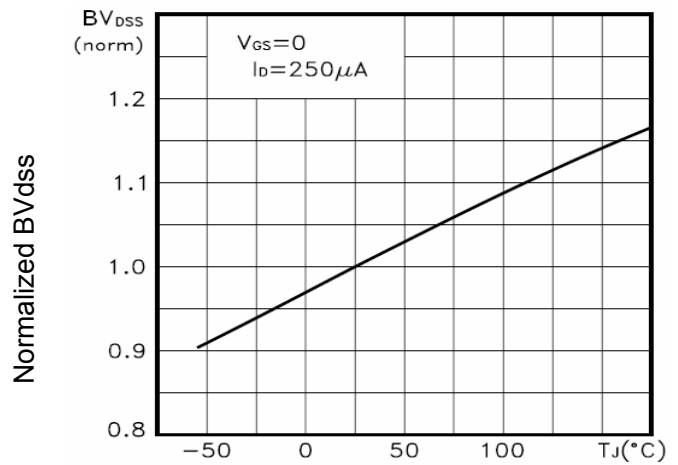


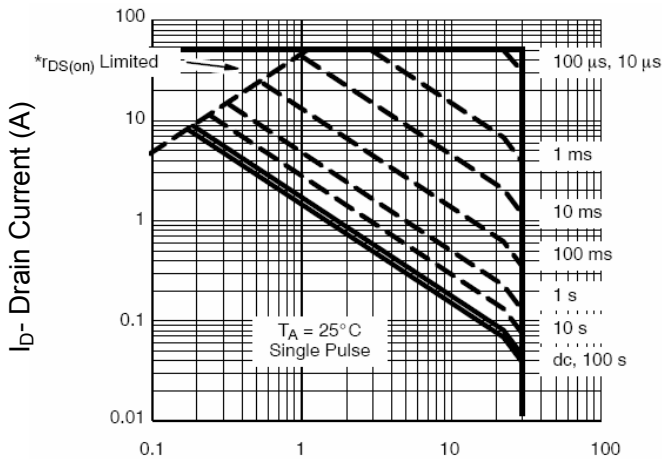
Figure 6 Source- Drain Diode Forward



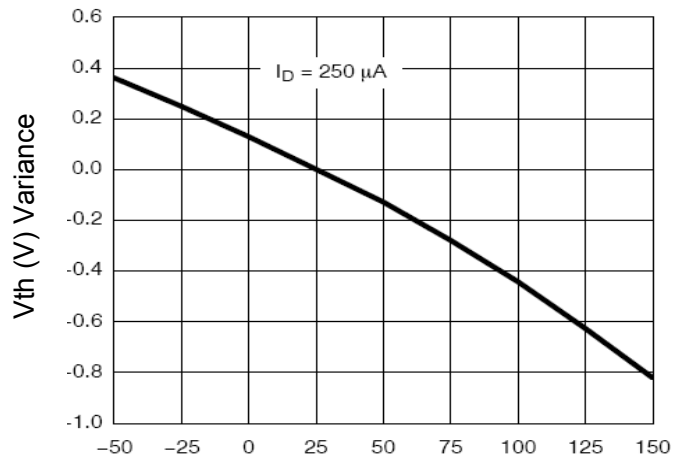
Vds Drain-Source Voltage (V)
Figure 7 Capacitance vs Vds



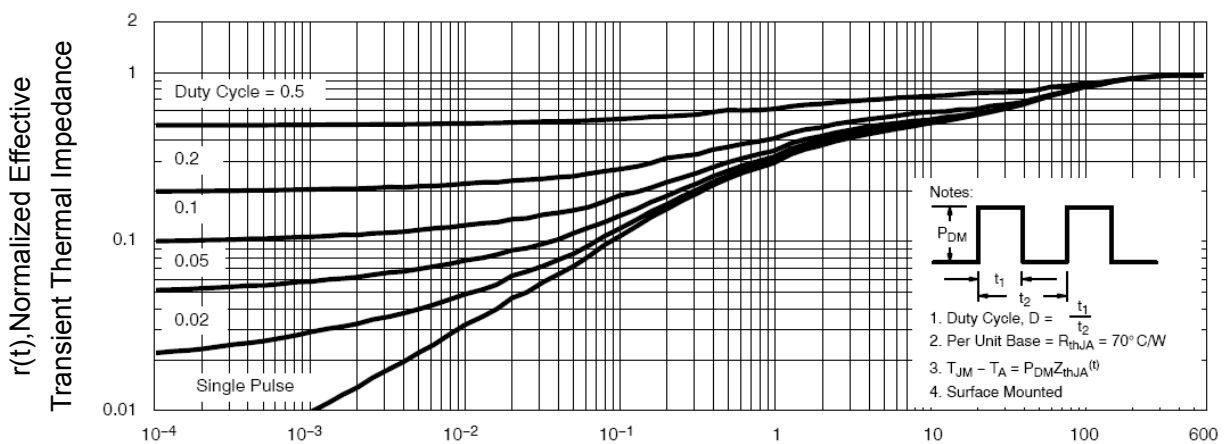
T_J-Junction Temperature(°C)
Figure 9 BV_{DSS} vs Junction Temperature



Vds Drain-Source Voltage (V)
Figure 8 Safe Operation Area

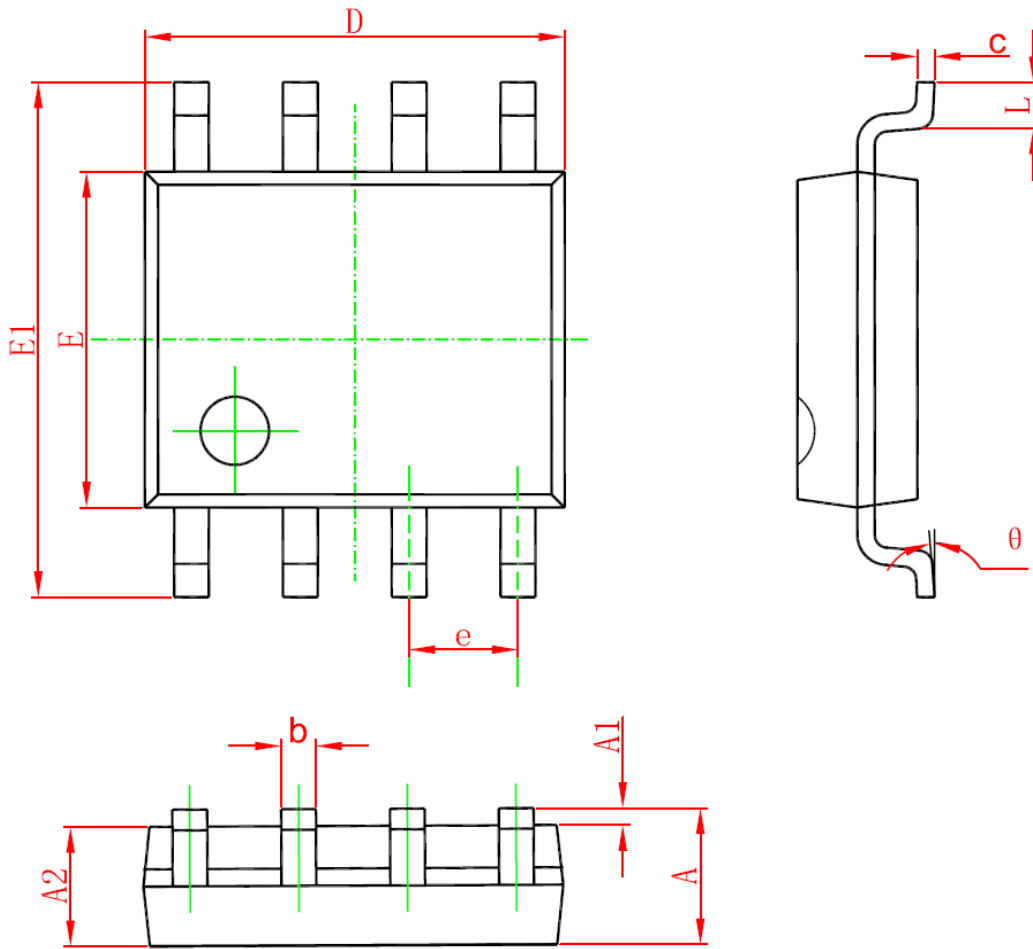


T_J-Junction Temperature(°C)
Figure 10 V_{GS(th)} vs Junction Temperature



Square Wave Pulse Duration(sec)
Figure 11 Normalized Maximum Transient Thermal Impedance

SOP-8 PACKAGE IN FORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

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