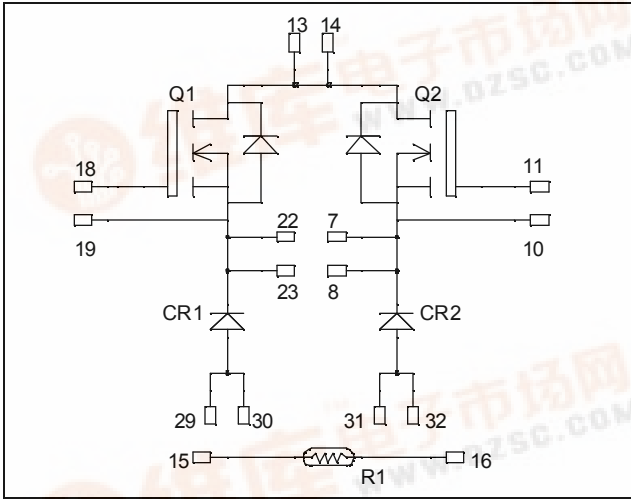




APTC60DSKM70T3G

Dual buck chopper Super Junction MOSFET Power Module

$V_{DSS} = 600V$
 $R_{DSon} = 70m\Omega \text{ max @ } T_j = 25^\circ C$
 $I_D = 39A \text{ @ } T_c = 25^\circ C$

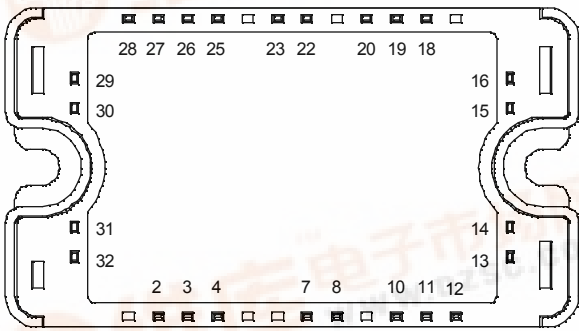


Application

- AC and DC motor control
- Switched Mode Power Supplies

Features

- **COOLMOS** Power Semiconductors
 - Ultra low R_{DSon}
 - Low Miller capacitance
 - Ultra low gate charge
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
 - Symmetrical design
- Internal thermistor for temperature monitoring
- High level of integration



Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- Low profile
- Each leg can be easily paralleled to achieve a single buck of twice the current capability
- RoHS Compliant

All multiple inputs and outputs must be shorted together
 Example: 13/14 ; 29/30 ; 22/23 ...

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	600	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	39
		$T_c = 80^\circ C$	29
I_{DM}	Pulsed Drain current	160	A
V_{GS}	Gate - Source Voltage	± 20	V
R_{DSon}	Drain - Source ON Resistance	70	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	250
I_{AR}	Avalanche current (repetitive and non repetitive)	20	A
E_{AR}	Repetitive Avalanche Energy	1	mJ
E_{AS}	Single Pulse Avalanche Energy	1800	

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com



All ratings @ $T_j = 25^\circ\text{C}$ unless otherwise specified

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} = 0V, V _{DS} = 600V T _j = 25°C			25	μA
		V _{GS} = 0V, V _{DS} = 600V T _j = 125°C			250	
R _{DS(on)}	Drain – Source on Resistance	V _{GS} = 10V, I _D = 39A			70	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = 2.7mA	2.1	3	3.9	V
I _{GSS}	Gate – Source Leakage Current	V _{GS} = ±20 V, V _{DS} = 0V			±100	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C _{iss}	Input Capacitance	V _{GS} = 0V		7		nF
C _{oss}	Output Capacitance	V _{DS} = 25V		2.56		
C _{rss}	Reverse Transfer Capacitance	f = 1MHz		0.21		
Q _g	Total gate Charge	V _{GS} = 10V V _{Bus} = 300V I _D = 39A		259		nC
Q _{gs}	Gate – Source Charge			29		
Q _{gd}	Gate – Drain Charge			111		
T _{d(on)}	Turn-on Delay Time	Inductive Switching @ 125°C V _{GS} = 15V V _{Bus} = 400V I _D = 39A R _G = 5Ω		21		ns
T _r	Rise Time			30		
T _{d(off)}	Turn-off Delay Time			283		
T _f	Fall Time			84		
E _{on}	Turn-on Switching Energy	Inductive switching @ 25°C V _{GS} = 15V, V _{Bus} = 400V I _D = 39A, R _G = 5Ω		670		μJ
E _{off}	Turn-off Switching Energy			980		
E _{on}	Turn-on Switching Energy	Inductive switching @ 125°C V _{GS} = 15V, V _{Bus} = 400V I _D = 39A, R _G = 5Ω		1096		μJ
E _{off}	Turn-off Switching Energy			1206		

Chopper diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V _{RRM}	Maximum Peak Repetitive Reverse Voltage		600			V
I _{RM}	Maximum Reverse Leakage Current	V _R = 600V	T _j = 25°C		250	μA
			T _j = 125°C		500	
I _F	DC Forward Current			40		A
V _F	Diode Forward Voltage	I _F = 40A V _{GE} = 0V	T _j = 25°C		1.45	V
			T _j = 125°C		1.35	
t _{rr}	Reverse Recovery Time	I _F = 40A V _R = 300V	T _j = 25°C		95	ns
			T _j = 125°C		115	
Q _{rr}	Reverse Recovery Charge	di/dt = 2600A/μs	T _j = 25°C		2.6	μC
			T _j = 125°C		4	

Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit	
R _{thJC}	Junction to Case Thermal Resistance	Transistor		0.5	°C/W	
		Diode		1.5		
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, I _{isol} <1mA, 50/60Hz	2500			V	
T _J	Operating junction temperature range	-40		150	°C	
T _{STG}	Storage Temperature Range	-40		125		
T _C	Operating Case Temperature	-40		100		
Torque	Mounting torque	To heatsink	M4	2.5	4.7	N.m
Wt	Package Weight				110	g

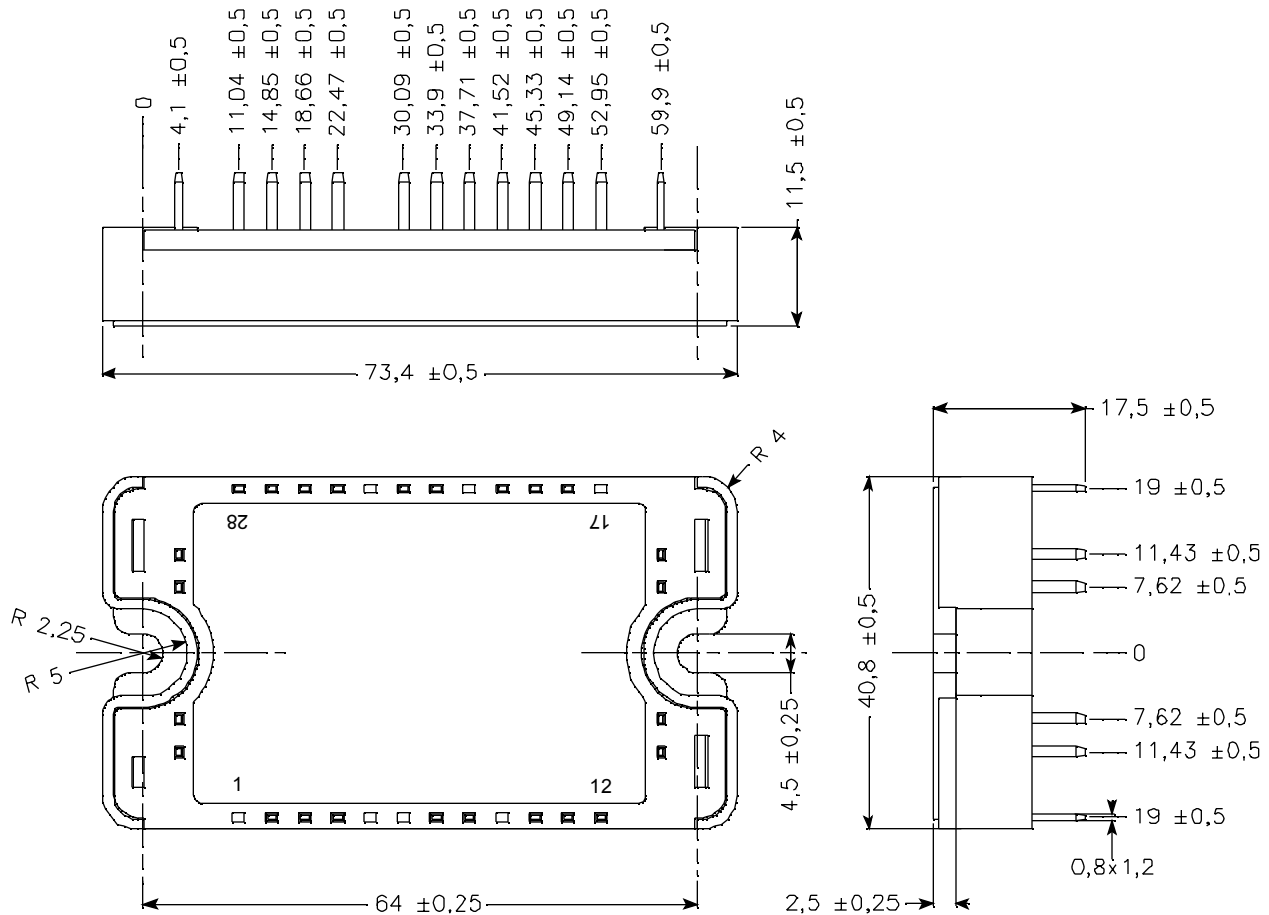
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		50		kΩ
B _{25/85}	T ₂₅ = 298.15 K		3952		K

$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

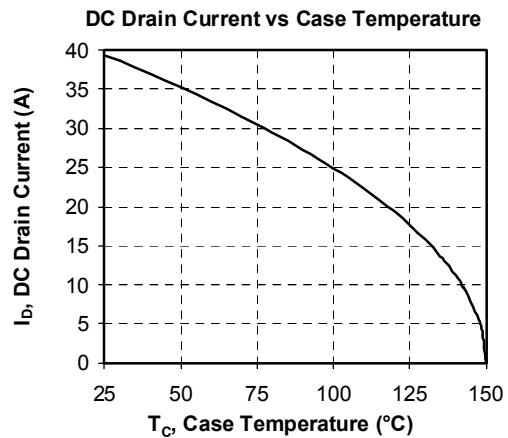
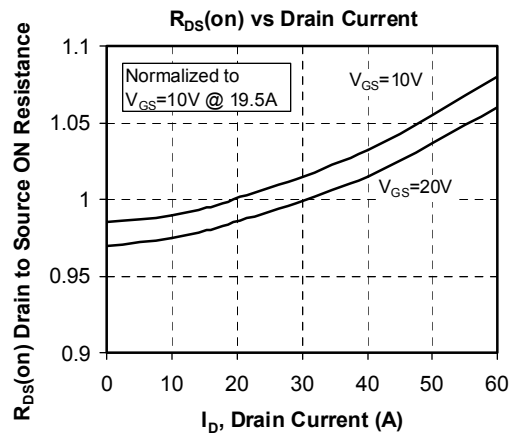
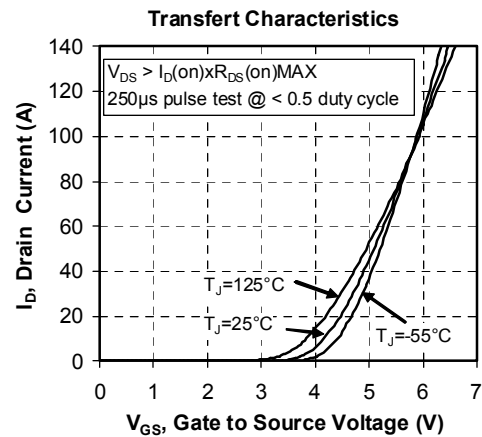
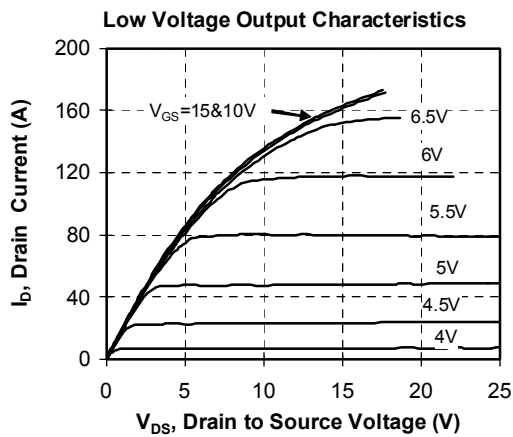
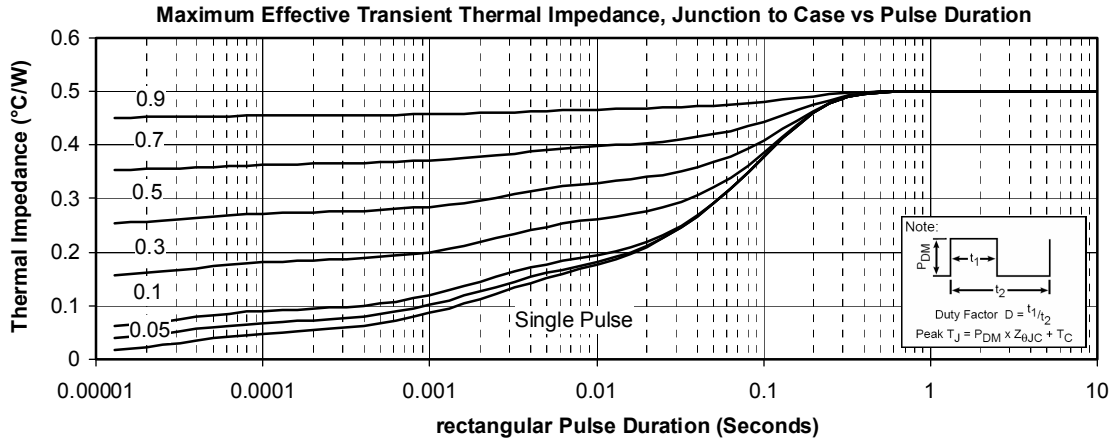
T: Thermistor temperature
 R_T: Thermistor value at T

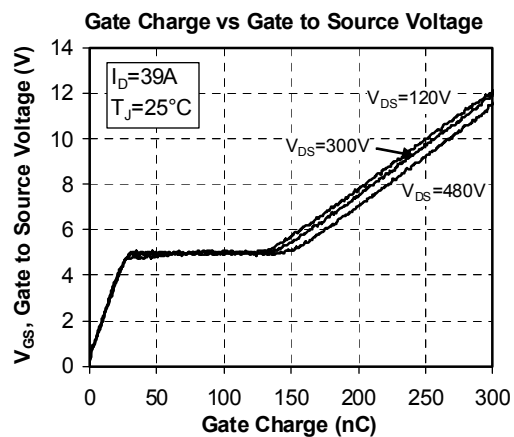
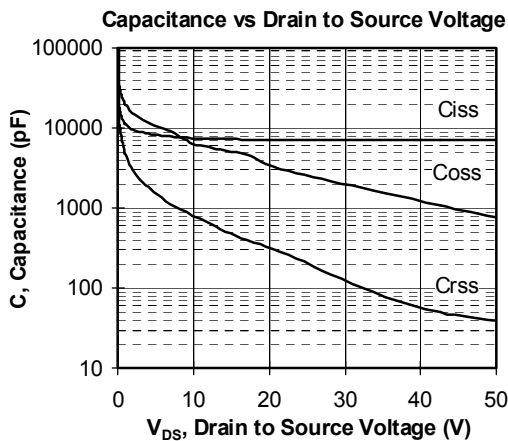
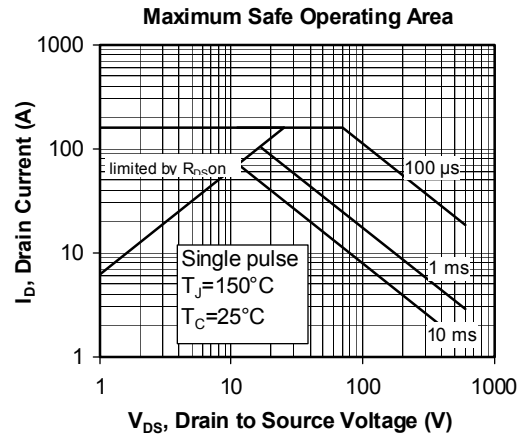
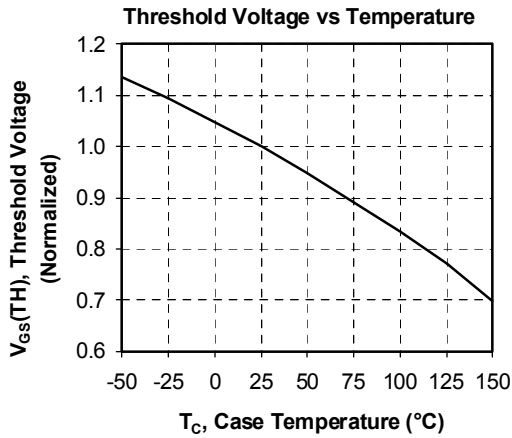
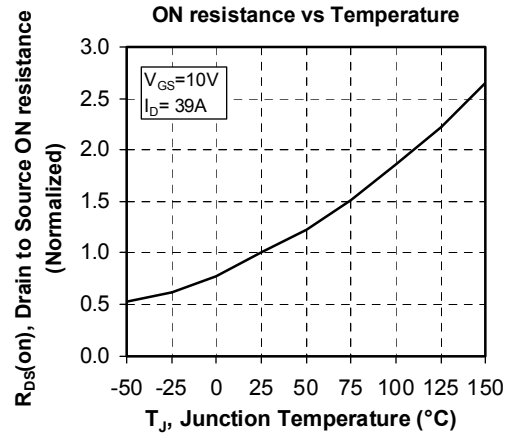
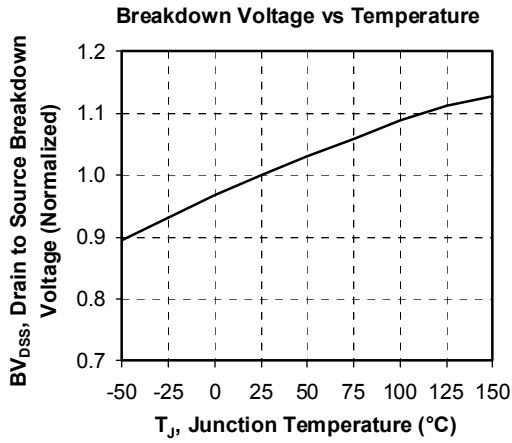
SP3 Package outline (dimensions in mm)

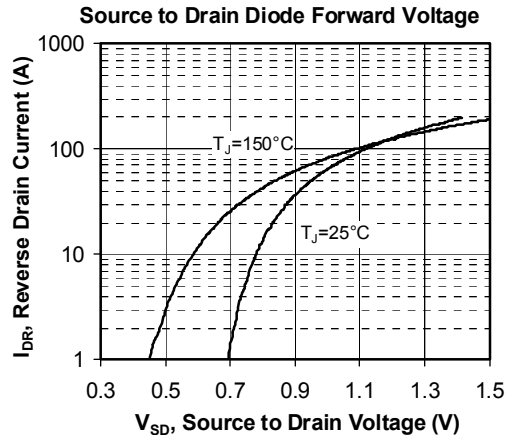
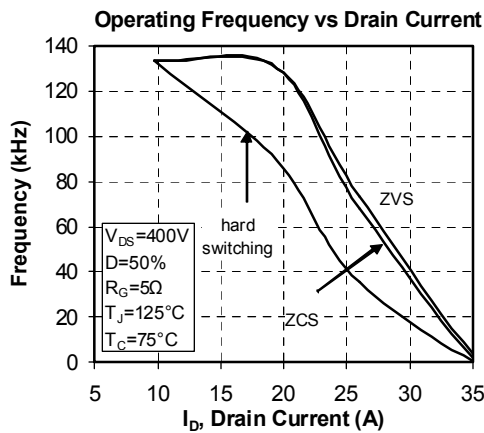
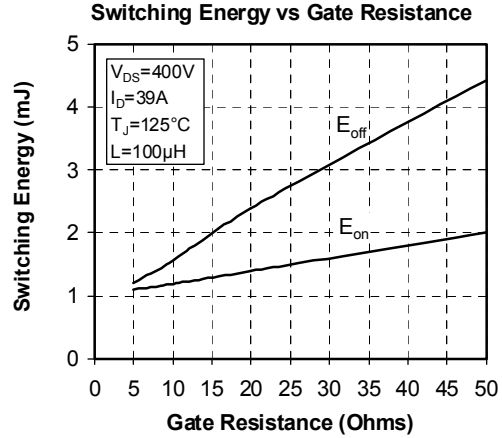
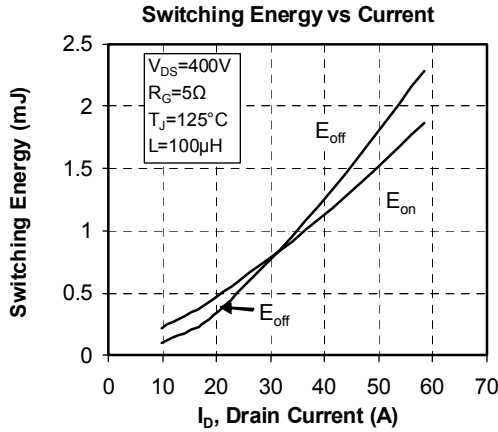
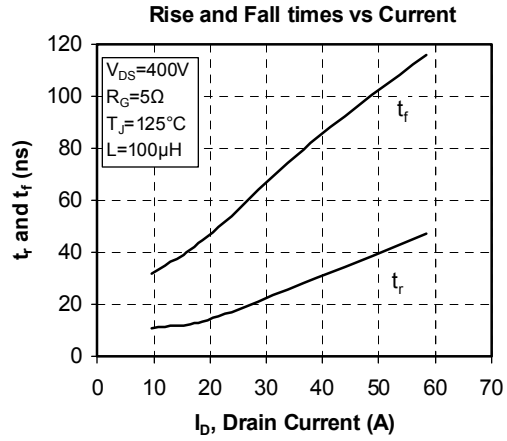
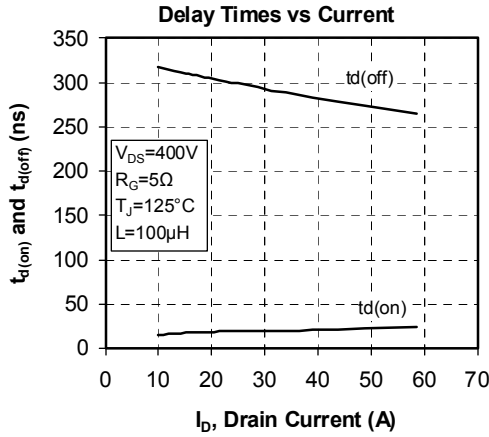


See application note 1901 - Mounting Instructions for SP3 Power Modules on www.microsemi.com

Typical Performance Curve







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