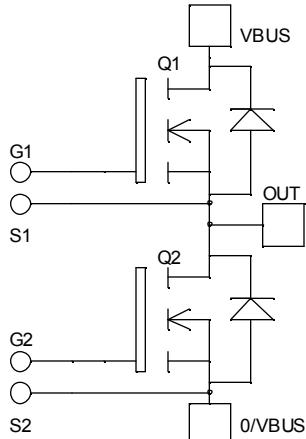


**Phase leg
MOSFET Power Module**

V_{DSS} = 200V
R_{DSon} = 4mΩ typ @ T_j = 25°C
I_D = 372A @ T_c = 25°C



Application

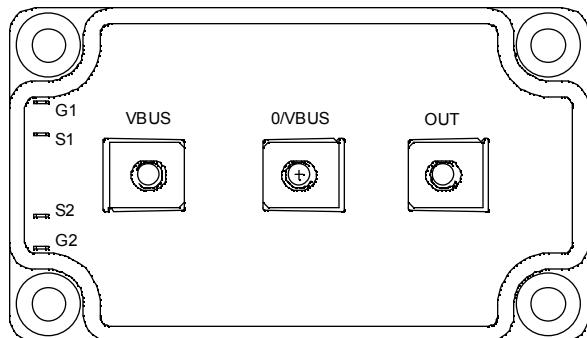
- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

Features

- Power MOS 7® FREDFETs
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Fast intrinsic reverse diode
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
 - Symmetrical design
 - M5 power connectors
- High level of integration

Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Low profile
- RoHS Compliant



Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V _{DSS}	Drain - Source Breakdown Voltage	200	V
I _D	Continuous Drain Current	T _c = 25°C	A
		T _c = 80°C	
I _{DM}	Pulsed Drain current	1488	
V _{GS}	Gate - Source Voltage	±30	V
R _{DSon}	Drain - Source ON Resistance	5	mΩ
P _D	Maximum Power Dissipation	T _c = 25°C	W
I _{AR}	Avalanche current (repetitive and non repetitive)	100	A
E _{AR}	Repetitive Avalanche Energy	50	mJ
E _{AS}	Single Pulse Avalanche Energy	3000	

 **CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handing 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	$V_{GS} = 0\text{V}$, $V_{DS} = 200\text{V}$	$T_j = 25^\circ\text{C}$			500	μA
		$V_{GS} = 0\text{V}$, $V_{DS} = 160\text{V}$	$T_j = 125^\circ\text{C}$			2000	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10\text{V}$, $I_D = 186\text{A}$			4	5	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}$, $I_D = 10\text{mA}$		3		5	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30\text{ V}$, $V_{DS} = 0\text{V}$				± 200	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}$ $V_{DS} = 25\text{V}$ $f = 1\text{MHz}$			28.9		nF
C_{oss}	Output Capacitance				9.32		
C_{rss}	Reverse Transfer Capacitance				0.58		
Q_g	Total gate Charge	$V_{GS} = 10\text{V}$ $V_{Bus} = 100\text{V}$ $I_D = 372\text{A}$			560		nC
Q_{gs}	Gate – Source Charge				212		
Q_{gd}	Gate – Drain Charge				268		
$T_{d(on)}$	Turn-on Delay Time		Inductive switching @ 125°C		32		ns
T_r	Rise Time	$V_{GS} = 15\text{V}$			64		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 133\text{V}$			88		
T_f	Fall Time	$I_D = 372\text{A}$			116		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15\text{V}$, $V_{Bus} = 133\text{V}$ $I_D = 372\text{A}$, $R_G = 1.2\Omega$			3396		μJ
E_{off}	Turn-off Switching Energy				3716		
E_{on}	Turn-on Switching Energy		Inductive switching @ 125°C		3744		μJ
E_{off}	Turn-off Switching Energy	$V_{GS} = 15\text{V}$, $V_{Bus} = 133\text{V}$ $I_D = 372\text{A}$, $R_G = 1.2\Omega$			3944		

Source - Drain diode ratings and characteristics

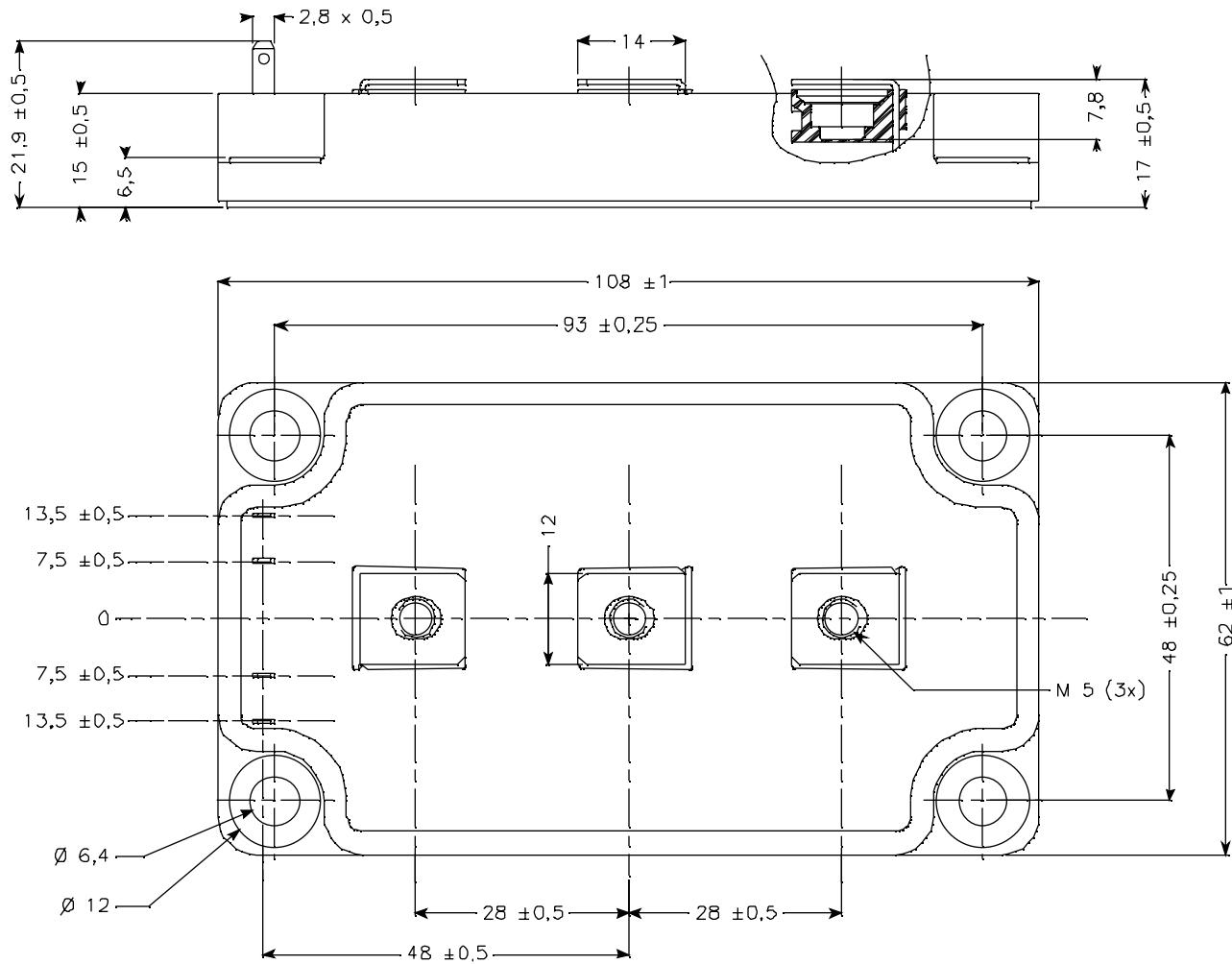
Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
I_S	Continuous Source current (Body diode)		$T_c = 25^\circ\text{C}$			372	A
			$T_c = 80^\circ\text{C}$			278	
V_{SD}	Diode Forward Voltage	$V_{GS} = 0\text{V}$, $I_S = -372\text{A}$				1.3	V
dv/dt	Peak Diode Recovery ①					5	V/ns
t_{rr}	Reverse Recovery Time	$I_S = -372\text{A}$ $V_R = 133\text{V}$ $dI_S/dt = 400\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$			230	ns
			$T_j = 125^\circ\text{C}$			450	
Q_{rr}	Reverse Recovery Charge	$I_S = -372\text{A}$ $V_R = 133\text{V}$ $dI_S/dt = 400\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$		3.6		μC
			$T_j = 125^\circ\text{C}$		13.6		

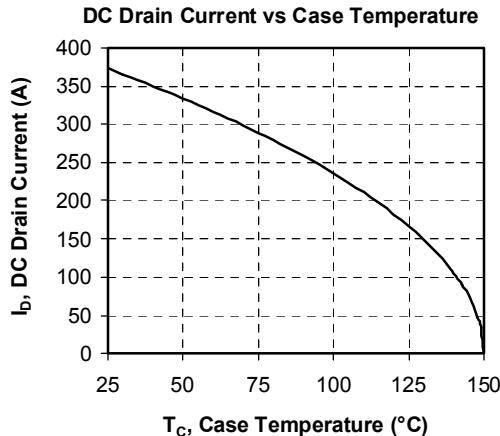
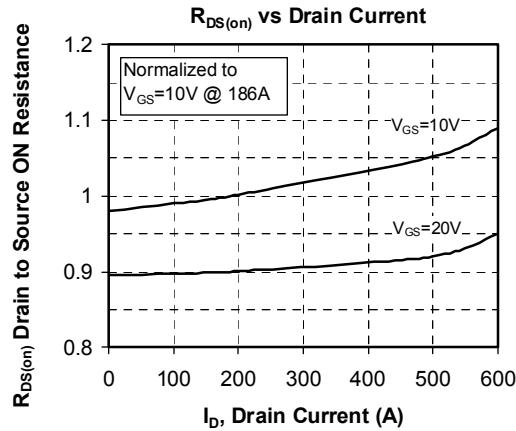
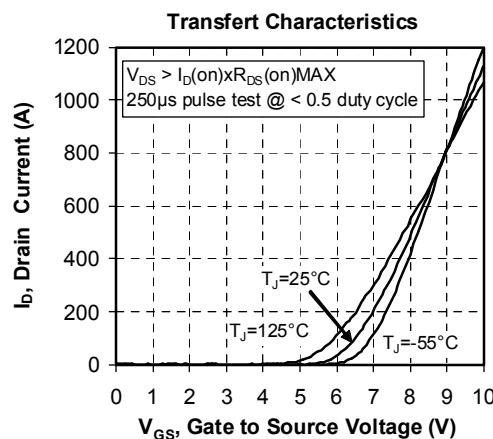
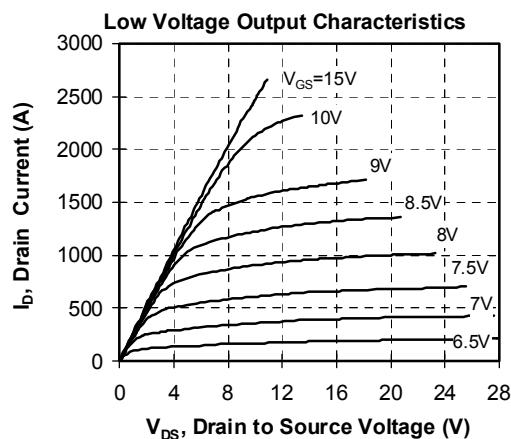
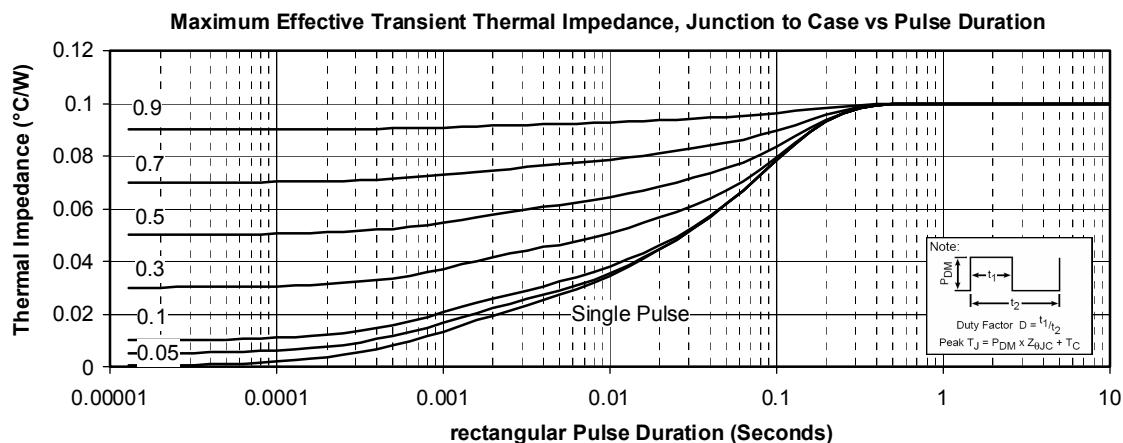
① dv/dt numbers reflect the limitations of the circuit rather than the device itself.

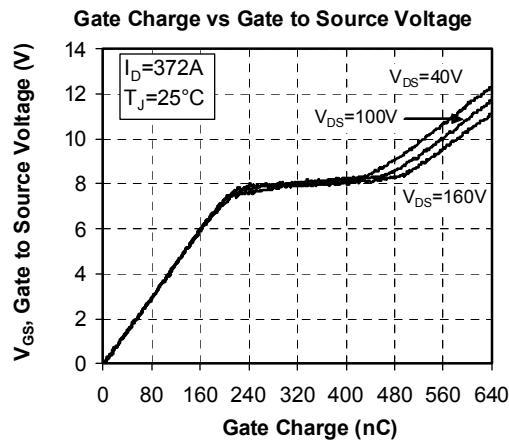
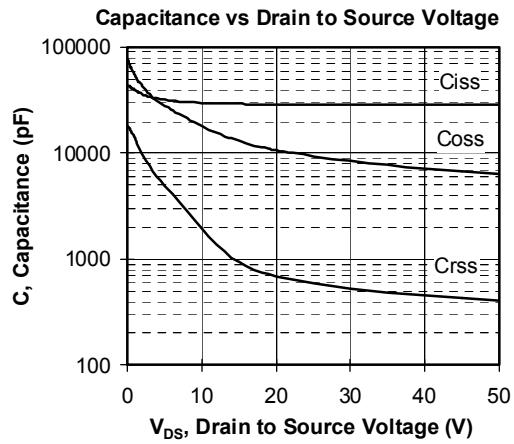
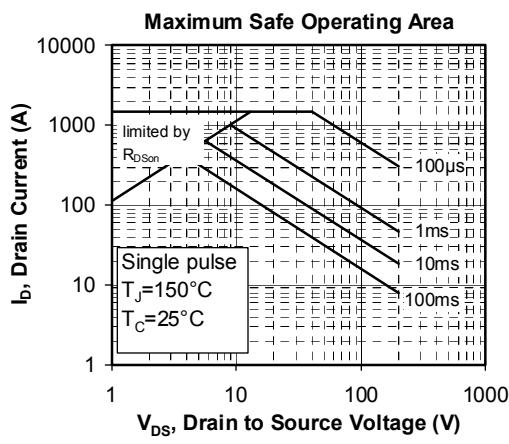
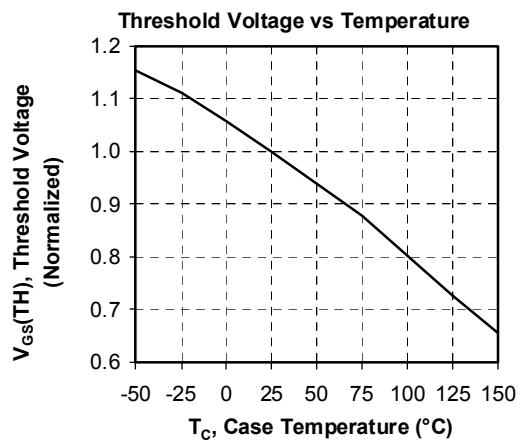
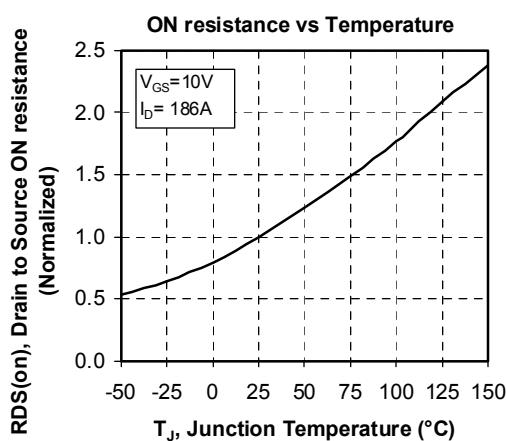
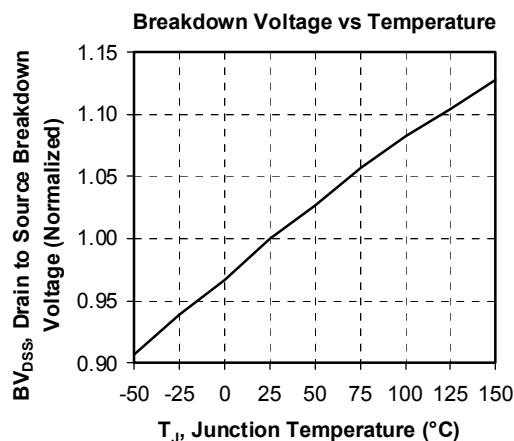
 $I_S \leq -372\text{A}$ $di/dt \leq 700\text{A}/\mu\text{s}$ $V_R \leq V_{DSS}$ $T_j \leq 150^\circ\text{C}$

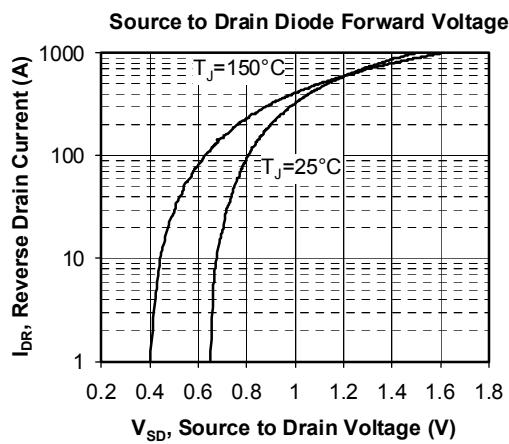
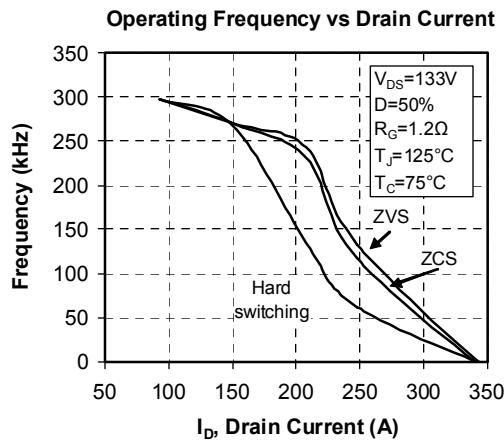
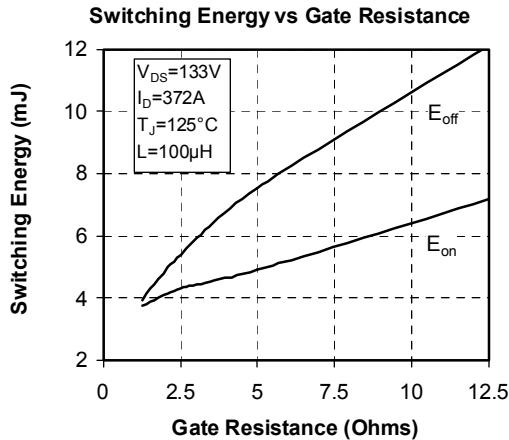
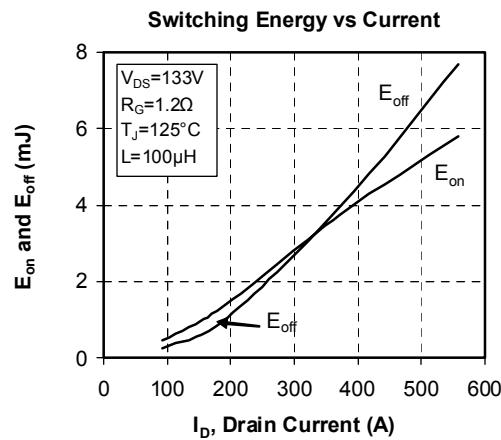
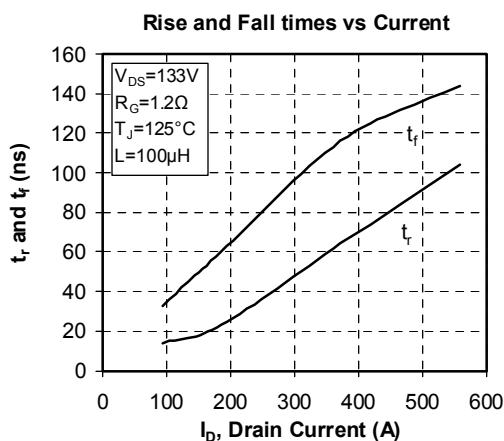
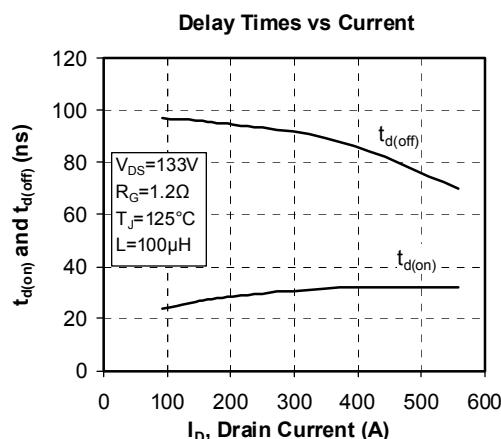
Thermal and package characteristics
Symbol **Characteristic**
Min **Typ** **Max** **Unit**

R_{thJC}	Junction to Case Thermal Resistance			0.1	$^{\circ}\text{C}/\text{W}$
V_{ISOL}	RMS Isolation Voltage, any terminal to case t = 1 min, Isol < 1mA, 50/60Hz	2500			V
T_J	Operating junction temperature range	-40		150	$^{\circ}\text{C}$
T_{STG}	Storage Temperature Range	-40		125	
T_C	Operating Case Temperature	-40		100	
Torque	Mounting torque	To heatsink	M6	3	N.m
		For terminals	M5	2	
Wt	Package Weight			280	g

SP6 Package outline (dimensions in mm)

 See application note APT0601 - Mounting Instructions for SP6 Power Modules on www.microsemi.com

Typical Performance Curve






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