

SKM 400GB123D

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SEMITRANS® 3

IGBT Modules

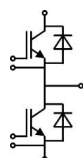
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Features

- MOS input (voltage controlled)
- N channel, homogeneous Si
- Low inductance case
- Very low tail current with low temperature dependence
- High short circuit capability, self limiting to $6 \times I_{Cnom}$
- Latch-up free
- Fast & soft CAL diodes
- Isolated copper baseplate using DBC Direct Copper Bonding Technology
- Large clearance (12 mm) and creepage distances (20 mm)

Typical Applications

- AC inverter drives
- UPS



GB

Absolute Maximum Ratings		$T_c = 25\text{ }^{\circ}\text{C}$, unless otherwise specified		
Symbol	Conditions	Values	Units	
IGBT				
V_{CES}	$T_j = 25\text{ }^{\circ}\text{C}$	1200	V	
I_C	$T_j = 150\text{ }^{\circ}\text{C}$	$T_{case} = 25\text{ }^{\circ}\text{C}$	400	A
		$T_{case} = 80\text{ }^{\circ}\text{C}$	330	A
I_{CRM}	$I_{CRM}=2 \times I_{Cnom}$	600	A	
V_{GES}		± 20	V	
t_{psc}	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125\text{ }^{\circ}\text{C}$ $V_{CES} < 1200\text{ V}$	10	μs	
Inverse Diode				
I_F	$T_j = 150\text{ }^{\circ}\text{C}$	$T_{case} = 25\text{ }^{\circ}\text{C}$	390	A
		$T_{case} = 80\text{ }^{\circ}\text{C}$	260	A
I_{FRM}	$I_{FRM}=2 \times I_{Fnom}$	600	A	
I_{FSM}	$t_p = 10\text{ ms}; \sin.$	$T_j = 150\text{ }^{\circ}\text{C}$	2880	A
Module				
$I_{t(RMS)}$		500	A	
T_{vj}		- 40...+ 150	$^{\circ}\text{C}$	
T_{stg}		- 40...+ 125	$^{\circ}\text{C}$	
V_{isol}	AC, 1 min.	2500	V	

Characteristics		$T_c = 25^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 12\text{ mA}$	4,5	5,5	6,5	V
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$		0,1	0,3	mA
V_{CE0}			$T_j = 25^\circ\text{C}$	1,4	V
			$T_j = 125^\circ\text{C}$	1,6	V
r_{CE}	$V_{GE} = 15\text{ V}$		$T_j = 25^\circ\text{C}$	3,66	$\text{m}\Omega$
			$T_j = 125^\circ\text{C}$	5	$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 300\text{ A}, V_{GE} = 15\text{ V}$		$T_j = ^\circ\text{C}_{chiplev.}$	2,5	V
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$		22	nF
C_{oes}				3,3	nF
C_{res}				1,2	nF
Q_G	$V_{GE} = -8\text{ V} - +20\text{ V}$			3000	nC
R_{Gint}	$T_j = ^\circ\text{C}$			1,25	Ω
$t_{d(on)}$	$R_{Gon} = 3,3\ \Omega$	$V_{CC} = 600\text{ V}$ $I_{Cnom} = 300\text{ A}$		200	ns
t_r				115	ns
E_{on}	$R_{Goff} = 3,3\ \Omega$	$T_j = 125^\circ\text{C}$ $V_{GE} = \pm 15\text{ V}$		38	mJ
$t_{d(off)}$				720	ns
t_f				80	ns
E_{off}				40	mJ
$R_{th(j-c)}$	per IGBT			0,05	K/W

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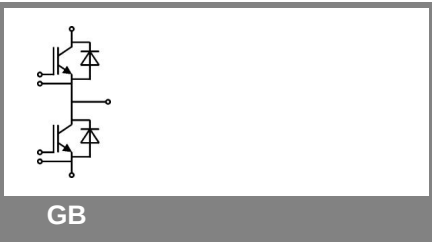
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Typical Applications

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Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 300\text{ A}$; $V_{GE} = 0\text{ V}$ $T_j = 25\text{ }^{\circ}\text{C}_{chiplev.}$ $T_j = 125\text{ }^{\circ}\text{C}_{chiplev.}$		2 1,8	2,5	V V
V_{F0}	$T_j = 25\text{ }^{\circ}\text{C}$ $T_j = 125\text{ }^{\circ}\text{C}$		1,1	1,2	V V
r_F	$T_j = 25\text{ }^{\circ}\text{C}$ $T_j = 125\text{ }^{\circ}\text{C}$		3	4,3	mΩ mΩ
I_{RRM} Q_{rr} E_{rr}	$I_{Fnom} = 300\text{ A}$ $di/dt = 2000\text{ A}/\mu\text{s}$ $V_{GE} = 0\text{ V}$; $V_{CC} = 600\text{ V}$		140 13		A μC mJ
$R_{th(j-c)D}$	per diode			0,125	K/W
Module					
L_{CE}			15	20	nH
$R_{CC'+EE'}$	res., terminal-chip $T_{case} = 25\text{ }^{\circ}\text{C}$ $T_{case} = 125\text{ }^{\circ}\text{C}$		0,35 0,5		mΩ mΩ
$R_{th(c-s)}$	per module			0,038	K/W
M_s	to heat sink M6	3		5	Nm
w				325	g

This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.

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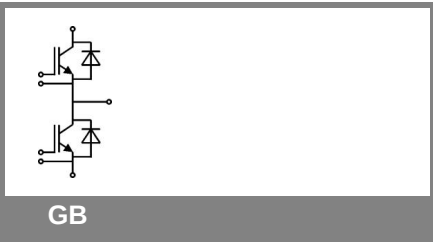
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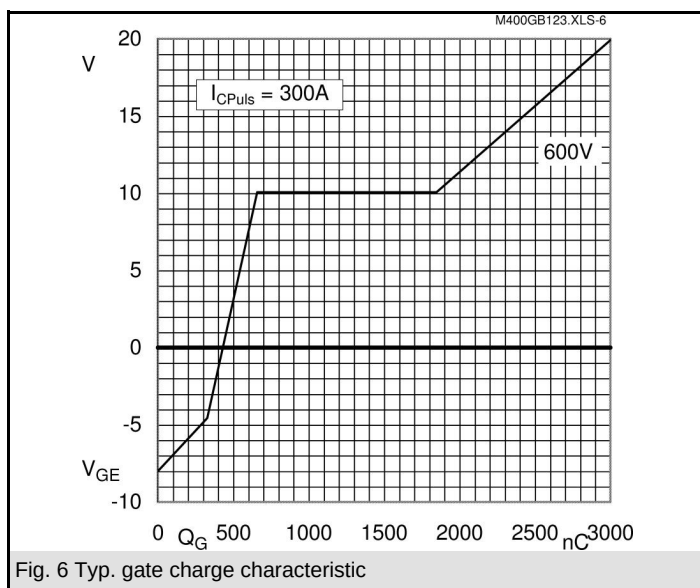
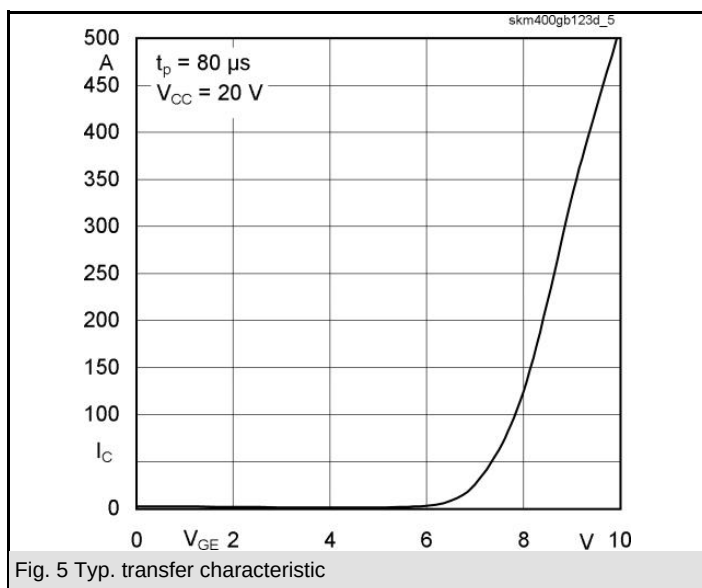
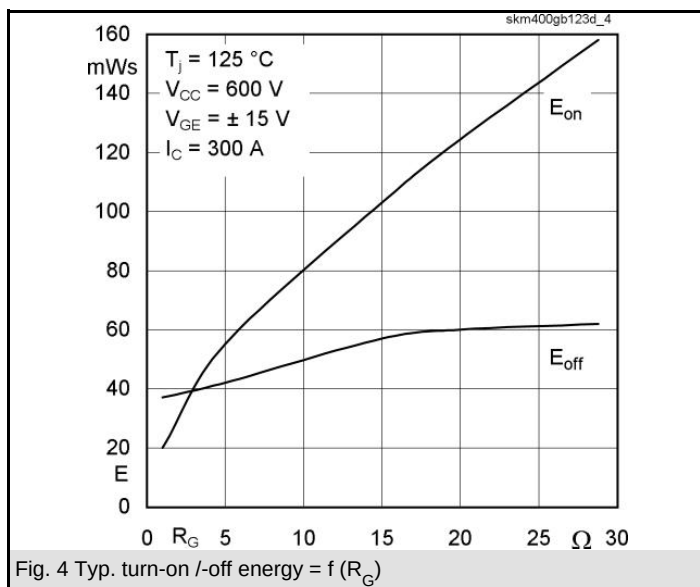
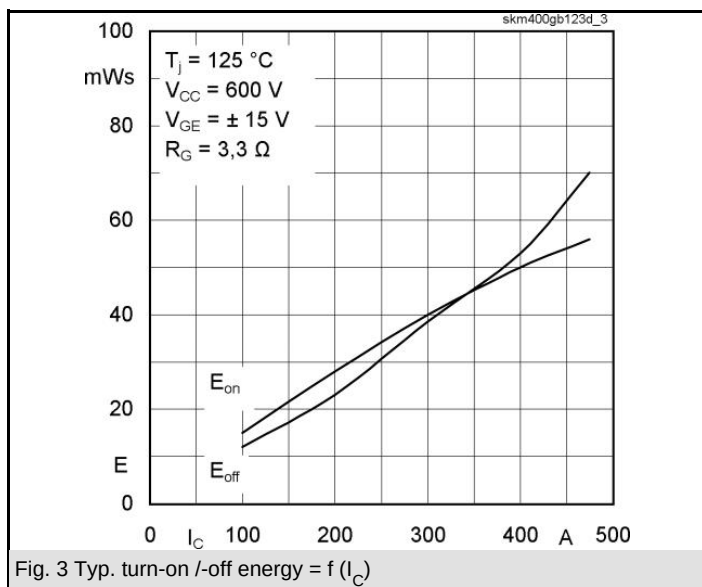
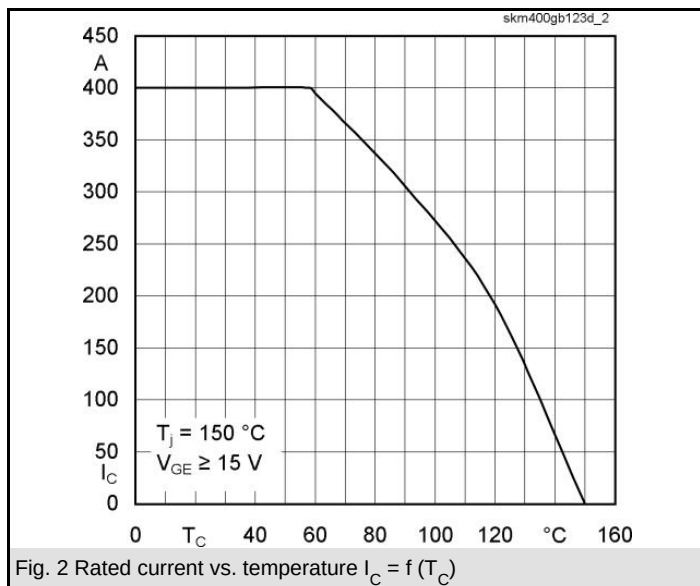
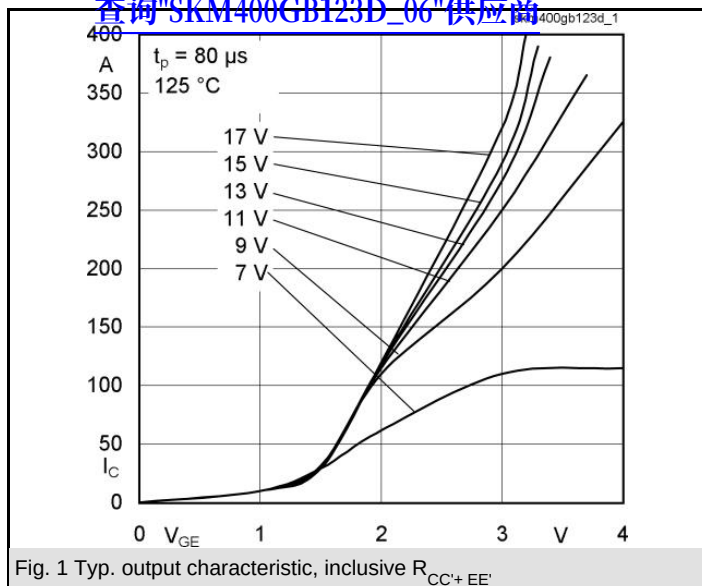
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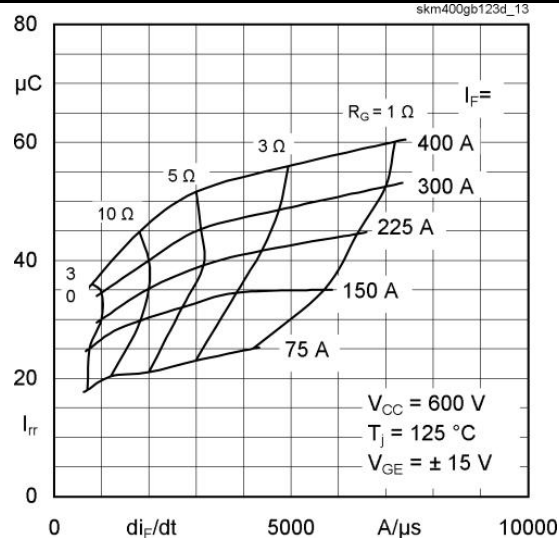
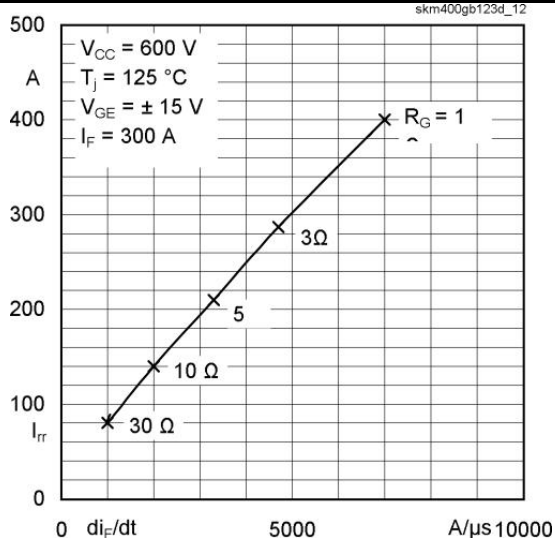
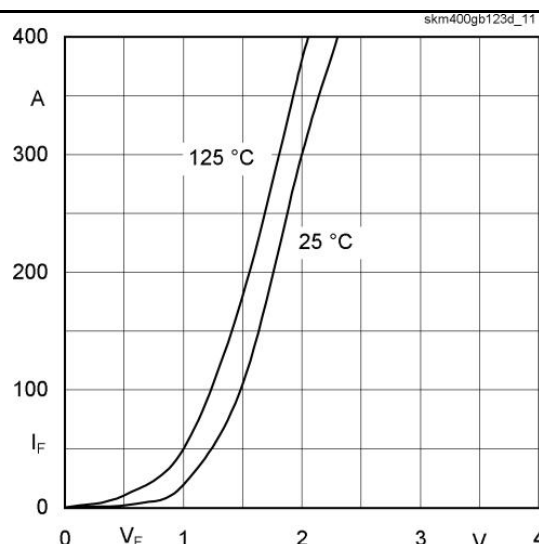
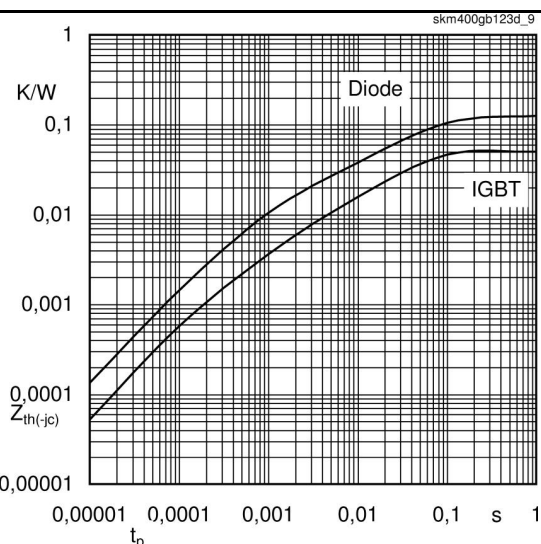
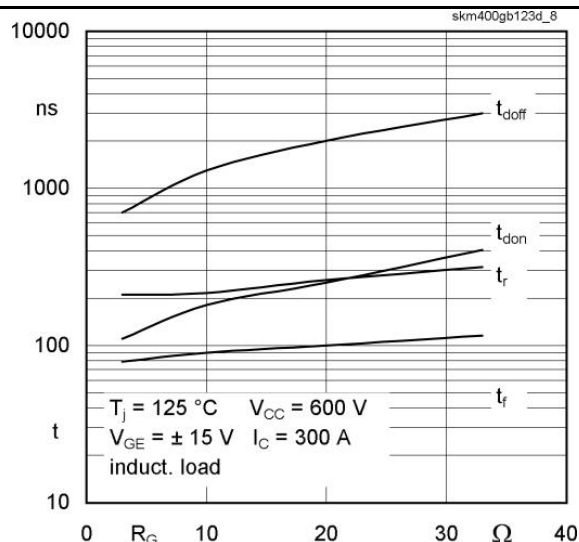
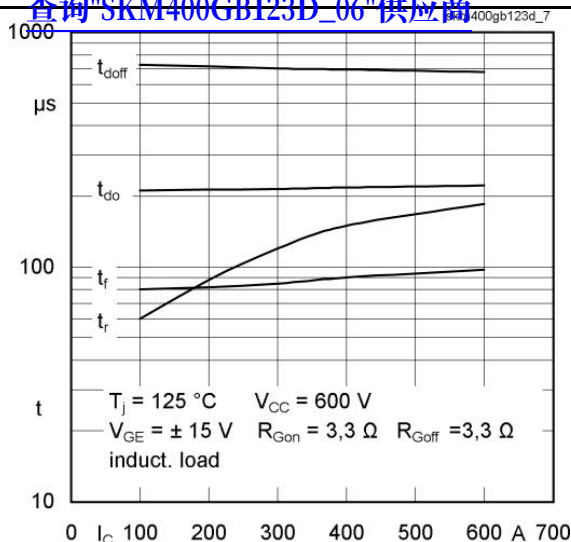


Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	$i = 1$	32	mk/W
R_i	$i = 2$	14	mk/W
R_i	$i = 3$	3,4	mk/W
R_i	$i = 4$	0,6	mk/W
τ_{ui}	$i = 1$	0,0447	s
τ_{ui}	$i = 2$	0,0122	s
τ_{ui}	$i = 3$	0,004	s
τ_{ui}	$i = 4$	0,0002	s
$Z_{th(j-c)D}$			
R_i	$i = 1$	80	mk/W
R_i	$i = 2$	33	mk/W
R_i	$i = 3$	10,2	mk/W
R_i	$i = 4$	1,8	mk/W
τ_{ui}	$i = 1$	0,05	s
τ_{ui}	$i = 2$	0,0057	s
τ_{ui}	$i = 3$	0,0034	s
τ_{ui}	$i = 4$	0,0003	s

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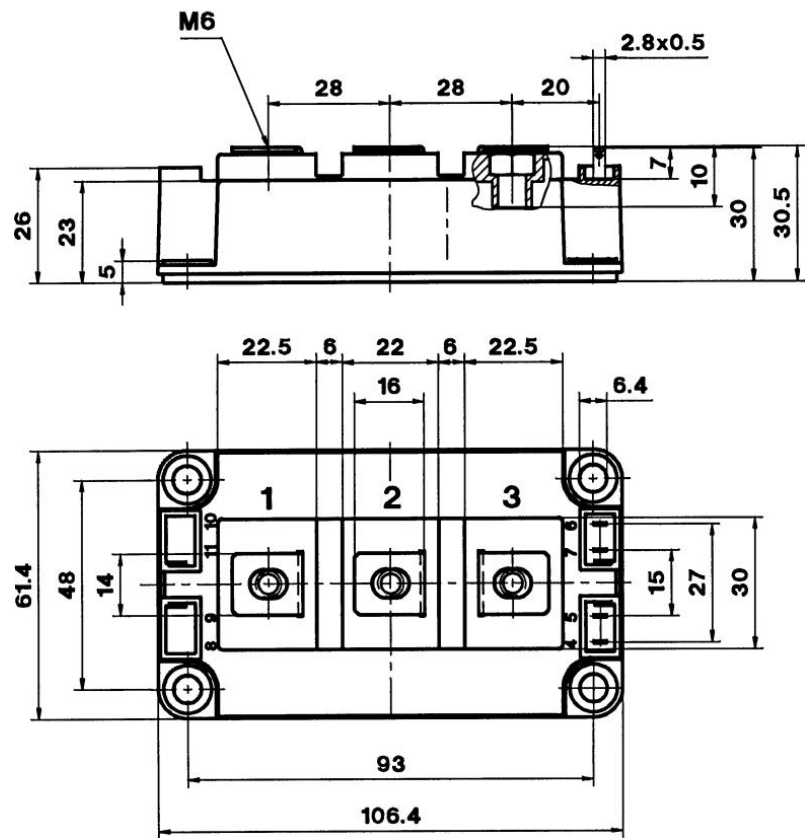


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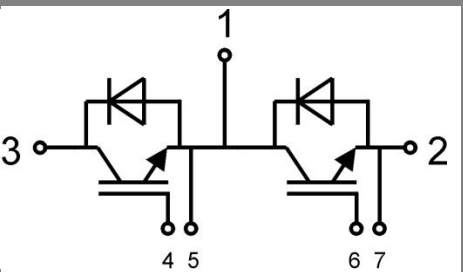


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Case D 56



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