

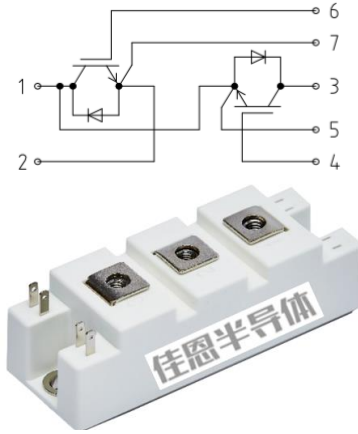
IGBT 34mm 半桥模块

Features 产品特性

- 1200V 75A $V_{CE(sat)(typ.)} = 2.5V$
- Planar Field-stop Technology 平面栅场截止技术
- High RBSOA Capability 高 RBSOA 性能
- Low Turn-off Losses 低关断损耗

Typical Application 典型应用

- Inductive Heating 感应加热
- Welding 电焊机
- High Frequency Switch Application 高频开关应用



IGBT Maximum Rated Values

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage ($T_{vj}=25^{\circ}C$) 集电极-发射极电压	1200	V
V_{GES}	Gate-Emitter Voltage 栅极-发射极峰值电压	± 20	V
I_C	Continuous Collector Current ($T_C=80^{\circ}C, T_{vj\ max}=150^{\circ}C$) 集电极连续直流电流	75	A
I_{CRM}	Repetitive Peak Collector Current 集电极可重复峰值电流	150	A
P_D	Maximum Power Dissipation ($T_C=25^{\circ}C, T_{vj\ max}=150^{\circ}C$) 总功率损耗	445	W

IGBT Characteristics

Symbol	Parameter	Test Condition	Min	Typ	Max	Units
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage 集电极-发射极饱和压降	$V_{GE}=15V, I_C=75A, T_{vj}=25^{\circ}C$	-	2.5	3.1	V

		$V_{GE}=15V, I_C=75A, T_{vj}=125^\circ C$		3.0			
		$V_{GE}=15V, I_C=75A, T_{vj}=150^\circ C$	-	3.0	-		
$V_{GE(th)}$	Gate Threshold Voltage 栅极阈值电压	$V_{GE}=V_{CE}, I_C=1mA, T_{vj}=25^\circ C$	5.0	6.0	7.0	V	
Q_g	Total Gate Charge 栅极电荷	$V_{GE}=-15V \dots +15V$	-	0.53		μC	
R_{Gint}	Internal Gate Resistor 内置栅极电阻	$T_{vj}=25^\circ C$		5		Ω	
C_{ies}	Input Capacitance 输入电容	$V_{CE}=25V$ $V_{GE}=0V$ $f=1MHz$	-	3.2	-	nF	
C_{res}	Reverse Transfer Capacitance 反向传输电容		-	0.15	-	nF	
I_{CES}	Collector-Emitter Leakage Current 集电极-发射极关断漏电流	$V_{CE}=1200V, V_{GE}=0V$ $T_{vj}=25^\circ C$	-	-	1.0	mA	
I_{GES}	Gate-Emitter Leakage Current, Forward 栅极发射极漏电流	$V_{GE}=20V, V_{CE}=0V, T_{vj}=25^\circ C$	-	-	200	nA	
	Gate-Emitter Leakage Current, Reverse 栅极发射极反向漏电流	$V_{GE}=-20V, V_{CE}=0V, T_{vj}=25^\circ C$	-	-	-200	nA	
$t_{d(on)}$	Turn-on Delay Time 开通延迟时间, 感性负载	$V_{CE} = 600V$ $I_C = 75A$	$T_{vj}=25^\circ C$ 125 $^\circ C$ 150 $^\circ C$	-	38 39 39	- - -	ns
t_r	Turn-on Rise Time 上升时间, 感性负载	$V_{GE} = \pm 15V$ $R_{Gon} = 1.0\Omega$	$T_{vj}=25^\circ C$ 125 $^\circ C$ 150 $^\circ C$	-	25 28 30	- - -	ns
$t_{d(off)}$	Turn-off Delay Time 关断延迟时间, 感性负载	$V_{CE} = 600V$ $I_C = 75A$	$T_{vj}=25^\circ C$ 125 $^\circ C$ 150 $^\circ C$	-	160 195 200	- - -	ns
t_f	Turn-off Fall Time 下降时间, 感性负载	$V_{GE} = \pm 15V$ $R_{Goff} = 1.0\Omega$	$T_{vj}=25^\circ C$ 125 $^\circ C$ 150 $^\circ C$	-	30 80 105	- - -	ns
E_{on}	Turn-on Switching Loss 开通损耗, 感性负载	$V_{CE} = 600V$ $I_C = 75A$ $V_{GE} = \pm 15V$	$T_{vj}=25^\circ C$ 125 $^\circ C$ 150 $^\circ C$	-	5.7 9.0 10.0	- - -	mJ
E_{off}	Turn-off Switching Loss 关断损耗, 感性负载	$R_{Gon} = 1.0\Omega$ $R_{Goff} = 1.0\Omega$ $L_\sigma = 80nH$	$T_{vj}=25^\circ C$ 125 $^\circ C$ 150 $^\circ C$	-	2.4 3.8 4.0	- - -	mJ

$R_{th\ j-c}$	Thermal Resistance, Junction to Case 结-壳热阻	Per IGBT/单个 IGBT	-	0.28	-	K/W
$T_{vj\ op}$	Temperature Under Switching Condition 工作温度		-40	-	150	°C

Diode Maximum Rated Values

Symbol	Parameter	Value	Units
V_{RRM}	Repetitive Peak Reverse Voltage 可重复反向峰值电压	1200	V
I_F	Continuous DC Forward Current 可连续正向直流电流	75	A
I_{FRM}	Repetitive Peak Collector Current 可重复正向峰值电流	150	A

Diode Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage 正向通态压降	$I_F = 75A$ $V_{GE} = 0V$		$T_{vj}=25^\circ C$ 1.9 $125^\circ C$ 1.95 $150^\circ C$ 1.95	2.5	V
I_{RM}	Peak Reverse Recovery Current 反向恢复峰值电流			$T_{vj}=25^\circ C$ 60 $125^\circ C$ 60 $150^\circ C$ 60	-	A
Q_{rr}	Reverse Recovery Charge 反向恢复电荷	$I_C = 75A$ $V_R = 600V$ $-di/dt = 1400A/\mu s$ $V_{GE} = -15V$		$T_{vj}=25^\circ C$ 4.7 $125^\circ C$ 8.7 $150^\circ C$ 10.0	-	μC
E_{rec}	Reverse Recovery Energy 反向恢复损耗			$T_{vj}=25^\circ C$ 2.2 $125^\circ C$ 4.0 $150^\circ C$ 4.8	-	mJ
$R_{th\ j-c}$	Thermal Resistance, Junction to Case 结-壳热阻	Per Diode/ 单个 Diode	-	0.51		K/W
$T_{vj\ op}$	Temperature Under Switching Condition 工作温度		-40	-	150	°C

Module

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
R_{thc-h}	Thermal Resistance, Case to Heatsink 外壳-散热片热阻	Per Module/每个模块		0.05		K/W
L_{sCE}	Stray Inductance Module 模块杂散电感			30		nH
$R_{CC'+EE'}$ $R_{AA'+CC'}$	Module Lead Resistance, Terminals-Chip 模块引脚电阻, 端子-芯片	$T_C = 25^\circ\text{C}$, Per Switch 每个开关		0.65		m Ω
T_{stg}	Storage Temperature 存储温度		-40		125	$^\circ\text{C}$
M	Module Mounting Torque 模块安装扭矩	M6 screws	3.0		5.0	Nm
M	Terminal Mounting Torque 端子安装扭矩	M5 screws	2.5		6.0	Nm
G	Weight 重量			145		g

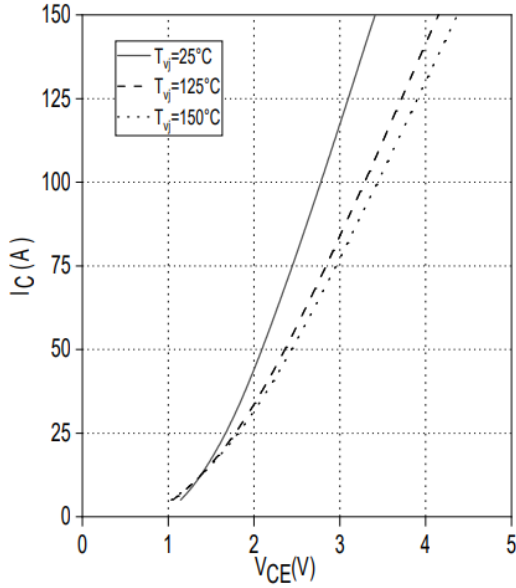
V_{iso}	Isolation Test Voltage 绝缘测试电压	RMS, f=50 Hz, t=1 min		3.0		kV
	Material of Module Baseplate 模块底板材料			Cu		
	Internal Isolation 内部绝缘	basic insulation (class 1, IEC 61140) 基本绝缘(class 1, IEC 61140)		Al_2O_3		
	Clearance Distance in Air 电气间隙	Terminal to heatsink 端子-散热片		17		mm
		Terminal to terminal 端子-端子		9.5		
	Surface Creepage Distance 爬电距离	Terminal to heatsink 端子-散热片		17		mm
		Terminal to terminal 端子-端子		20		
CTI	Comparative Tracking Index 相对漏电起痕指数			>200		

Typical Performance Characteristics

IGBT output characteristics (typical)

$$I_C = f(V_{CE})$$

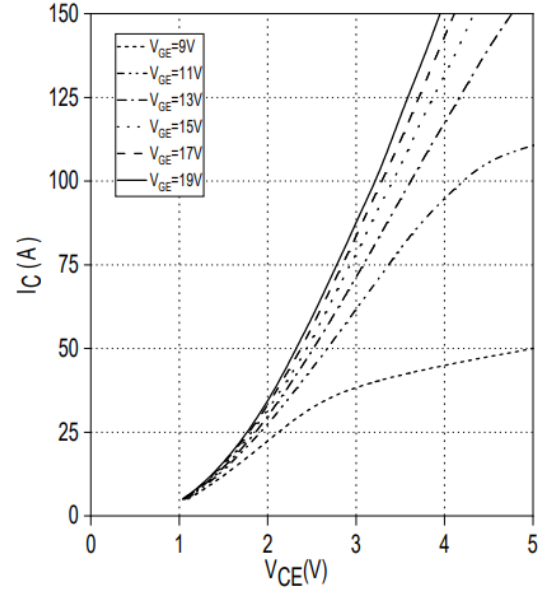
$$V_{GE} = 15V$$



IGBT output characteristics (typical)

$$I_C = f(V_{CE})$$

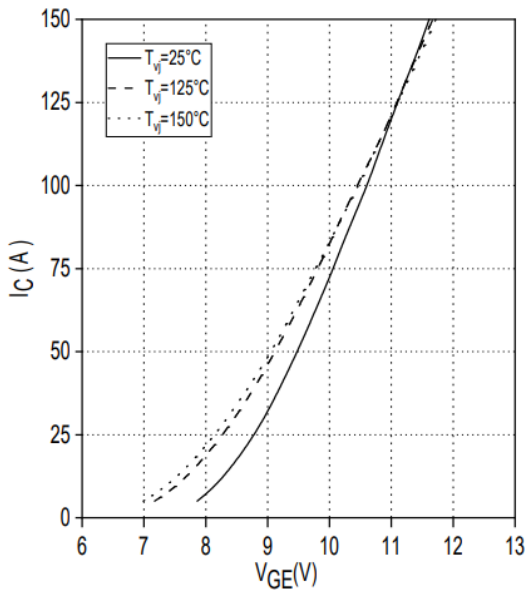
$$T_{vj} = 150^\circ C$$



IGBT Transfer characteristics (typical)

$$I_C = f(V_{CE})$$

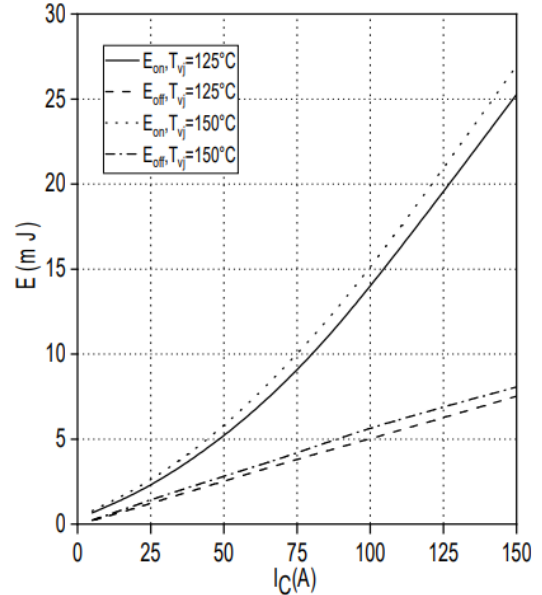
$$V_{CE} = 20V$$



IGBT Switching losses (typical)

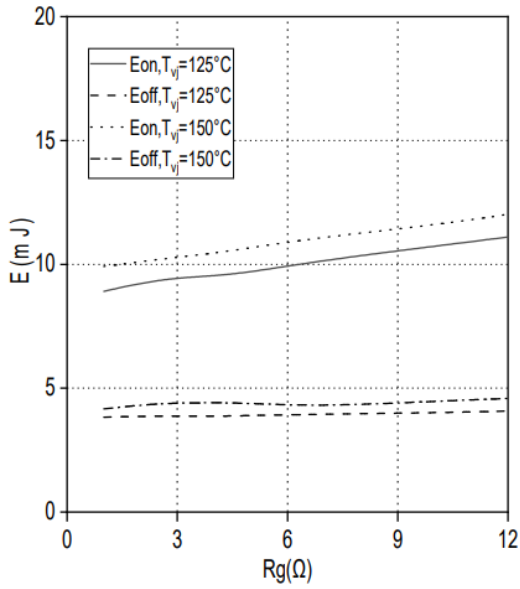
$$E_{on} = f(I_C), E_{off} = f(I_C), V_{GE} = \pm 15V$$

$$R_{Gon} = 1.0\Omega, R_{Goff} = 1.0\Omega, V_{CE} = 600V$$



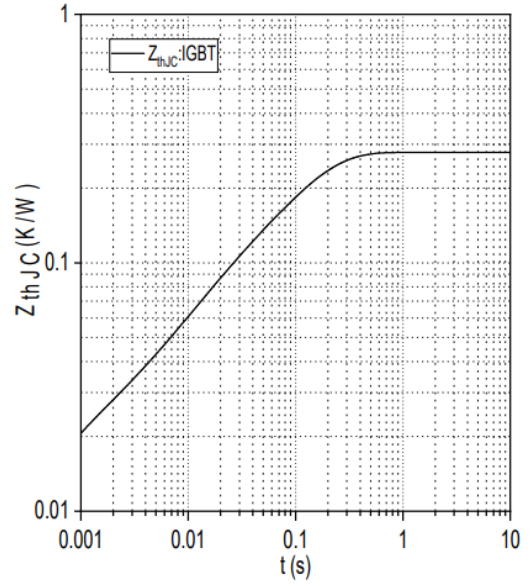
IGBT Switching losses (typical)

$V_{GE} = \pm 15V, I_C = 75A, V_{CE} = 600V$



IGBT Transient thermal impedance

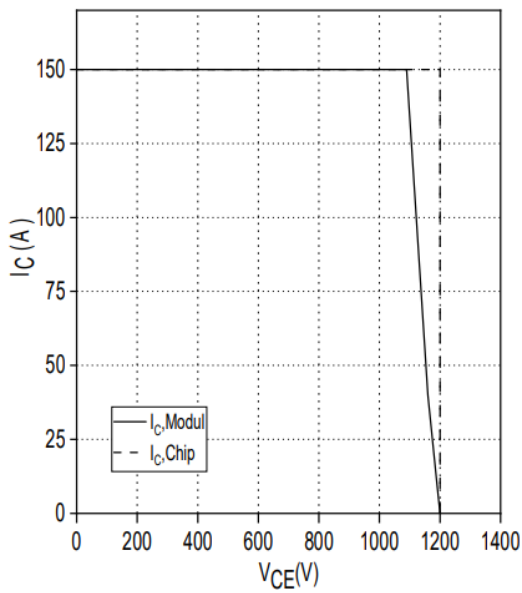
$Z_{thJC} = f(t)$



IGBT Reverse bias safe operating area (RBSOA)

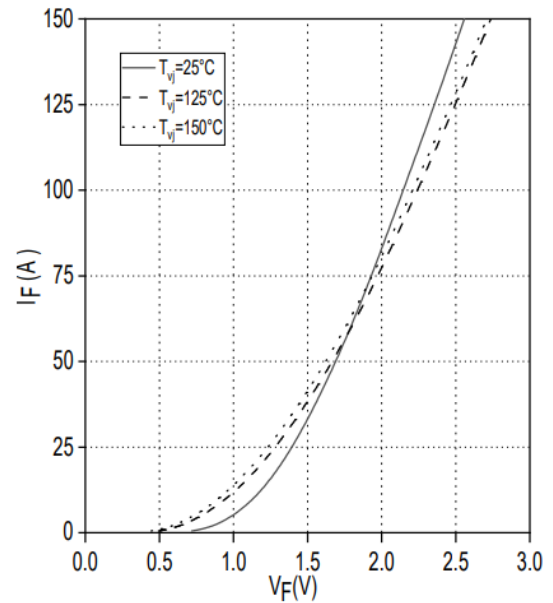
$I_C = f(V_{CE})$

$V_{GE} = \pm 15V, R_{Goff} = 1.0\Omega, T_{vj} = 150^\circ C$



Diode Forward characteristics

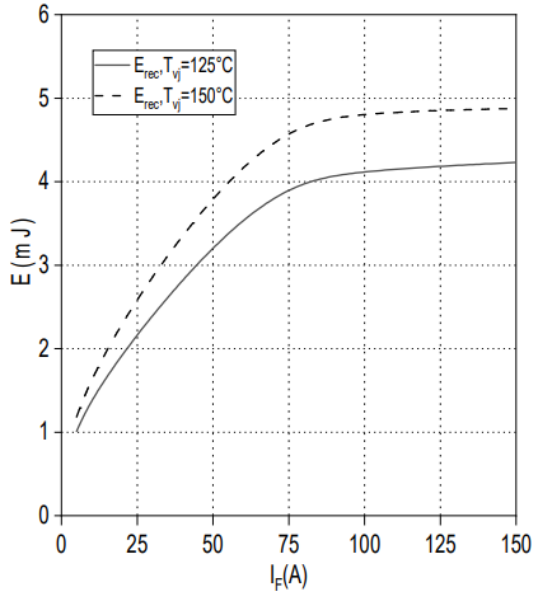
$I_F = f(V_F)$



Diode Switching losses (typical)

$$E_{rec} = f(I_F)$$

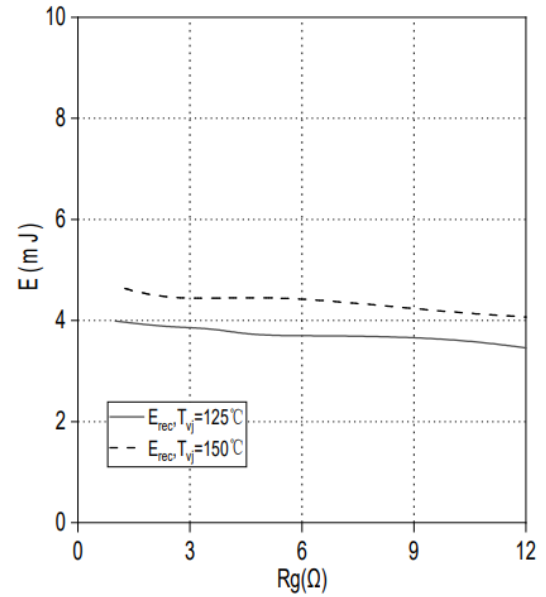
$R_{on} = 1.0\Omega, V_{CE} = 600V$



Diode Switching losses (typical)

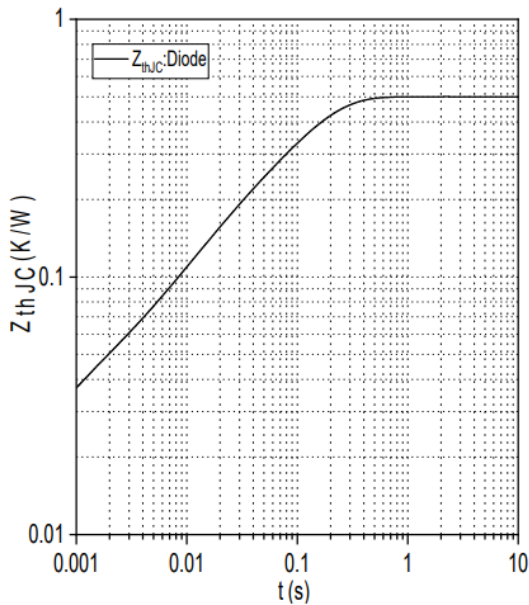
$$E_{rec} = f(R_G)$$

$I_F = 75A, V_{CE} = 600V$

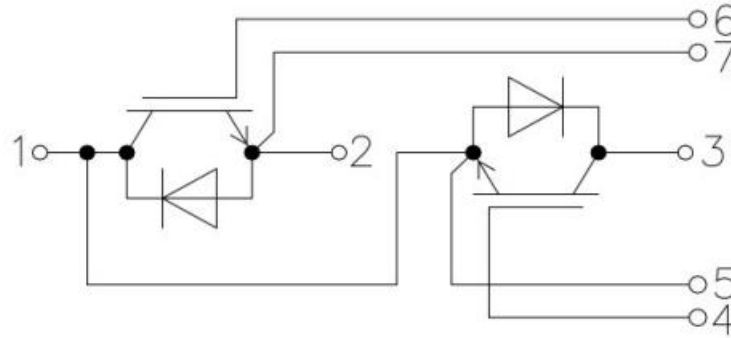


Diode Transient thermal impedance

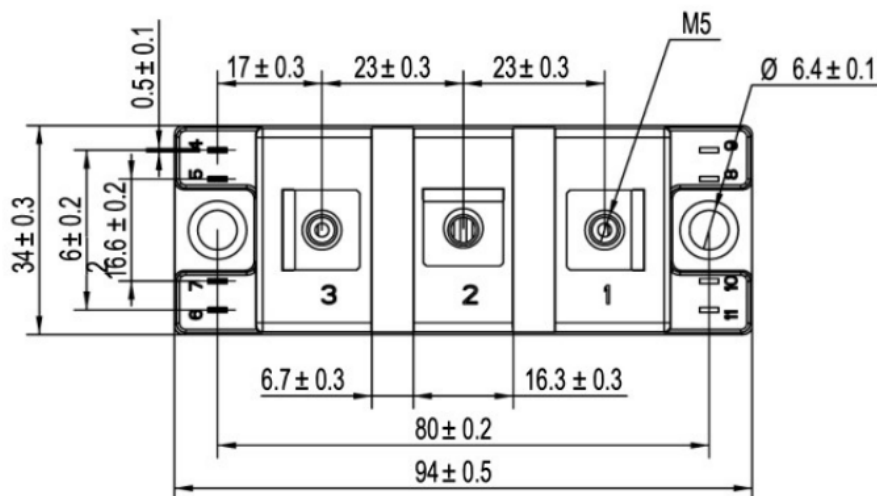
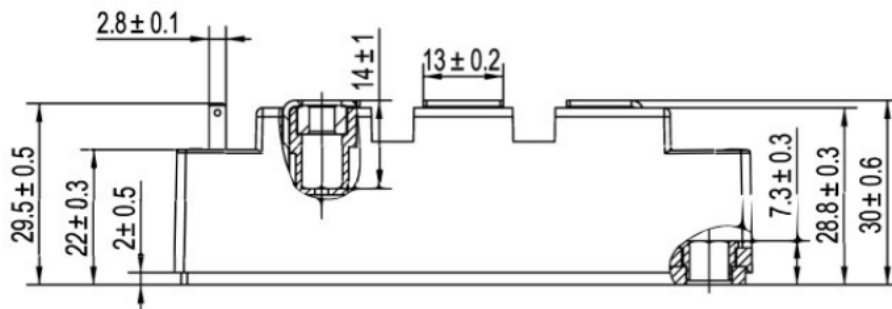
$$Z_{thJC} = f(t)$$



Internal Circuit



Package Dimension(unit: mm)



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