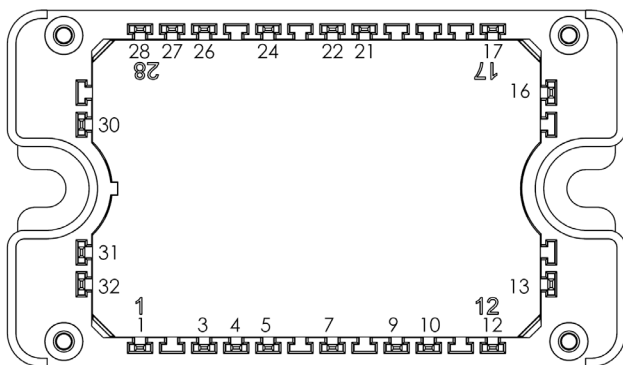
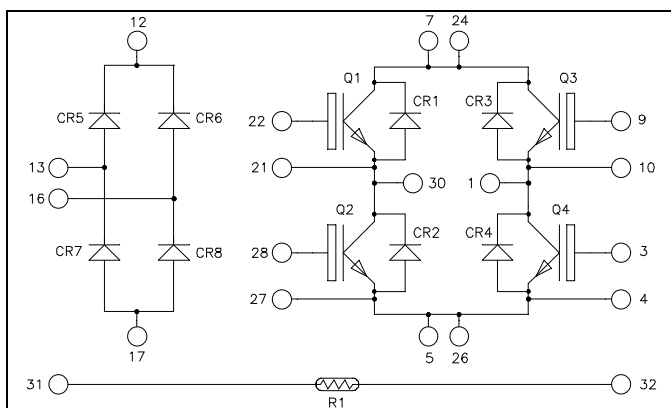


**Full bridge + rectifier bridge
Trench + Field Stop IGBT3
Power Module**

**$V_{CES} = 600V$
 $I_C = 50A @ T_c = 80^\circ C$**



All multiple inputs and outputs must be shorted together
7/24 ; 5/26

Application

- Solar converter

Features

- Trench + Field Stop IGBT3 Technology
 - Low voltage drop
 - Low tail current
 - Switching frequency up to 20 kHz
 - Soft recovery parallel diodes
 - Low diode VF
 - Low leakage current
 - RBSOA and SCSOA rated
- Kelvin emitter for easy drive
- Very low stray inductance
- High level of integration
- Internal thermistor for temperature monitoring

Benefits

- Stable temperature behavior
- Very rugged
- Solderable terminals both for power and signal for easy PCB mounting
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive TC of V_{CESat}
- Low profile
- RoHS Compliant

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



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

1. Full bridge

Absolute maximum ratings (per IGBT)

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	600	V
I_C	Continuous Collector Current	$T_C = 25^\circ\text{C}$ 80	A
		$T_C = 80^\circ\text{C}$ 50	
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ\text{C}$ 100	
V_{GE}	Gate – Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ\text{C}$ 176	W
RBSOA	Reverse Bias Safe Operating Area	$T_J = 150^\circ\text{C}$ 100A @ 550V	

Electrical Characteristics (per IGBT)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0\text{V}, V_{CE} = 600\text{V}$			250	μA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 50\text{A}$		1.5	1.9	V
		$T_J = 25^\circ\text{C}$ $T_J = 150^\circ\text{C}$		1.7		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 600\mu\text{A}$	5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$			600	nA

Dynamic Characteristics (per IGBT)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}$ $V_{CE} = 25\text{V}$ $f = 1\text{MHz}$		3150		pF
C_{oes}	Output Capacitance			200		
C_{res}	Reverse Transfer Capacitance			95		
Q_G	Gate charge	$V_{GE} = \pm 15\text{V}, I_C = 50\text{A}$ $V_{CE} = 300\text{V}$		0.5		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 50\text{A}$ $R_G = 8.2\Omega$		110		ns
T_r	Rise Time			45		
$T_{d(off)}$	Turn-off Delay Time			200		
T_f	Fall Time			40		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 50\text{A}$ $R_G = 8.2\Omega$		120		ns
T_r	Rise Time			50		
$T_{d(off)}$	Turn-off Delay Time			250		
T_f	Fall Time			60		
E_{on}	Turn-on Switching Energy	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 50\text{A}$	$T_J = 25^\circ\text{C}$ 0.3			mJ
			$T_J = 150^\circ\text{C}$ 0.43			
E_{off}	Turn-off Switching Energy	$R_G = 8.2\Omega$	$T_J = 25^\circ\text{C}$ 1.35			mJ
			$T_J = 150^\circ\text{C}$ 1.75			
I_{sc}	Short Circuit data	$V_{GE} \leq 15\text{V}; V_{Bus} = 360\text{V}$ $t_p \leq 6\mu\text{s}; T_J = 150^\circ\text{C}$		250		A
R_{thJC}	Junction to Case Thermal Resistance				0.85	$^\circ\text{C/W}$

Reverse diode ratings and characteristics (per diode)

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 = 150°C			500	
I _F	DC Forward Current		T _c = 80°C		50		A
V _F	Diode Forward Voltage	I _F = 50A V _{GE} = 0V	T _j = 25°C		1.6	2	V
			T _j = 150°C		1.5		
t _{rr}	Reverse Recovery Time	I _F = 50A V _R = 300V di/dt = 1800A/μs	T _j = 25°C		100		ns
			T _j = 150°C		150		
Q _{rr}	Reverse Recovery Charge		T _j = 25°C		2.6		μC
			T _j = 150°C		5.4		
E _{rr}	Reverse Recovery Energy		T _j = 25°C		0.6		mJ
			T _j = 150°C		1.2		
R _{thJC}	Junction to Case Thermal Resistance					1.42	°C/W

2. Rectifier bridge

Absolute maximum ratings (per diode)

Symbol	Parameter			Max ratings	Unit
V _R	Maximum DC reverse Voltage			600	V
V _{RRM}	Maximum Peak Repetitive Reverse Voltage				
I _{F(AV)}	Maximum Average Forward Current	Duty cycle = 50%	T _C = 80°C	40	A
I _{FSM}	Non-Repetitive Forward Surge Current	8.3ms	T _J = 45°C	320	

Electrical Characteristics (per diode)

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V_F	Diode Forward Voltage	$I_F = 30A$			1.8	2.2	V
		$I_F = 60A$			2.2		
		$I_F = 30A$	$T_j = 125^\circ C$		1.5		
I_{RM}	Maximum Reverse Leakage Current	$V_R = 600V$	$T_j = 25^\circ C$			250	μA
			$T_j = 125^\circ C$			500	

Dynamic Characteristics (per diode)

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
t_{rr}	Reverse Recovery Time	$I_F=1A, V_R=30V$ $di/dt = 100A/\mu s$	$T_j = 25^\circ C$		22		ns
t_{rr}	Reverse Recovery Time	$I_F = 30A$ $V_R = 400V$ $di/dt = 200A/\mu s$	$T_j = 25^\circ C$		25		ns
			$T_j = 125^\circ C$		160		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ C$		35		nC
			$T_j = 125^\circ C$		480		
I_{RRM}	Reverse Recovery Current		$T_j = 25^\circ C$		3		A
			$T_j = 125^\circ C$		6		
t_{rr}	Reverse Recovery Time	$I_F = 30A$ $V_R = 400V$ $di/dt = 1000A/\mu s$	$T_j = 125^\circ C$		85		ns
Q_{rr}	Reverse Recovery Charge				920		μC
I_{RRM}	Reverse Recovery Current				20		A
R_{thJC}	Junction to Case Thermal Resistance					1.2	$^\circ C/W$

3. Thermal and package characteristics

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

Symbol	Characteristic	Min	Typ	Max	Unit
R_{25}	Resistance @ $25^\circ C$		50		$k\Omega$
$\Delta R_{25}/R_{25}$			5		%
$B_{25/85}$	$T_{25} = 298.15 K$		3952		K
$\Delta B/B$	$T_C = 100^\circ C$		4		%

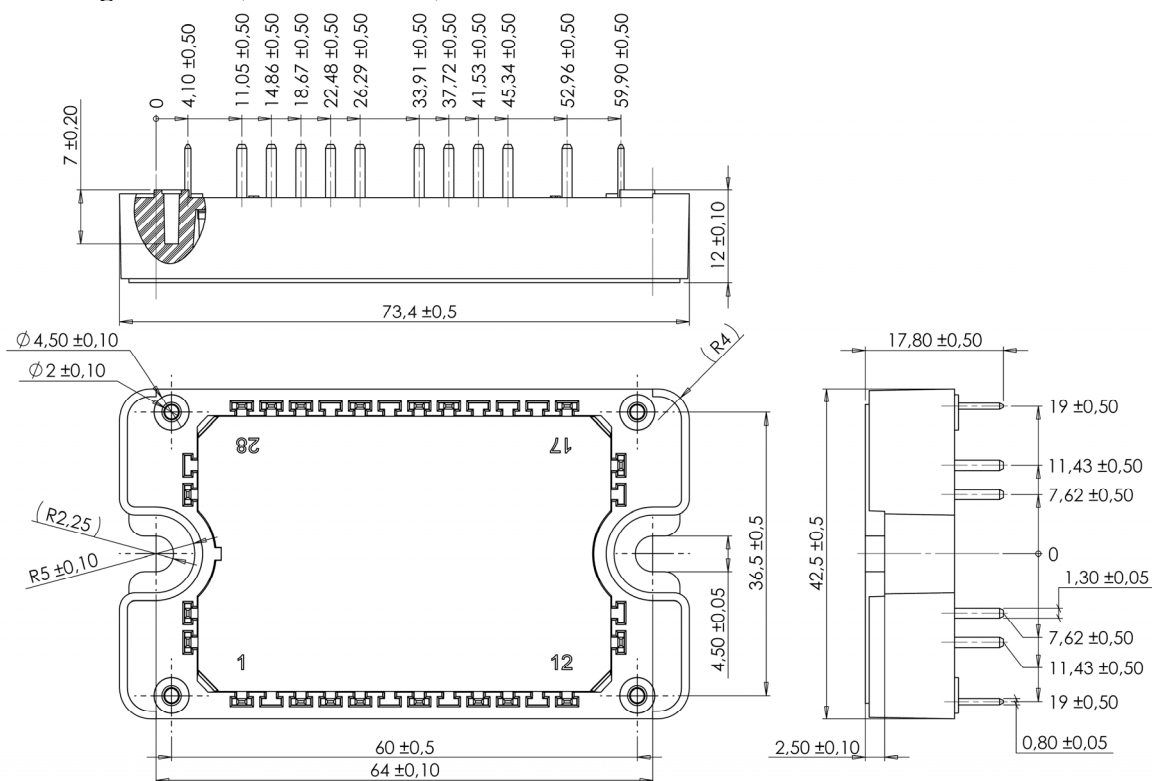
$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

T: Thermistor temperature
 R_T : Thermistor value at T

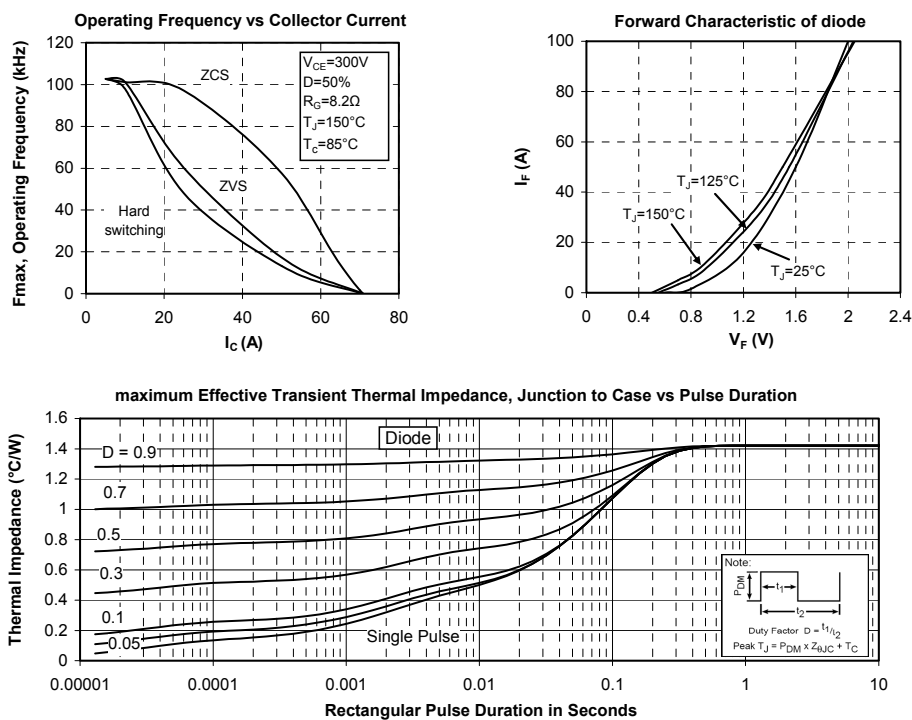
Package characteristics

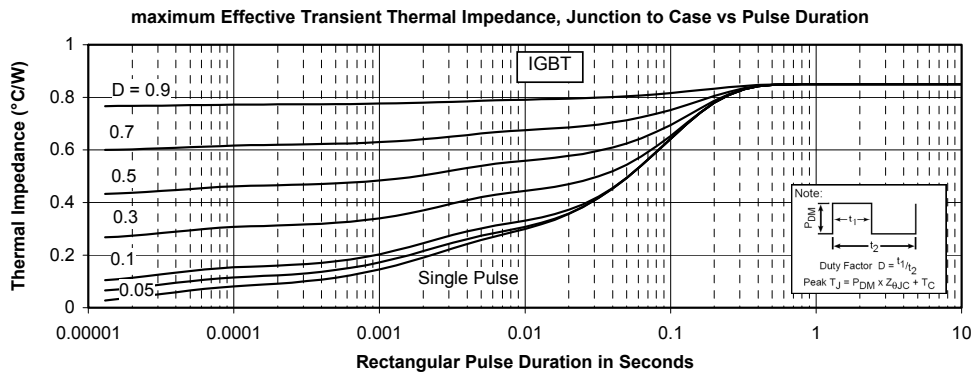
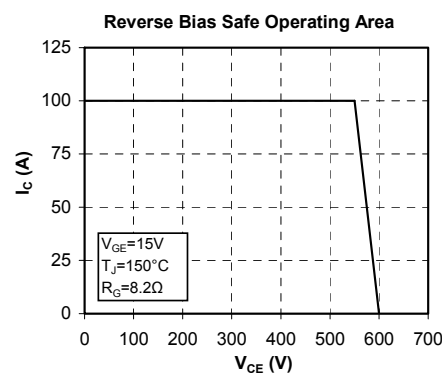
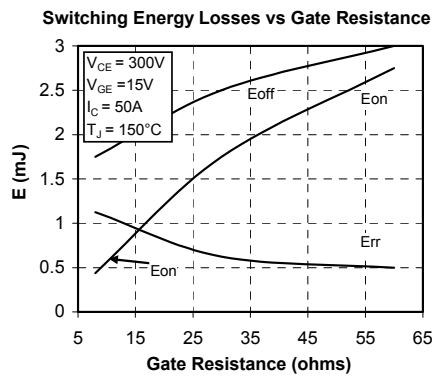
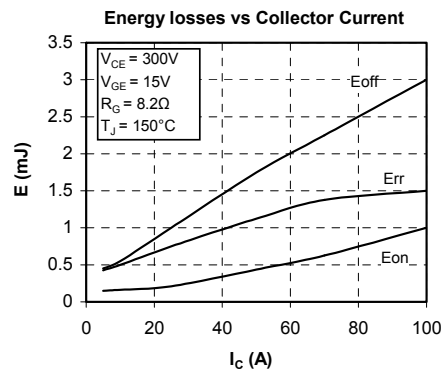
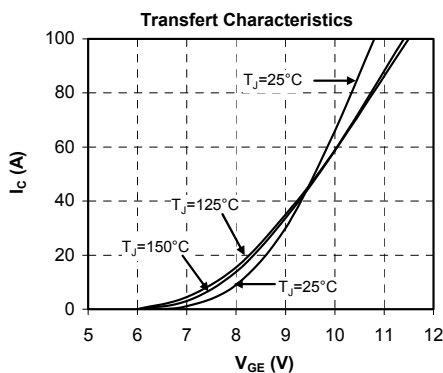
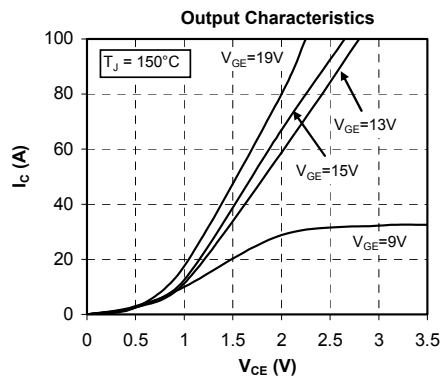
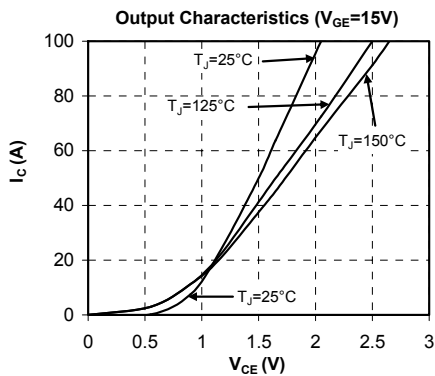
Symbol	Characteristic			Min	Typ	Max	Unit
V _{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz			4000			V
T _J	Operating junction temperature range			-40		175	°C
T _{STG}	Storage Temperature Range			-40		125	
T _C	Operating Case Temperature			-40		100	
Torque	Mounting torque	To heatsink	M4	2		3	N.m
Wt	Package Weight					110	g

SP3 Package outline (dimensions in mm)

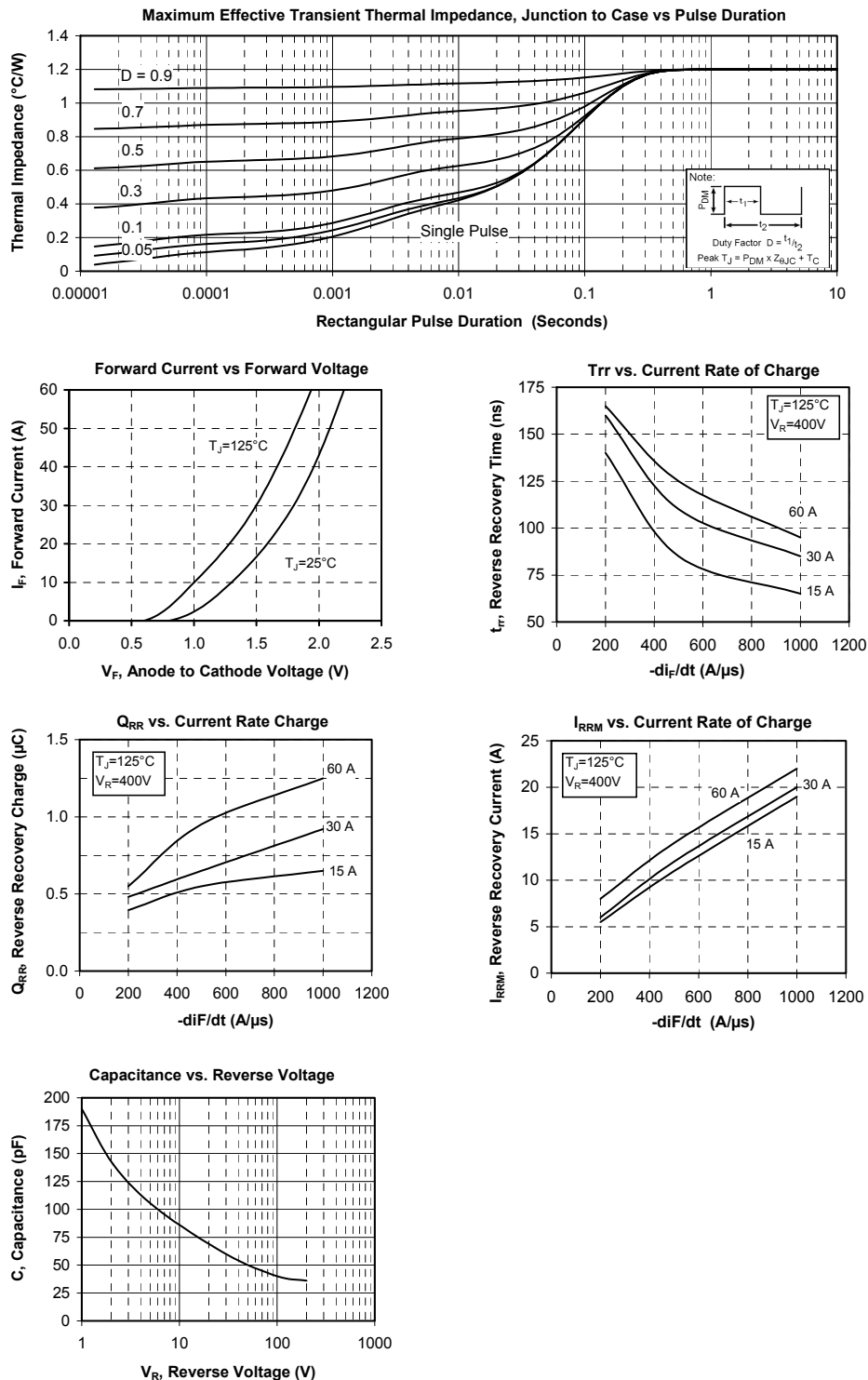


4. Typical full bridge Performance Curve (per IGBT and parallel diode)





5. Typical rectifier bridge Performance Curve (per diode)



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