

**Tyco/Electronics**  
**Raychem Circuit Protection**  
 308 Constitution Drive  
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**PolySwitch®**  
**Power Switch**  
**Devices**

**PRODUCT: RYC8220-4M**

DOCUMENT: SCD24676  
 PCN: 013309  
 REV LETTER: C  
 REV DATE: OCTOBER 9, 2001  
 PAGE NO.: 1 OF 2

**Specification Status: Released**

**ABSOLUTE MAXIMUM RATINGS ( Note 1, 2 )**

Parameter	Symbol	Value	Units
Max supply voltage	V <sub>IN</sub>	+8	V
Fault flag voltage	V <sub>FLG</sub>	+8	V
Fault flag current	I <sub>FLG</sub>	50	μA
Output voltage	V <sub>OUT</sub>	+8	V
Output current	I <sub>OUT</sub>	Internally limited	A
Control input	V <sub>EN</sub>	- 0.3 to +12.0	V
Storage temperature	T <sub>S</sub>	- 65 to +150	°C
Max lead temperature during soldering (5 sec.)		260	°C

**OPERATING RATINGS (Note 3)**

Parameter	Symbol	Value	Units
Supply voltage	V <sub>IN</sub>	+3 to +5.5	V
Continuous output current (each output)	I <sub>OUT</sub>	0.6	A
Ambient operating temperature	T <sub>A</sub>	-40 to +85	°C
Thermal resistance (SO-8)	θ J <sub>A</sub>	120	°C/W

**ELECTRICAL CHARACTERISTICS (V<sub>IN</sub> = +5V; T<sub>A</sub> = 25°C; unless noted.)**

Power switch	Condition	Min	Typ	Max	Units
Switch Resistance	V <sub>IN</sub> = 5V, I <sub>OUT</sub> = 500mA, each switch		95	120	mΩ
	V <sub>IN</sub> = 3.3V, I <sub>OUT</sub> = 500mA, each switch		90	110	mΩ
Output Turn-On Time	R <sub>L</sub> = 10Ω each output, consists of delay+rise time		3.6	12	ms
Output Turn-Off Time	R <sub>L</sub> = 10Ω each output, consists of delay+fall time		2	40	μs

Current limit	Condition	Min	Typ	Max	Units
Short-Circuit Current Limit	Each output (enable into 0Ω load)	0.6	0.9	1.25	A
	Each output (3Ω load hot-plugged into EN device), V <sub>OUT</sub> = 4.0V	0.6	0.9	1.25	A

Enable input	Condition	Min	Typ	Max	Units
Enable Input Threshold	Low-to-high transition, Note 4		1.5	2.4	V
	High-to-low transition, Note 4	0.8	1.5		V
Enable Input Current	V <sub>EN</sub> = 0V to 5.5V		0.01	1	μA
Enable Input Capacitance				5	pF

Supply current	Condition	Min	Typ	Max	Units
Supply Current	Switch off, OUT = open		0.5	5	μA
	Switches on, OUT = open		100	150	μA
Output Leakage Current	Each output (output disabled)			10	μA

OT, UVLO/OVLO	Condition	Min	Typ	Max	Units
Overtemperature Shutdown Threshold	T <sub>J</sub> increasing		135		°C
	T <sub>J</sub> decreasing		125		°C
UVLO Threshold	V <sub>IN</sub> = increasing		2.5		V
	V <sub>IN</sub> = decreasing		2.3		V
OVLO Threshold	V <sub>IN</sub> = increasing		6.4		V
	V <sub>IN</sub> = decreasing		6.1		V

Error flag	Condition	Min	Typ	Max	Units
Error Flag Output Resistance	V <sub>IN</sub> = 5V, I <sub>L</sub> = 10μA, Note 5		50	100	Ω
	V <sub>IN</sub> = 3.3V, I <sub>L</sub> = 10μA, Note 5		80	100	Ω
Error flag output delay	Fault on overcurrent, Note 6	6	9	15	ms
Error Flag Off Current	V <sub>FLAG</sub> = 5V		0.01	1	μA



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# PolySwitch® Power Switch Devices

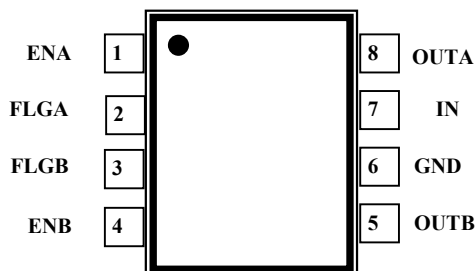
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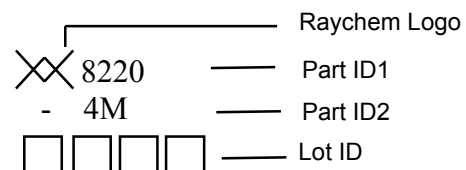
## ELECTRICAL CHARACTERISTICS - NOTES

- Note 1.** Exceeding the absolute maximum rating may damage the device.  
**Note 2.** Devices are ESD sensitive. Handling precautions recommended..  
**Note 3.** The device is not designed to function outside its operating rating.  
**Note 4.** Off is  $\leq 0.8V$  and on is  $\geq 2.4V$  for the RYC8220-1 and RYC8220-3. Off is  $\geq 2.4V$  and on is  $\leq 0.8V$  for the RYC8220-2 and RYC8220-4. The enable input has approximately 200mV of hysteresis. Pull-down/Pull-up resistors are on chip for "-1" and "-2" configurations.  
**Note 5.** Pull-up resistors are on chip.  
**Note 6.** No error flag out delay on UVLO, OVLO and thermal shutdown.

## PIN CONFIGURATION:



## DEVICE MARKING:

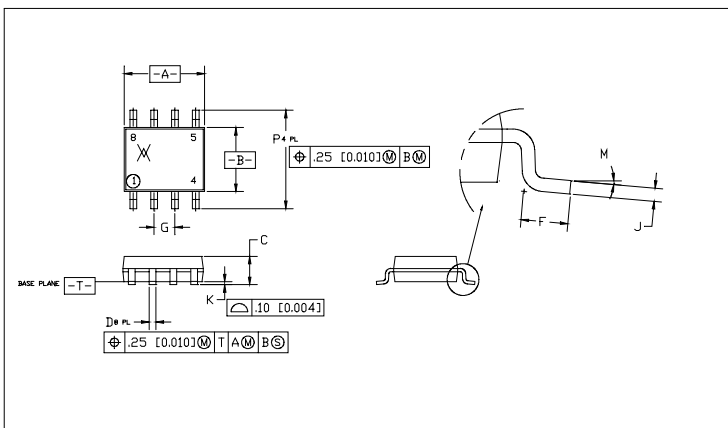


## PIN DESCRIPTIONS:

Pin Number	Pin Name	Pin Function
1, 4	EN	Enable (Input): Logic-compatible enable input. High input > 2.4V. Low input < 0.8V (-1, -3 active high, -2, -4 active low). Do not float.
2, 3	FLG	Fault Flag (Output): Active-low open-drain output. Indicates overcurrent, UVLO, OVLO and thermal shutdown.
6	GND	Ground: Supply return
7	IN	Supply Input: Output MOSFET drain. Also supplies IC's internal circuitry. Connect to positive supply.
5 and 8	OUT	Switch Output: Output MOSFET source. Typically connect to switched side of load.

## MECHANICAL DIMENSIONS:

### SO-8 PACKAGE NOTES:



DIMENSION	MIN	MAX	MIN	MAX
	mm	mm	inch	inch
A	4.80	5.00	0.190	0.197
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.013	0.020
F	0.40	1.27	0.016	0.050
G	1.27 BSC		0.050 BSC	
J	0.18	0.25	0.0075	0.010
K	0.10	0.25	0.004	0.010
M	0°	8°	0°	8°
P	5.80	6.20	0.228	0.244

- Dimensions and tolerance per ANSI Y14.5M-1982.
- Dimensions A and B are datums and T is a datum surface.
- Controlling dimensions: Millimeters
- Dimension A and B do not include mold flash. Mold flash shall not exceed 0.15mm [0.006] per side.
- Dimension D does not include interlead flash. Interlead flash shall not exceed 0.25 mm [0.010].