



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

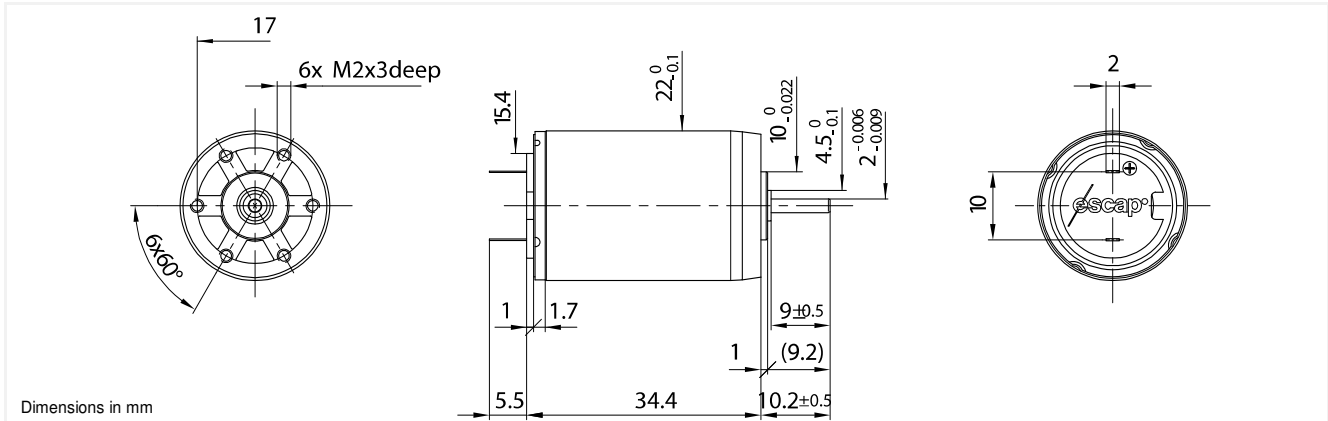


22V28

Precious metal commutation

Ø22mm

9.7 mNm



22V28 \*\*\*\* .201

Electrical Data	****	213P	216E	213E	210E	208E	
1 Nominal Voltage	V	6	9	12	15	24	Volt
2 No-Load Speed	$n_0$	7,100	6,725	7,630	7,550	6,340	rpm
3 No-Load Current	$I_0$	15.0	9.0	7.6	6.0	3.2	mA
4 Terminal Resistance	R	3.0	6.7	11.9	24.5	75.0	$\Omega$
5 Output Power	$P_{2max}$	4.1	4.4	3.8	3.3	3.6	W
6 Stall Torque	mNm	16 (2.27)	17.1 (2.43)	15 (2.13)	11.5 (1.63)	11.5 (1.63)	mNm (oz-in)
7 Efficiency	$\eta_{max}$	83	84	83	81	81	%
8 Max Continuous Speed	$n_{e max}$	10,000	10,000	10,000	10,000	10,000	rpm
9 Max Continuous Torque	$M_{e max}$	9.1 (1.38)	9.7 (1.38)	8.5 (1.21)	7.4 (1.05)	8.1 (1.15)	mNm (oz-in)
10 Max Continuous Current	$I_{e max}$	1.15	0.77	0.58	0.40	0.23	A
11 Back-EMF Constant	$k_E$	0.84	1.33	1.56	1.97	3.75	mV/rpm
12 Torque Constant	$k_M$	8.00	12.70	14.90	18.80	35.80	mNm/A
13 Motor Regulation	$R/k^2$	47.0	42.0	54.0	69.00	58.00	$10^3/Nms$
14 Friction Torque	$T_F$	0.12 (0.02)	0.12 (0.02)	0.11 (0.02)	0.11 (0.02)	0.11 (0.02)	mNm (oz-in)
15 Rotor Inductance	L	0.15	0.50	0.55	0.80	3.30	mH
16 Mechanical Time Constant	$t_m$	15.0	16.4	17.3	20.0	13.9	ms
17 Rotor Inertia	J	3.20	3.90	3.20	2.90	2.40	$g.cm^2$
<b>General Data</b>							
18 Thermal Resistance (rotor/body)	$R_{th1} / R_{th2}$			7/16			$^{\circ}C/W$
19 Thermal Time Constant (rotor/stator)	$t_{w1}/t_{w2}$			8/460			S
20 Operating Temperature Range:	motor			-30 $^{\circ}C$ to 85 $^{\circ}C$ (-22 $^{\circ}F$ to 185 $^{\circ}F$ )			$^{\circ}C$ ( $^{\circ}F$ )
	rotor			100 $^{\circ}C$ (212 $^{\circ}F$ )			$^{\circ}C$ ( $^{\circ}F$ )
21 Shaft Load Max.:				With sleeve bearings			
(5mm from bearing)	-radial			3.0 (10.8)			N (oz)
	-axial			150 (539.5)			N (oz)
22 Shaft Play:	-radial			<0.03 (0.0012)			mm (inch)
	-axial			0.15 (0.0059)			mm (inch)
23 Weight	g			68 (2.4)			g (oz)

Execution Table				
Gearbox	Single Shaft	F16	E9	MR2
R22	202	202	225	Upon Request
M22	201	201	204	Upon Request
K24	202	202	225	Upon Request
K27	202	202	225	Upon Request

