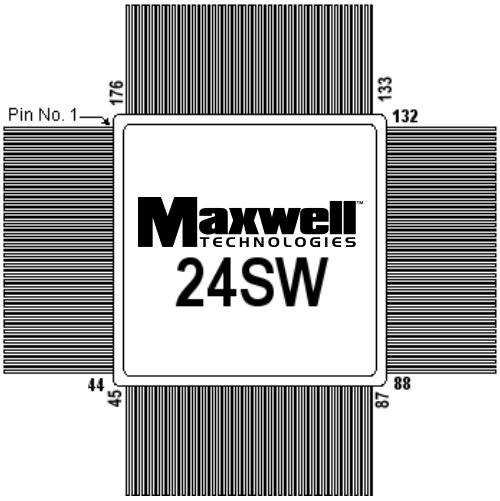
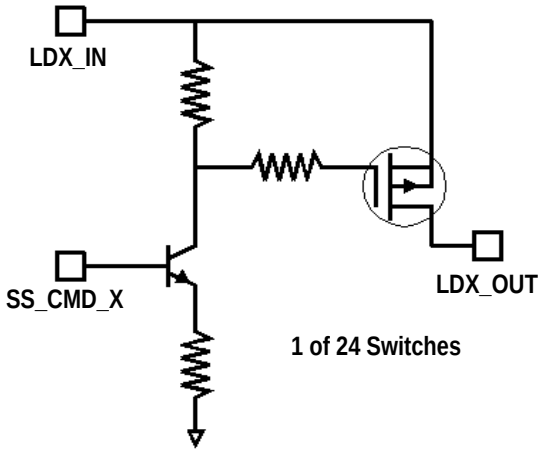
24SW
24 Channel MOSFET Driver





Logic Diagram

FEATURES:

- 24 independently switchable power FETs
- Low equivalent on resistance (200 mΩ typ)
- 2A switching current per channel
- No derating required to 90˚C
- Total dose hardness: depending upon space mission in RAD-PAK®
- Package: 176-pin quad flat pack

DESCRIPTION:

Maxwell Technologies 24SW multi-chip module (MCM) 24 channel MOSFET driver uses Maxwell Technologies' patented radiation-hardened RAD-PAK® MCM packaging technology. The 24SW is a radiation hardened MOSFET driver for space applications.

The 24SW incorporates twenty-four independent p-channel MOSFETs, along with interface components, that can switch up to 2A per channel. The R_{DS-ON} of the MOSFET is typically less than 200mΩ.

Maxwell Technologies' patented RAD-PAK® packaging technology incorporates radiation shielding in the micro-circuit package. It eliminates the need for box shielding while improving the TID performance in most space environments. This product is available with screening up to Maxwell Technologies self-defined Class K.

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TABLE 1. 24SW PINOUT DESCRIPTION

PIN	NAME	FUNCTION	NOTES
1	Pkg-Gnd	Case Ground	This pin is for grounding the case(lid)
2	TP1B		
3	TP7D		
4	TP1D		
5	TP8D		
6	TP2D		
7	TP7E		
8	TP1E		
9	TP8E		
10	SS_CMD_5	Switch 5 Control Input	TTL voltage level switch input
11	SS_CMD_4	Switch 4 Control Input	TTL voltage level switch input
12	SS_CMD_3	Switch 3 Control Input	TTL voltage level switch input
13	TP2E		
14	SS_CMD_2	Switch 2 Control Input	TTL voltage level switch input
15	SS_CMD_1	Switch 1 Control Input	TTL voltage level switch input
16	TP2B		
17	SS_CMD_0	Switch 0 Control Input	TTL voltage level switch input
18	TP38A		
19	TP46A		
20	TP38C		
21	TP2C		
22	TP2A		
23	VDD	+15V Power Supply	
24	TP38B		
25	GND	Analog Ground	
26	VSS	-15V Power Supply	
27	TP38D		
28	TP44D		
29	SS_CMD_12	Switch 12 Control Input	TTL voltage level switch input
30	TP37D		
31	SS_CMD_13	Switch 13 Control Input	TTL voltage level switch input
32	SS_CMD_14	Switch 14 Control Input	TTL voltage level switch input

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TABLE 1. 24SW PINOUT DESCRIPTION

PIN	NAME	FUNCTION	NOTES
33	TP43D		
34	SS_CMD_15	Switch 15 Control Input	TTL voltage level switch input
35	SS_CMD_16	Switch 16 Control Input	TTL voltage level switch input
36	SS_CMD_17	Switch 17 Control Input	TTL voltage level switch input
37	TP44C		
38	TP44A		
39	TP44B		
40	TP37C		
41	TP43E		
42	TP37E		
43	TP44E		
44	TP38E		
45	LD14_OUT	Switch 14 Low Side	FET Drain
46	LD14_IN	Switch 14 High Side	FET Source
47	PKG_GND	Case Ground	This pin is for grounding the case(lid)
48	LD15_OUT	Switch 15 Low Side	FET Drain
49	LD15_IN	Switch 15 High Side	FET Source
50	TP37A		
51	LD12_OUT	Switch 12 Low Side	FET Drain
52	LD12_IN	Switch 12 High Side	FET Source
53	TP37B		
54	LD18_OUT	Switch 18 Low Side	FET Drain
55	LD18_IN	Switch 18 High Side	FET Source
56	TP43A		
57	LD13_OUT	Switch 13 Low Side	FET Drain
58	LD13_IN	Switch 13 High Side	FET Source
59	TP9A		
60	TP3E		
61	TP4E		
62	TP10E		
63	LD17_OUT	Switch 17 Low Side	FET Drain
64	LD17_IN	Switch 17 High Side	FET Source
65	TP10D		
66	LD19_OUT	Switch 19 Low Side	FET Drain
67	LD19_IN	Switch 19 High Side	FET Source
68	TP4D		
69	LD16_OUT	Switch 16 Low Side	FET Drain

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TABLE 1. 24SW PINOUT DESCRIPTION

PIN	NAME	FUNCTION	NOTES
70	LD16_IN	Switch 16 High Side	FET Source
71	TP3D		
72	LD23_OUT	Switch 23 Low Side	FET Drain
73	LD23_IN	Switch 23 High Side	FET Source
74	TP9D		
75	TP41A		
76	TP41C		
77	TP46D		
78	LD21_OUT	Switch 21 Low Side	FET Drain
79	LD21_IN	Switch 21 High Side	FET Source
80	TP40D		
81	LD22_OUT	Switch 22 Low Side	FET Drain
82	LD22_IN	Switch 22 High Side	FET Source
83	TP39D		
84	TP45D		
85	LD20_OUT	Switch 20 Low Side	FET Drain
86	LD20_IN	Switch 20 High Side	FET Source
87	TP45E		
88	TP39E		
89	TP40E		
90	TP46E		
91	TP48D		
92	TP42D		
93	TP47D		
94	TP41D		
95	TP41E		
96	TP47E		
97	TP42E		
98	SS_CMD_18	Switch 18 Control Input	TTL voltage level switch input
99	SS_CMD_19	Switch 19 Control Input	TTL voltage level switch input
100	SS_CMD_20	Switch 20 Control Input	TTL voltage level switch input
101	TP48E		
102	SS_CMD_21	Switch 21 Control Input	TTL voltage level switch input
103	SS_CMD_22	Switch 22 Control Input	TTL voltage level switch input
104	TP12B		
105	SS_CMD_23	Switch 23 Control Input	TTL voltage level switch input
106	TP12A		

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TABLE 1. 24SW PINOUT DESCRIPTION

PIN	NAME	FUNCTION	NOTES
107	TP48A		
108	VSS	-15V Power Supply	
109	GND	Analog Ground	
110	TP10C		
111	VDD	+15V Power Supply	
112	TP10A		
113	TP48B		
114	TP12C		
115	TP10B		
116	TP12D		
117	SS_CMD_11	Switch 11 Control Input	TTL voltage level switch input
118	TP6D		
119	SS_CMD_10	Switch 10 Control Input	TTL voltage level switch input
120	SS_CMD_9	Switch 9 Control Input	TTL voltage level switch input
121	TP11D		
122	SS_CMD_8	Switch 8 Control Input	TTL voltage level switch input
123	SS_CMD_7	Switch 7 Control Input	TTL voltage level switch input
124	SS_CMD_6	Switch 6 Control Input	TTL voltage level switch input
125	TP5D		
126	TP12E		
127	TP6E		
128	TP11E		
129	TP5E		
130	TP6C		
131	TP6A		
132	TP6B		
133	LD11_OUT	Switch 11 Low Side	FET Drain
134	LD11_IN	Switch 11 High Side	FET Source
135	TP11C		
136	LD10_OUT	Switch 10 Low Side	FET Drain
137	LD10_IN	Switch 10 High Side	FET Source
138	TP11A		
139	LD9_OUT	Switch 9 Low Side	FET Drain
140	LD19_IN	Switch 9 High Side	FEt Source
141	TP11B		
142	LD7_OUT	Switch 7 Low Side	FET Drain
143	LD7_IN	Switch 7 High Side	FET Source

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TABLE 1. 24SW PINOUT DESCRIPTION

PIN	NAME	FUNCTION	NOTES
144	TP5C		
145	LD8_OUT	Switch 8 Low Side	FET Drain
146	LD8_IN	Switch 8 High Side	FET Source
147	TP5A		
148	TP5B		
149	TP9C		
150	TP9A		
151	LD4_OUT	Switch 4 Low Side	FET Drain
152	LD4_IN	Switch 4 High Side	FET Source
153	TP9B		
154	LD6_OUT	Switch 6 Low Side	FET Drain
155	LD6_IN	Switch 6 High Side	FET Source
156	TP3C		
157	LD5_OUT	Switch 5 Low Side	FET Drain
158	LD5_IN	Switch 5 High Side	FET Source
159	TP3A		
160	LD2_OUT	Switch 2 Low Side	FET Drain
161	LD2_IN	Switch 2 High Side	FET Source
162	TP3B		
163	TP8C		
164	TP8A		
165	TP8B		
166	LD0_OUT	Switch 0 Low Side	FET Drain
167	LD0_IN	Switch 0 High Side	FET Source
168	TP7C		
169	LD3_OUT	Switch 3 Low Side	FET Drain
170	LD3_IN	Switch 3 High Side	FET Source
171	TP7A		
172	TP7B		
173	LD1_OUT	Switch 1 Low Side	FET Drain
174	LD1_IN	Switch 1 High Side	FET Source
175	TP1C		
176	TP1A		

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TABLE 2. 24SW ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Supply Voltage Range	V_{15V}	--	16.5	V
	V_{-15V}	-16.5	--	V
Switch Input Voltage Range		-1.0	40	V
Storage Temperature Range	T_S	-55	125	˚C
Operational Temperature Range	T_A	-40	110	˚C
Maximum Power Dissipation Per Switch Per Module	P_D	 -- --	 2.04 10.0	W
Thermal Resistance, Junction to Mounting Base of Case	Θ_{JC}	--	6.5	˚C/W
Junction Temperature	T_J	--	125	˚C

TABLE 3. 24SW RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Supply Voltage Range	V_{15V}	13.5	16.5	V
	V_{-15V}	-13.5	-16.5	V
Control Input High Voltage	V_{IH}	2.4	V_{5V} + 0.5	V
Control Input Low Voltage	V_{IL}	DGND - 0.5	0.8	V
Operational Temperature Range (Case temperature) [1]	T_A	-40	110	˚C
Power Dissipation	P_D	--	6.5	W

1. As long as the 125 ˚C junction temperature limit is not exceeded.

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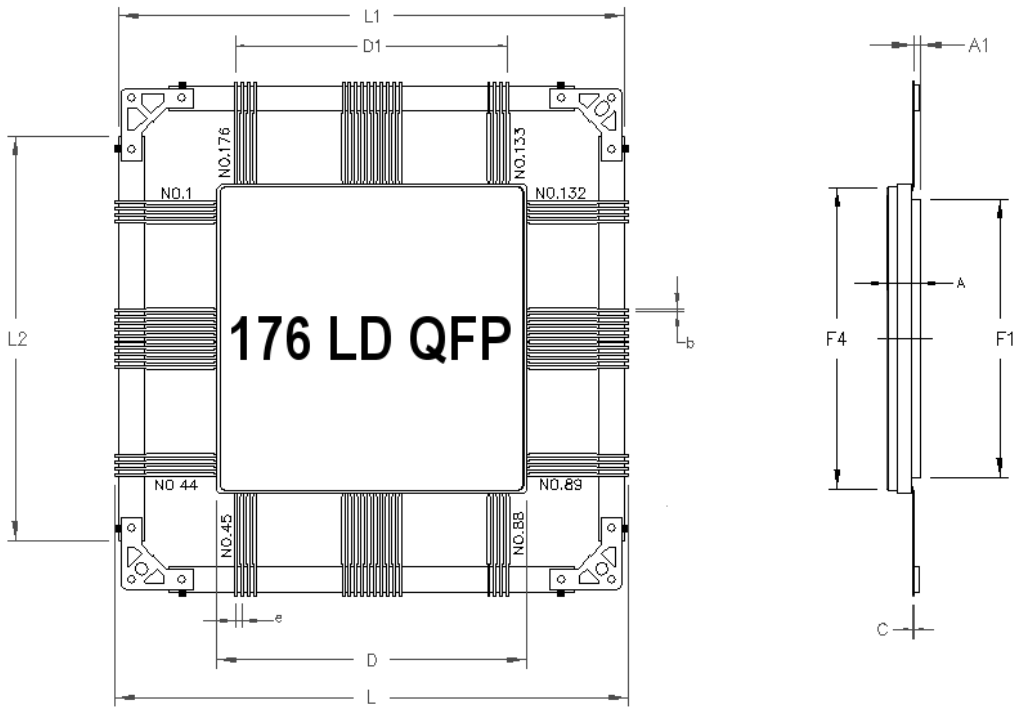
TABLE 4. 24SW ELECTRICAL CHARACTERISTICS

(V_{15V} = 15V, V_{-15V} = -15V, T_A = -40 TO 110°C, UNLESS OTHERWISE SPECIFIED)

PARAMETER	SYMBOL	CONDITIONS	SUBGROUPS	MIN	NOM	MAX	UNIT
Control Input High Voltage	V_{IH}	Results in turning FET switch -ON (closed)	1, 2, 3	2.4	--	--	V
Control Input Low Voltage	V_{IL}	Results in turning FET switch -OFF (Open)	1, 2, 3	--	--	0.8	V
	I_{15V}	All 24 switches OFF	1, 2, 3	--	--	3.0	mA
	I_{-15V}	All 24 switches OFF	1, 2, 3	--	--	3.0	mA
	I_{15V}	For each switch that is ON[1]	1, 2, 3	135	200	240	µA per switch
	I_{-15V}	For each switch that is ON[1]	1, 2, 3	310	475	590	µA per switch
Switching Voltage (Ground side switching is acceptable)[2]	V_{SW}	Referenced to Power Ground	1, 2, 3	-1.0	28	37	V
Switching Current	$I_{SW-POWER}$	Load Switching Range	1, 2, 3	0.002	--	2.0	A
Equivalent ON resistance per switch	R_{ON}	Switch input voltage = 28V, Current = 2 amps	1, 2, 3	--	200	325	mΩ
Switching Leakage Current for OFF state	I_{SWOFF}	Switch input voltage = 37V, Tj temperature = 125˚C	1, 2, 3	--	--	0.25	mA
Turn ON Time (Rise time)	t_{ON}	Switch input voltage = 28V, Load current = 1 amp	1, 2, 3	100	--	500	uS
Turn OFF Time (Fall time)	t_{OFF}	Switch input voltage = 28V, load current = 0.1 amps	1, 2, 3	50	--	350	uS

1. Total current = current per SW x # of SW + bias current.
2. Power Gnd, DGND and AGND all must be within 0.7V of each other.

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176 PIN RAD-PAK® QUAD FLAT PACKAGE

SYMBOL	DIMENSION		
	MIN	NOM	MAX
A	0.239	0.264	0.289
b	0.028	0.030	0.032
c	0.010	0.012	0.014
D	2.425	2.450 SQ	2.475
D1	2.150		
e	0.050 BSC		
L	4.025	4.040	4.045
L1	3.985	4.000	4.005
L2	3.168	3.200	3.232
A1	0.051	0.058	0.065
F1	2.195	2.200	2.205
F4	2.395	2.400	2.405
N	176		

Q176-01
Note: All dimensions in inches

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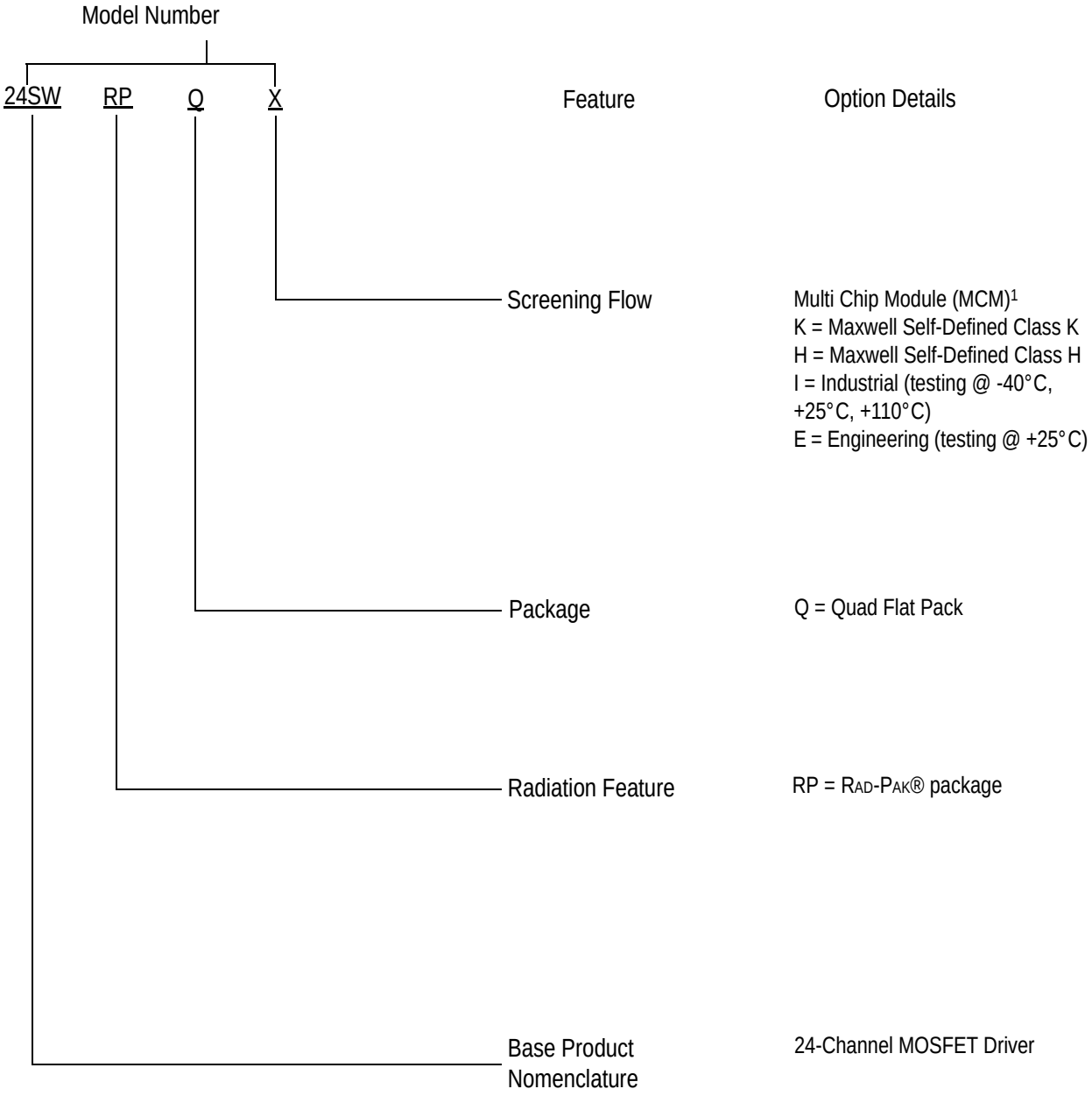
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