4AM16

Silicon N Channel/P Channel Power MOS FET Array

Application

High speed power switching

Features

- Low on–resistance
  - N Channel : $R_{DS(on)} \leq 0.17\Omega$,
    $V_{GS} = 10V$, $I_D = 4A$
  - P Channel : $R_{DS(on)} \leq 0.2\Omega$,
    $V_{GS} = -10V$, $I_D = -4A$
- High speed switching
- High density mounting
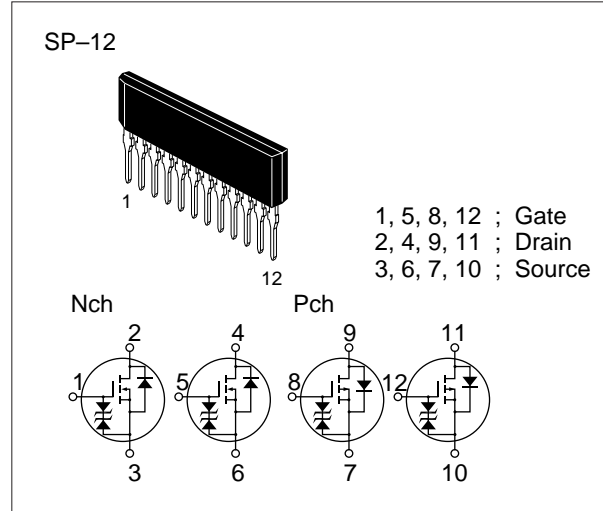- Suitable for H–brided motor driver

SP–12

1, 5, 8, 12 ; Gate
2, 4, 9, 11 ; Drain
3, 6, 7, 10 ; Source

Nch   Pch

Table 1   Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings		Unit
		Nch	Pch	
Drain to source voltage	V_{DSS}	60	-60	V
Gate to source voltage	V_{GSS}	±20	±20	V
Drain current	I_D	8	-8	A
Drain peak current	$I_{D(pulse)}$*	32	-32	A
Body–drain diode reverse drain current	I_{DR}	8	-8	A
Channel dissipation	Pch** (Tc = 25 °C)	28		W
	Pch**	4.0		W
Channel temperature	Tch	150		°C
Storage temperature	Tstg	–55 to +150		°C

*   PW ≤ 10 μs, duty cycle ≤ 1 %
**   4 Device Operation

Table 2 Electrical Characteristics (Ta = 25°C)

| Item | Symbol | N Channel | | | Unit | Test conditions |
		Min	Typ	Max		
Drain to source breakdown voltage	$V_{(BR)DSS}$	60	—	—	V	I_D = 10 mA, V_{GS} = 0
Gate to source breakdown voltage	$V_{(BR)GSS}$	±20	—	—	V	I_G = ±100 µA, V_{DS} = 0
Gate to source leak current	I_{GSS}	—	—	±10	µA	V_{GS} = ±16 V, V_{DS} = 0
Zero gate voltage drain current	I_{DSS}	—	—	250	µA	V_{DS} = 50 V, V_{GS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.0	V	I_D = 1 mA, V_{DS} = 10 V
Static drain to source on state	$R_{DS(on)}$	—	0.13	0.17	Ω	I_D = 4 A, V_{GS} = 10 V *
resistance		—	0.18	0.24		I_D = 4 A, V_{GS} = 4 V *
Forward transfer admittance	$|y_{fs}|$	3.5	5.5	—	S	I_D = 4 A V_{DS} = 10 V *
Input capacitance	Ciss	—	400	—	pF	V_{DS} = 10 V
Output capacitance	Coss	—	220	—	pF	V_{GS} = 0
Reverse transfer capacitance	Crss	—	60	—	pF	f = 1 MHz
Turn–on delay time	$t_{d(on)}$	—	5	—	ns	I_D = 4 A
Rise time	t_r	—	45	—	ns	V_{GS} = 10 V
Turn–off delay time	$t_{d(off)}$	—	150	—	ns	R_L = 7.5 Ω
Fall time	t_f	—	85	—	ns	
Body–drain diode forward voltage	V_{DF}	—	1.2	—	V	I_F = 8 A, V_{GS} = 0
Body–drain diode reverse recovery time	t_{rr}	—	120	—	ns	I_F =8 A, V_{GS} = 0, diF / dt = 50 A / µs

*   Pulse Test

See characteristic curves of 2SK970

Table 3 Electrical Characteristics (Ta = 25°C)

| Item | Symbol | P Channel | | | Unit | Test conditions |
		Min	Typ	Max		
Drain to source breakdown voltage	$V_{(BR)DSS}$	−60	—	—	V	$I_D = -10$ mA, $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	±20	—	—	V	$I_G = \pm100$ µA, $V_{DS} = 0$
Gate to source leak current	I_{GSS}	—	—	±10	µA	$V_{GS} = \pm16$ V, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	250	µA	$V_{DS} = -50$ V, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	−1.0	—	−2.0	V	$I_D = -1$ mA, $V_{DS} = -10$ V
Static drain to source on state	$R_{DS(on)}$	—	0.15	0.20	Ω	$I_D = -4$ A, $V_{GS} = -10$ V *
resistance		—	0.20	0.27		$I_D = -4$ A, $V_{GS} = -4$ V *
Forward transfer admittance	$\|y_{fs}\|$	3.5	6.0	—	S	$I_D = -4$ A $V_{DS} = -10$ V *
Input capacitance	Ciss	—	900	—	pF	$V_{DS} = -10$ V
Output capacitance	Coss	—	460	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	Crss	—	130	—	pF	f = 1 MHz
Turn–on delay time	$t_{d(on)}$	—	8	—	ns	$I_D = -4$ A
Rise time	t_r	—	50	—	ns	$V_{GS} = -10$ V
Turn–off delay time	$t_{d(off)}$	—	180	—	ns	$R_L = 7.5$ Ω
Fall time	t_f	—	95	—	ns	
Body–drain diode forward voltage	V_{DF}	—	−1.2	—	V	$I_F = -8$ A, $V_{GS} = 0$
Body–drain diode reverse recovery time	t_{rr}	—	185	—	ns	$I_F = -8$ A, $V_{GS} = 0$, diF / dt = 50 A / µs

*   Pulse Test

See characteristics curves of 2SJ172

Maximum Channel Dissipation Curve

Condition : Channel dissipation of each die is is idetical

4 Device Operation
3 Device Operation
2 Device Operation
1 Device Operation

Collector Power Dissipation   Pc (W)

Ambient Temperature   Tc (°C)

Maximum Channel Dissipation Curve

Condition : Channel dissipation of each die is is idetical

4 Device Operation
3 Device Operation
2 Device Operation
1 Device Operation

Collector Power Dissipation   Pc (W)

Case Temperature   Tc (°C)

Maximum Safe Operation Area
(N–channel)

Drain Current I_D (A)

10 µs
100 µs
PW = 1 ms
10 ms (1shot)
DC Operation (Tc = 25 °C)

Operation in this area is limited by $R_{DS(on)}$

Ta = 25 °C

Drain to Source Voltage V_{DS} (V)

Maximum Safe Operation Area
(P–channel)

Drain Current I_D (A)

10 µs
100 µs
PW = 1 ms
10 ms (1shot)
DC Operation (Tc = 25 °C)

Operation in this area is limited by $R_{DS(on)}$

Ta = 25 °C

Drain to Source Voltage V_{DS} (V)