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# PM50302F

Silicon N-Channel Power MOS FET Module

## HITACHI

November 1996

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### Application

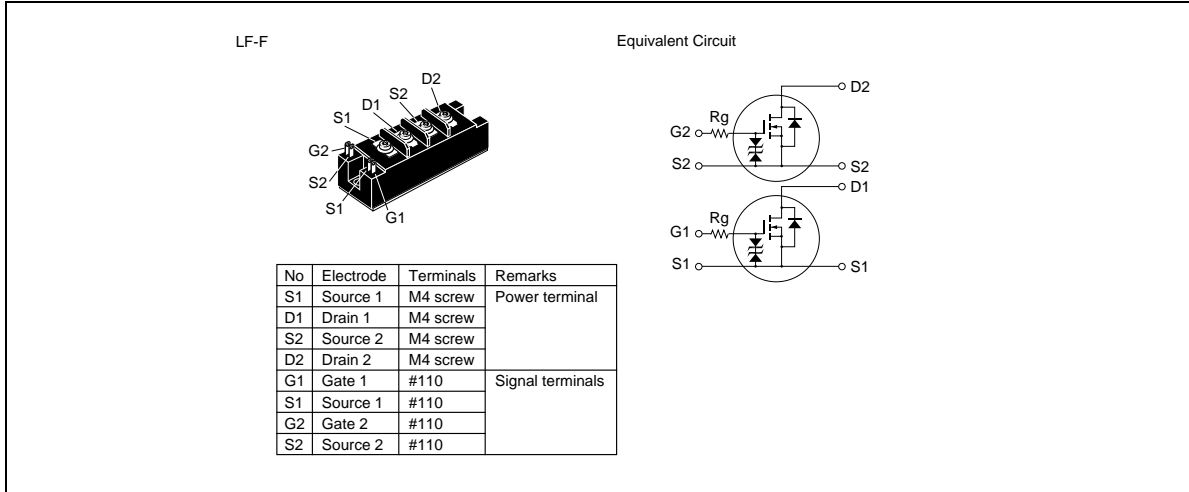
High Speed Power Switching

### Features

- Equipped with Power MOS FET
- Low on-resistance
- High speed switching
- Low drive current
- Wide area of safe operation
- Inherent parallel diode between source and drain
- Isolated base from Terminal
- Suitable for motor driver, switching regulator and etc.

# PM50302F

## Outline



### Absolute Maximum Ratings (Ta = 25°C) (Per FET chip)

Item	Symbol	Rating	Unit
Drain source voltage	$V_{DSS}$	500	V
Gate source voltage	$V_{GSS}$	±20	V
Drain current	$I_D$	30	A
Drain peak current	$I_{D(peak)}$	60	A
Body to drain diode reverse drain current	$I_{DR}$	30	A
Body to drain diode reverse drain peak current	$I_{DR(peak)}$	60	A
Channel dissipation	$P_{ch}^{*1}$	200	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-45 to +125	°C
Insulation dielectric	$V_{isol}^{*2}$	2000	V

- Notes
1. Value at Tc = 25°C
  2. Base to terminals AC minute

**Electrical Characteristics (Ta = 25°C) (Per FET chip)**

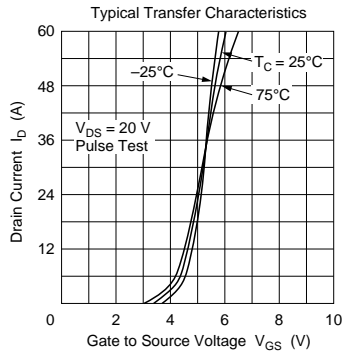
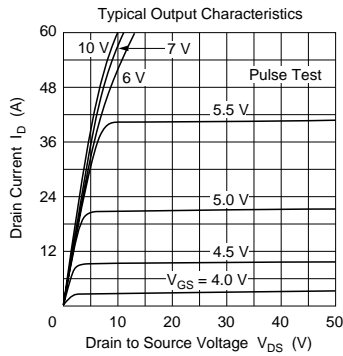
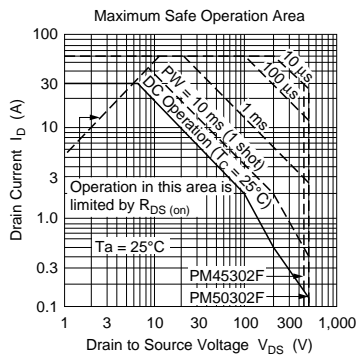
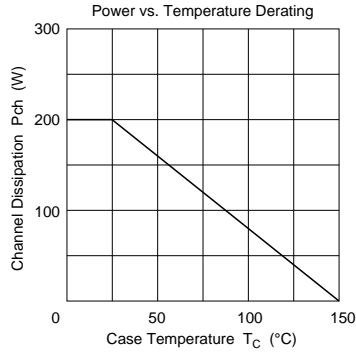
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	500	—	—	V	$I_D = 10 \text{ mA}, V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	±50	μA	$V_{GS} = \pm 16 \text{ V}, V_{DS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	±20	—	—	V	$I_G = \pm 100 \text{ } \mu\text{A}, V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	mA	$V_{DS} = 400 \text{ V}, V_{GS} = 0$
Gate to source threshold voltage	$V_{GS(th)}$	1.5	—	4.0	V	$I_D = 1 \text{ mA}, V_{DS} = 10 \text{ V}$
Drain to source saturation voltage	$V_{DS(on)}$	—	2.25	3.0	V	$I_D = 15 \text{ A}, V_{GS} = 10 \text{ V}^{*1}$
Static Drain to source on state resistance	$R_{DS(on)}$	—	0.15	0.20	Ω	$I_D = 15 \text{ A}, V_{GS} = 10 \text{ V}^{*1}$
Forward transfer admittance	$ y_{fs} $	15	25	—	S	$I_D = 15 \text{ A}, V_{DS} = 10 \text{ V}^{*1}$
Input capacitance	Ciss	—	6150	—	pF	$V_{DS} = 10 \text{ V}, V_{GS} = 0 \text{ V}$
Output capacitance	Coss	—	2160	—	pF	$f = 1 \text{ MHz}$
Reverse transfer capacitance	Crss	—	240	—	pF	
Turn-on delay time	$t_{d(on)}$	—	100	—	ns	$I_D = 15 \text{ A}, V_{GS} = 10 \text{ V}$
Rise time	$t_r$	—	480	—	ns	$R_L = 2 \text{ } \Omega$
Turn-off delay time	$t_{d(off)}$	—	500	—	ns	
Fall time	$t_f$	—	400	—	ns	
Body to drain diode forward voltage	$V_{DF}$	—	1.2	—	V	$I_F = 15 \text{ A}, V_{GS} = 0$
Body to drain diode reverse recovery time	$t_{rr}$	—	200	—	ns	$I_F = 15 \text{ A}, V_{GS} = 0$ $diF/dt = 100 \text{ A}/\mu\text{s}$

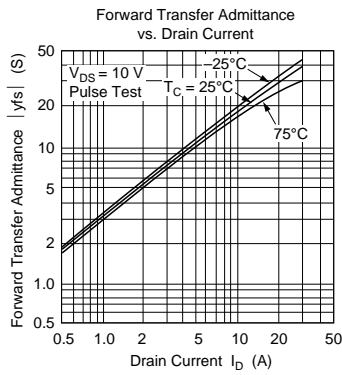
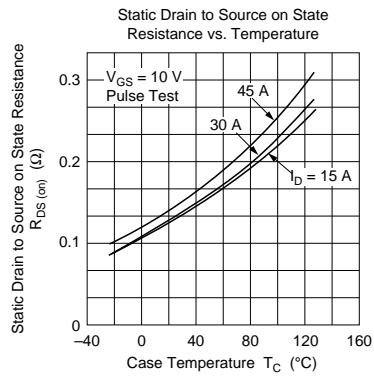
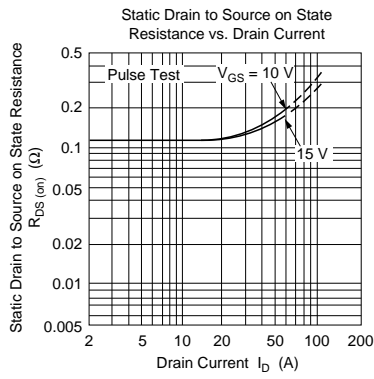
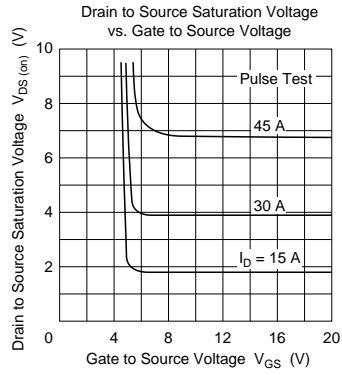
Note 1. Pulse Test

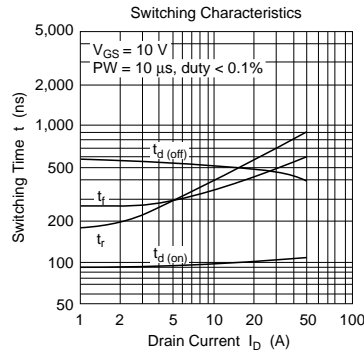
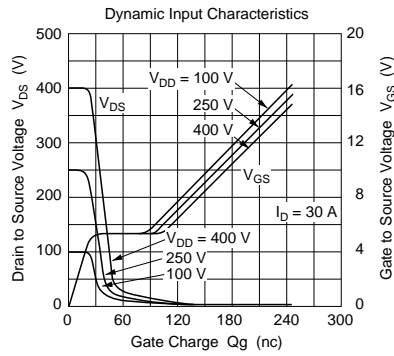
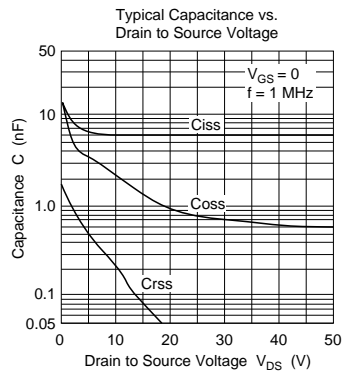
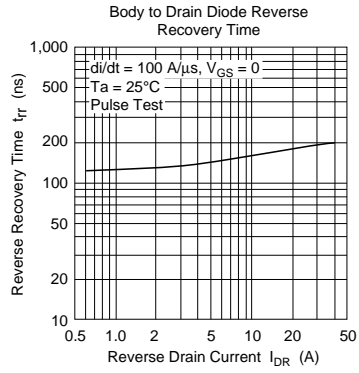
**Mechanical Characteristics**

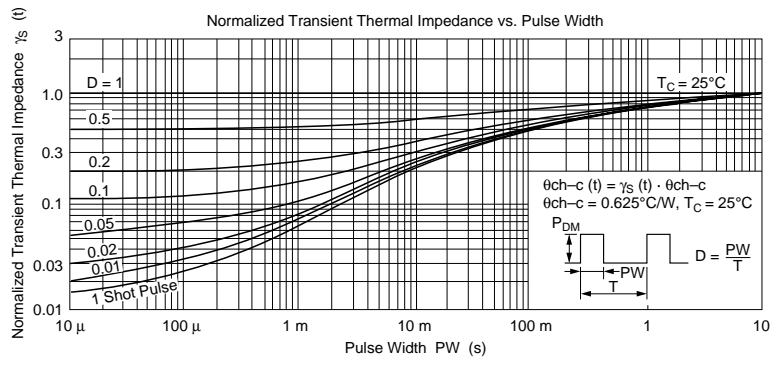
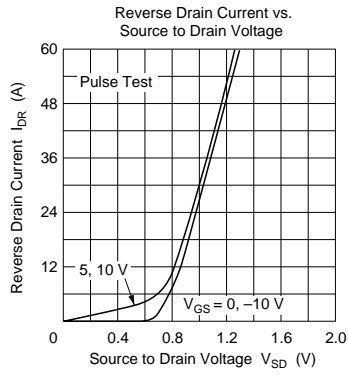
Item	Symbol	Condition	Rating	Unit
Fixing strength	—	Mounting into main-terminal with M4 screw	15 to 20	kg•cm
	—	Mounting into heat sink with M5 screw	15 to 25	kg•cm
Weight	—	Typical value	220	g

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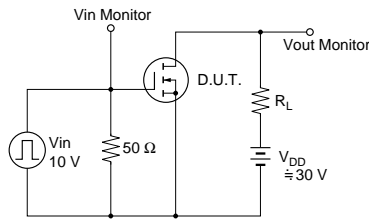




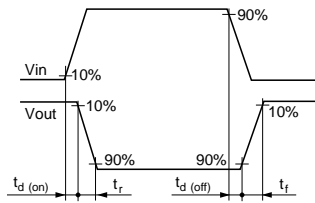




Switching Time Test Circuit



Waveforms



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