Silicon P-Channel MOS FET

HITACHI

November 1996

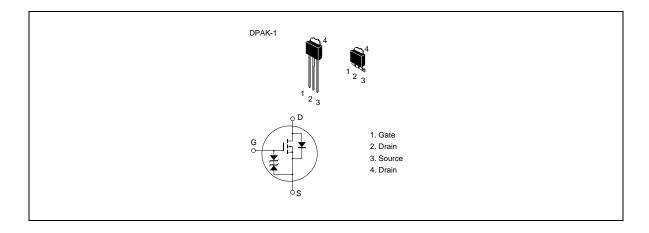
Application

High speed power switching

Features

- Low on-resistance
- High speed switching
- Low drive current
- 4 V gate drive device
 - Can be driven from 5 V source
- Suitable for motor drive, DC-DC converter, power switch and solenoid drive

Outline



Absolute Maximum Ratings ($Ta = 25^{\circ}C$)

Item	Symbol	Ratings	Unit
Drain to source voltage	V _{DSS}	-60	V
Gate to source voltage	V _{GSS}	±20	V
Drain current	I _D	-3	A
Drain peak current	I _{D(pulse)} *1	-12	A
Body to drain diode reverse drain current	I _{DR}	-3	A
Channel dissipation	Pch*2	20	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-55 to +150	°C

Notes 1. $PW \le 10 \mu s$, duty cycle $\le 1\%$

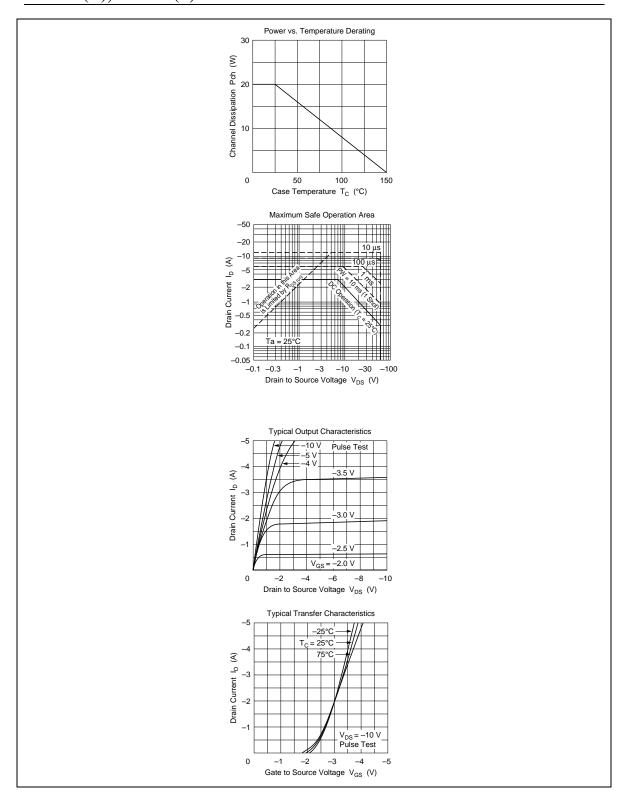
2. Value at $T_c = 25$ °C

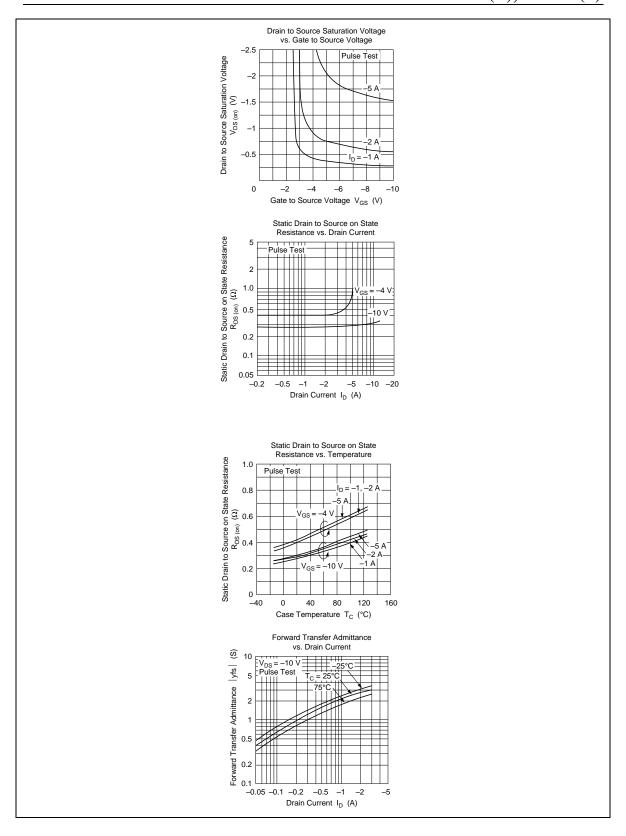
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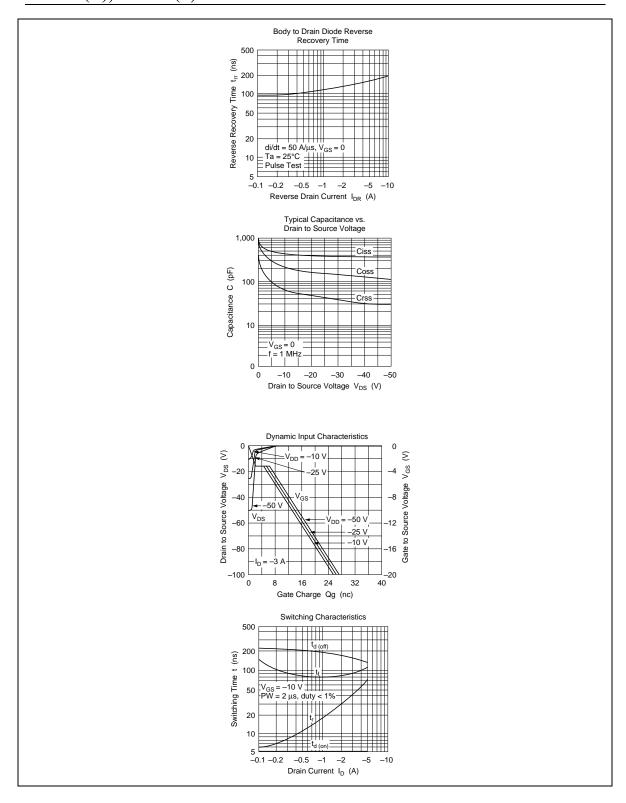
Electrical Characteristics ($Ta = 25^{\circ}C$)

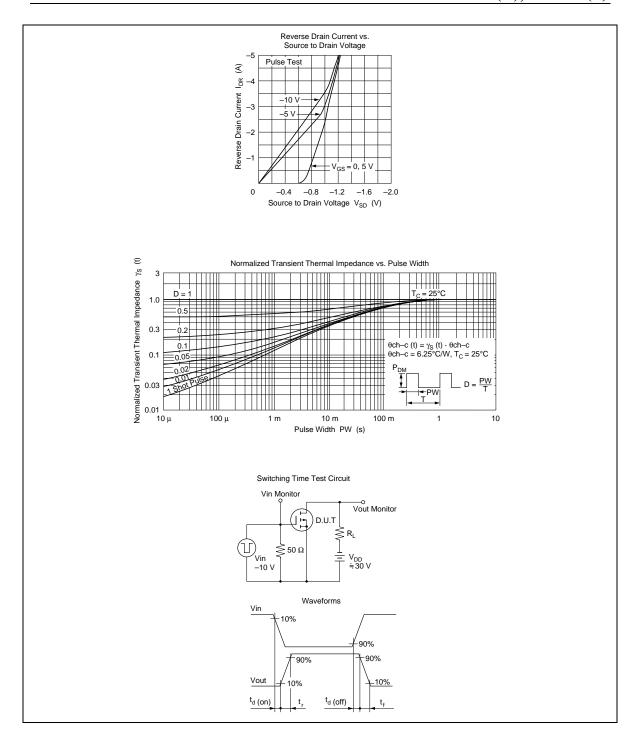
Item	Symbol	Min	Тур	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	-60	_	_	V	$I_{D} = -10 \text{ mA}, V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	±20	_	_	V	$I_{G} = \pm 100 \ \mu A, \ V_{DS} = 0$
Gate to source leak current	I _{GSS}	_	_	±10	μΑ	$V_{gs} = \pm 16 \text{ V}, V_{ds} = 0$
Zero gate voltage drain current	I _{DSS}	_	_	-100	μΑ	$V_{DS} = -50 \text{ V}, V_{GS} = 0$
Gate to source cutoff voltage	$V_{\text{GS(off)}}$	-1.0	_	-2.0	V	$I_{D} = -1 \text{ mA}, V_{DS} = -10 \text{ V}$
Static drain to source on state resistance	R _{DS(on)}	_	0.28	0.40	Ω	$I_D = -2 \text{ A}, V_{GS} = -10 \text{ V}^{*1}$
		_	0.40	0.55	_	$I_D = -2 \text{ A}, V_{GS} = -4 \text{ V}^{*1}$
Forward transfer admittance	y _{fs}	1.6	2.7	_	S	$I_D = -2 \text{ A}, V_{DS} = -10 \text{ V}^{*1}$
Input capacitance	Ciss	_	425	_	pF	$V_{DS} = -10 \text{ V}, V_{GS} = 0,$ f = 1 MHz
Output capacitance	Coss	_	225	_	pF	_
Reverse transfer capacitance	Crss	_	60	_	pF	_
Turn-on delay time	t _{d(on)}	_	5	_	ns	$I_{D} = -2 \text{ A}, V_{GS} = -10 \text{ V},$ $R_{L} = 15 \Omega$
Rise time	t,	_	30	_	ns	_
Turn-off delay time	t _{d(off)}	_	160	_	ns	_
Fall time	t _f	_	85	_	ns	_
Body to drain diode forward voltage	V_{DF}	_	-1.05	_	V	$I_F = -3 \text{ A}, V_{GS} = 0$
Body to drain diode reverse recovery time	t _{rr}	_	140	_	ns	$I_F = -3 \text{ A}, V_{GS} = 0,$ $di_F/dt = 50 \text{ A}/\mu\text{s}$

Note 1. Pulse test









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