
2SJ291

Silicon P-Channel MOS FET

HITACHI

November 1996

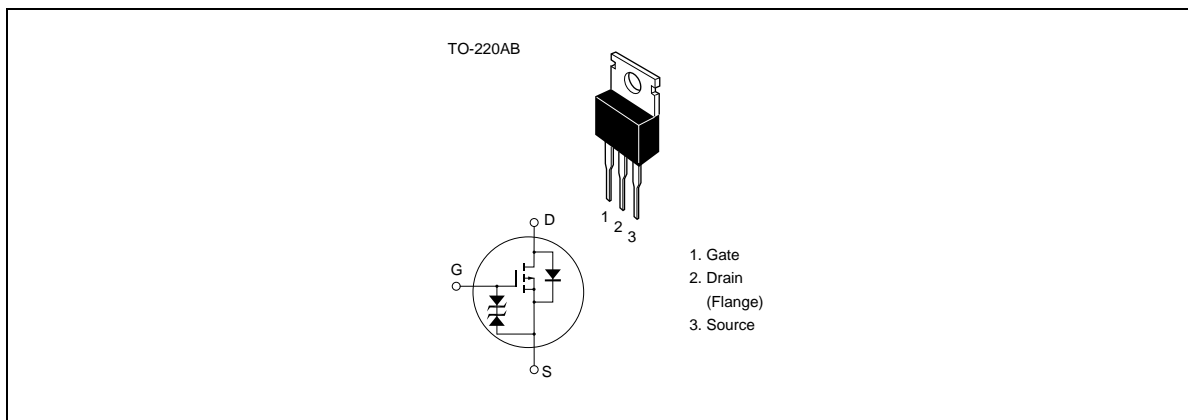
Application

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 switching regulator, DC-DC converter
- Avalanche ratings

Outline



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Absolute Maximum Ratings (Ta = 25°C)

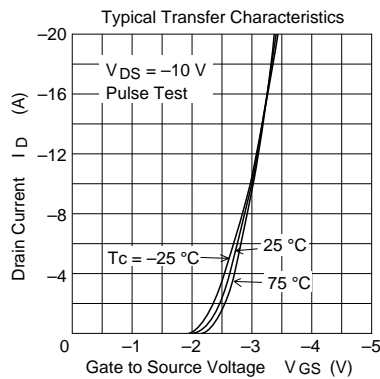
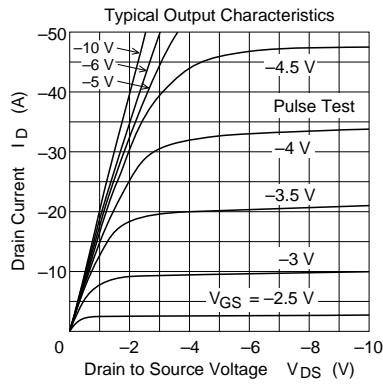
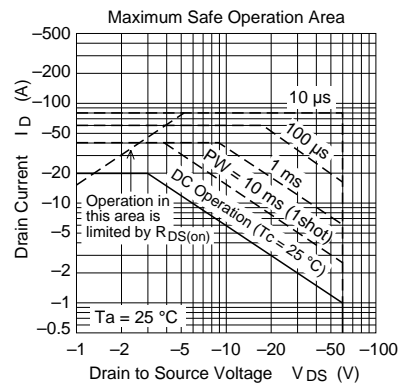
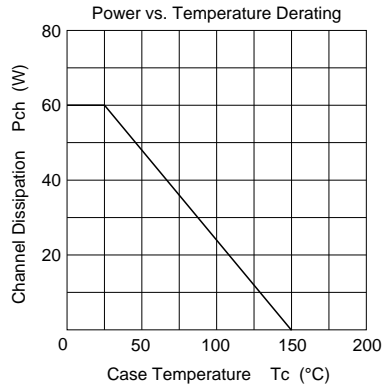
Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DS}	−60	V
Gate to source voltage	V_{GS}	±20	V
Drain current	I_D	−20	A
Drain peak current	$I_{D(pulse)}^{*1}$	−80	A
Body to drain diode reverse drain current	I_{DR}	−20	A
Avalanche current	I_{AP}^{*3}	−20	A
Avalanche energy	E_{AR}^{*3}	34	mJ
Channel dissipation	Pch^{*2}	60	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	−55 to +150	°C

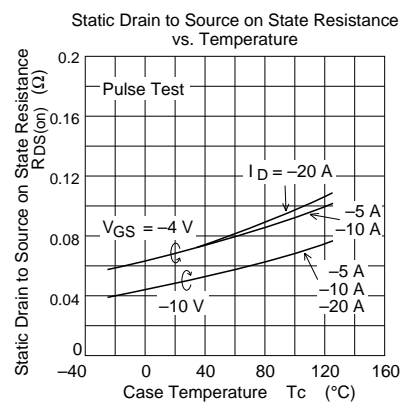
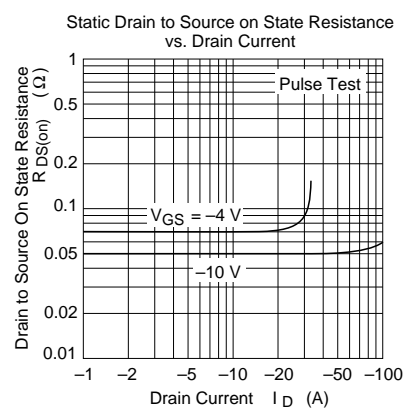
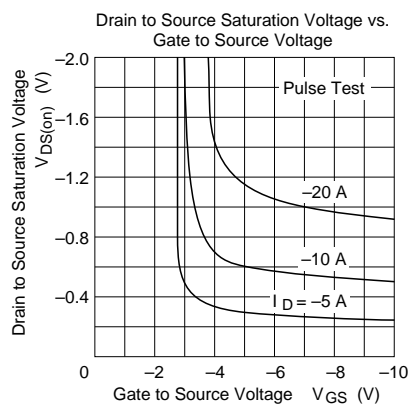
Notes 1. $PW \leq 10 \mu s$, duty cycle $\leq 1\%$
2. Value at $T_c = 25^\circ C$
3. Value at Tch = 25°C, $R_g \geq 50 \Omega$

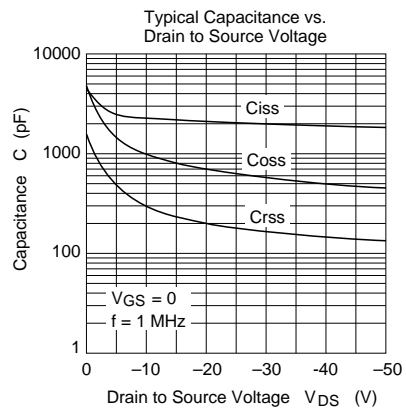
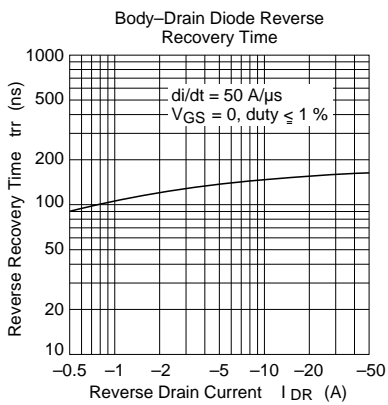
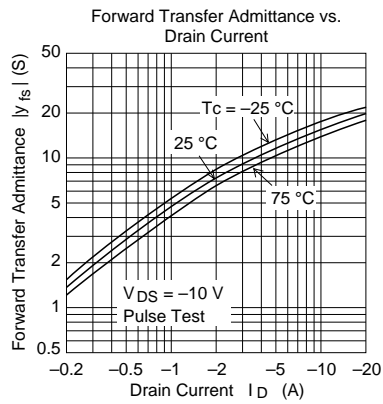
Electrical Characteristics (Ta = 25°C)

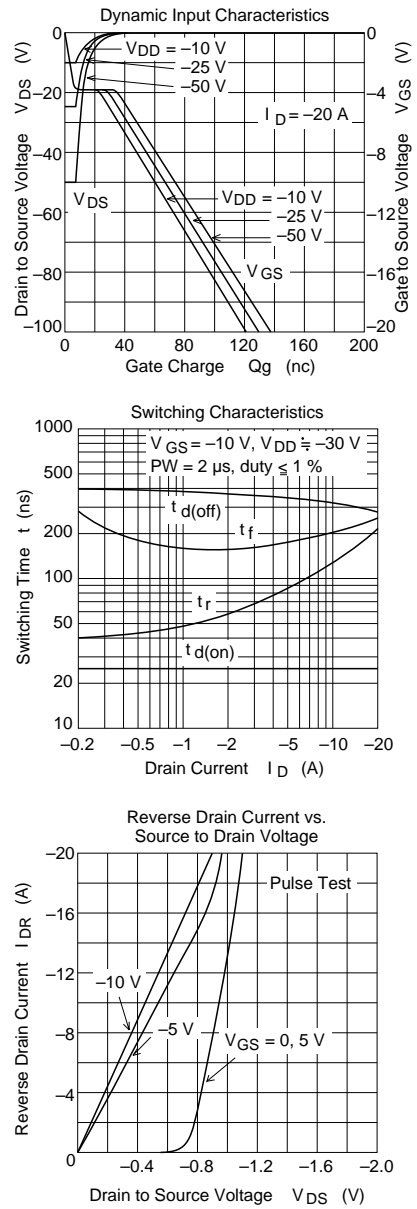
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	-60	—	—	V	$I_D = -10 \text{ mA}$, $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	± 20	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}$, $V_{DS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 16 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	-250	μA	$V_{DS} = -50 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	-1.0	—	-2.25	V	$I_D = -1 \text{ mA}$, $V_{DS} = -10 \text{ V}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.05	0.065	Ω	$I_D = -10 \text{ A}$, $V_{GS} = -10 \text{ V}^{*1}$
		—	0.07	0.095	Ω	$I_D = -10 \text{ A}$, $V_{GS} = -4 \text{ V}^{*1}$
Forward transfer admittance	$ y_{fs} $	10	16	—	S	$I_D = -10 \text{ A}$, $V_{DS} = -10 \text{ V}^{*1}$
Input capacitance	C_{iss}	—	2200	—	pF	$V_{DS} = -10 \text{ V}$, $V_{GS} = 0$, $f = 1 \text{ MHz}$
Output capacitance	C_{oss}	—	1000	—	pF	
Reverse transfer capacitance	C_{rss}	—	300	—	pF	
Turn-on delay time	$t_{d(on)}$	—	25	—	ns	$I_D = -10 \text{ A}$, $V_{GS} = -10 \text{ V}$, $R_L = 3 \text{ }\Omega$
Rise time	t_r	—	130	—	ns	
Turn-off delay time	$t_{d(off)}$	—	320	—	ns	
Fall time	t_f	—	210	—	ns	
Body to drain diode forward voltage	V_{DF}	—	-1.1	—	V	$I_F = -20 \text{ A}$, $V_{GS} = 0$
Body to drain diode reverse recovery time	t_{rr}	—	160	—	ns	$I_F = -20 \text{ A}$, $V_{GS} = 0$, $di_F/dt = 50 \text{ A}/\mu\text{s}$

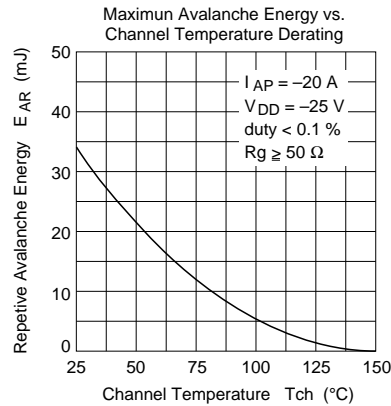
Note 1. Pulse test



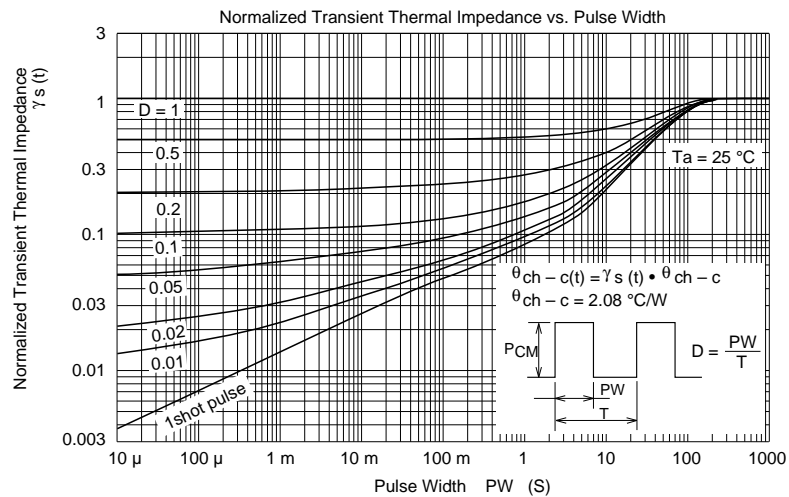
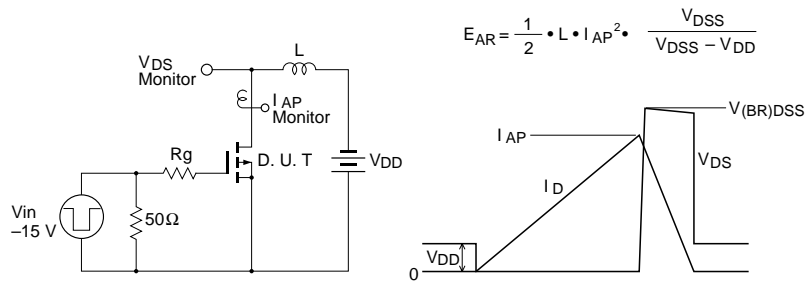




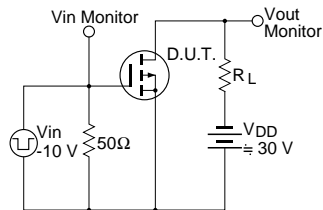




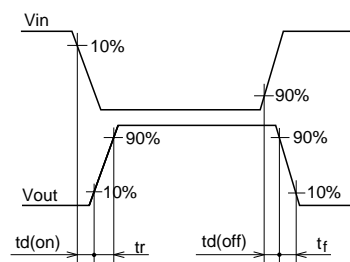
Avalanche Test Circuit and Waveform



Switching Time Test Circuit



Waveforms



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