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# 2SJ291

Silicon P-Channel MOS FET

## HITACHI

November 1996

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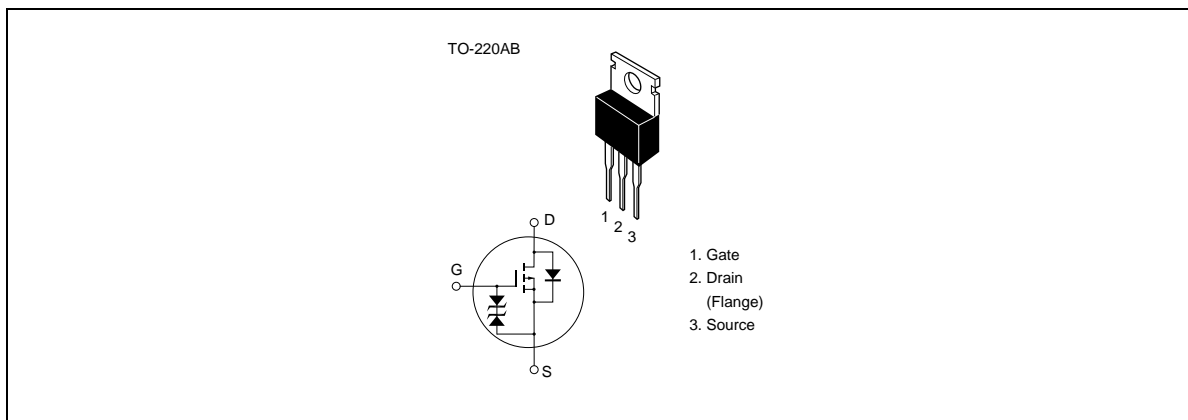
### Application

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



## 2SJ291

### Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DSS}$	-60	V
Gate to source voltage	$V_{GSS}$	±20	V
Drain current	$I_D$	-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

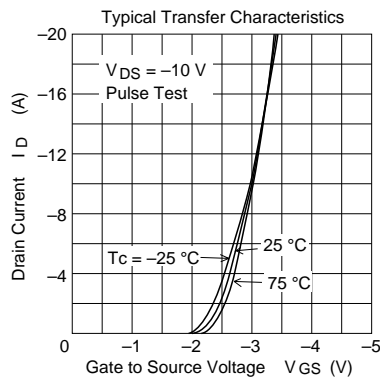
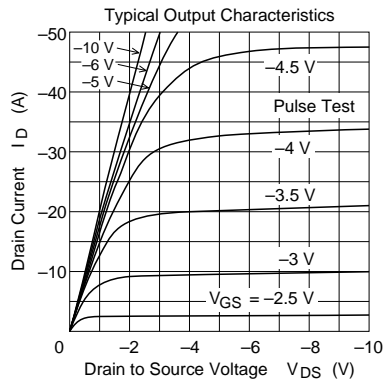
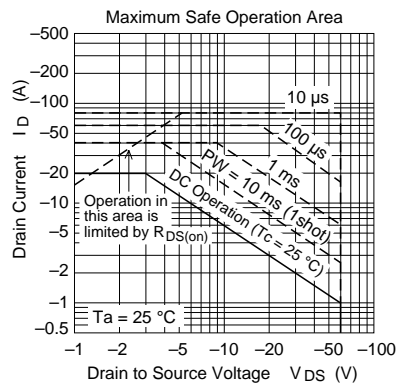
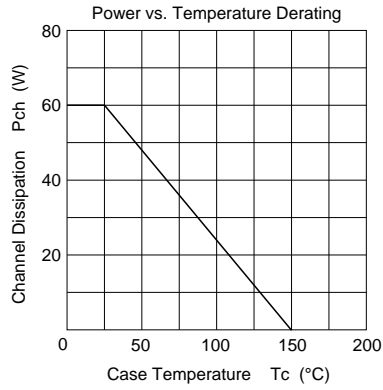
- Notes
1.  $PW \leq 10 \mu s$ , duty cycle  $\leq 1\%$
  2. Value at  $T_c = 25^\circ C$
  3. Value at  $Tch = 25^\circ C$ ,  $Rg \geq 50 \Omega$

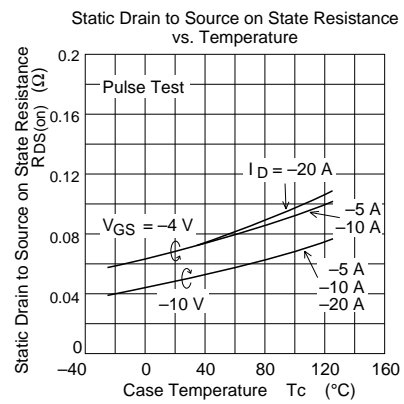
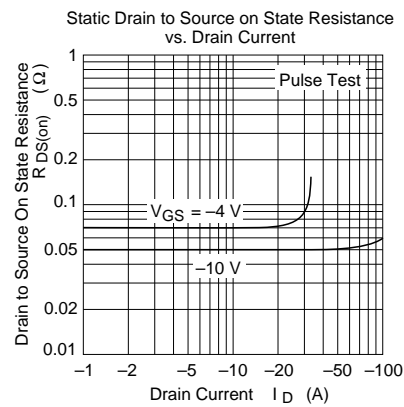
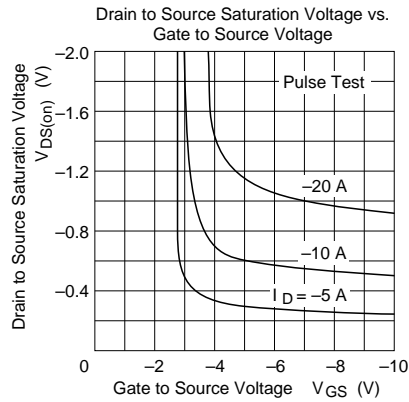
## Electrical Characteristics (Ta = 25°C)

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	$V_{(BR)GSS}$	$\pm 20$	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}, V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 16 \text{ V}, V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	-250	$\mu\text{A}$	$V_{DS} = -50 \text{ V}, V_{GS} = 0$
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	$\Omega$	$I_D = -10 \text{ A}, V_{GS} = -10 \text{ V}^{*1}$
		—	0.07	0.095	$\Omega$	$I_D = -10 \text{ A}, V_{GS} = -4 \text{ V}^{*1}$
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	$I_F = -20 \text{ A}, V_{GS} = 0,$ $di_F/dt = 50 \text{ A}/\mu\text{s}$

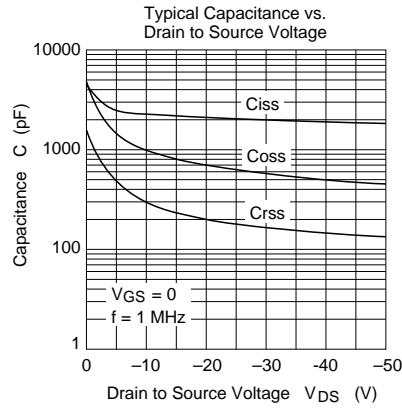
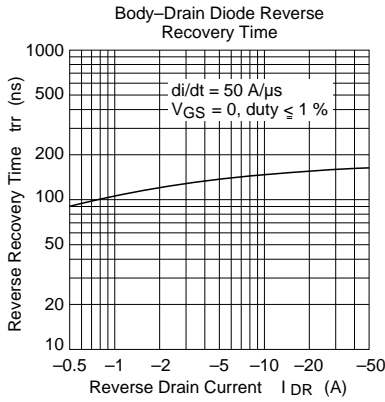
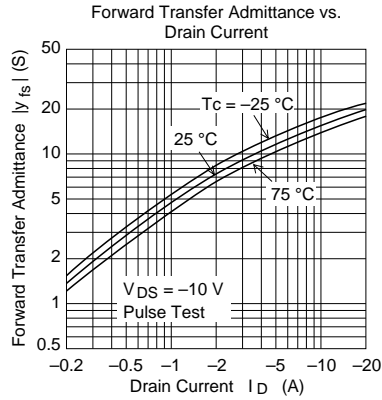
Note 1. Pulse test

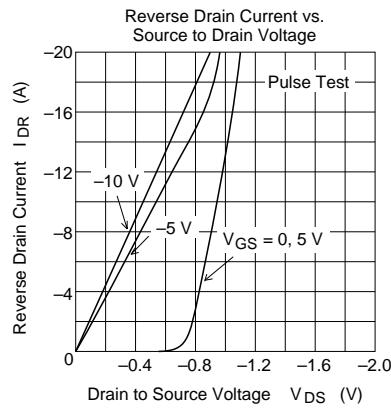
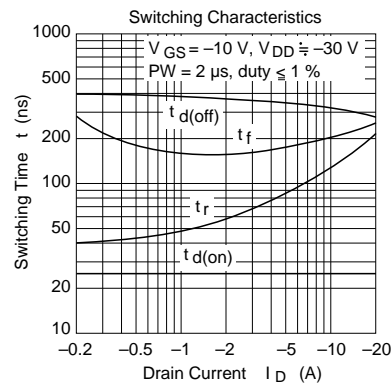
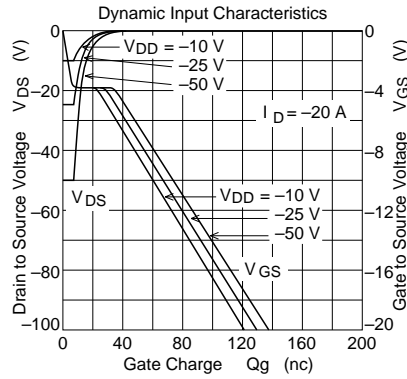
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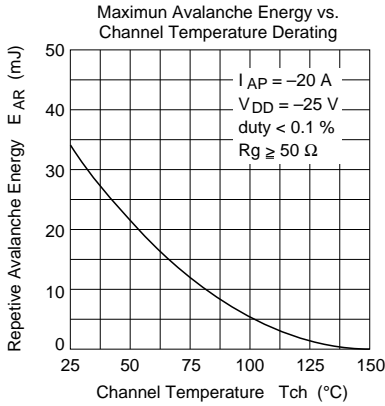
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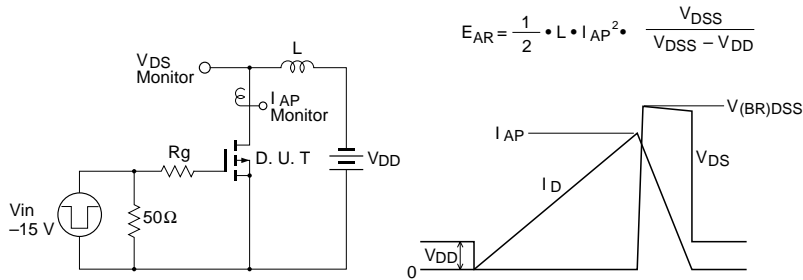


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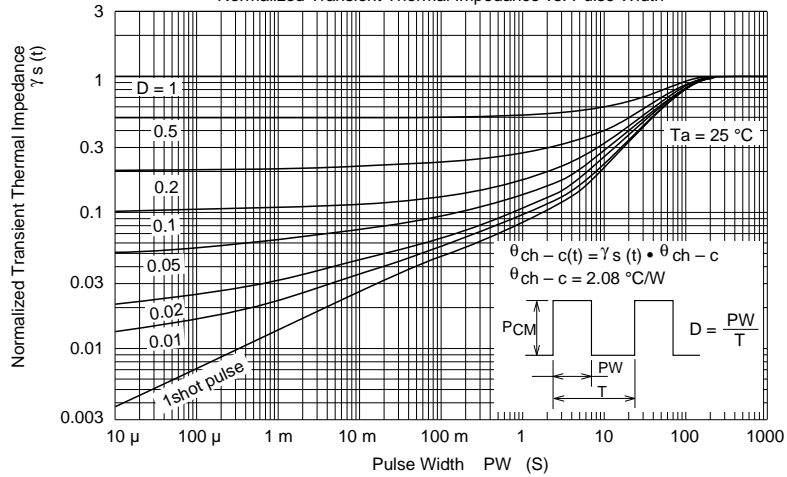
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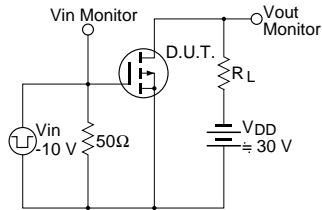
Avalanche Test Circuit and Waveform



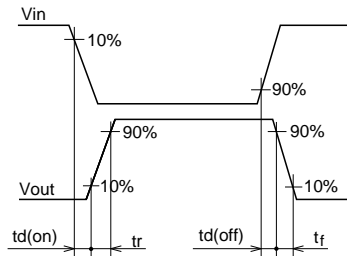
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



Waveforms





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