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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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2SJ506(L), 2SJ506(S)

Silicon P Channel MOS FET
High Speed Power Switching

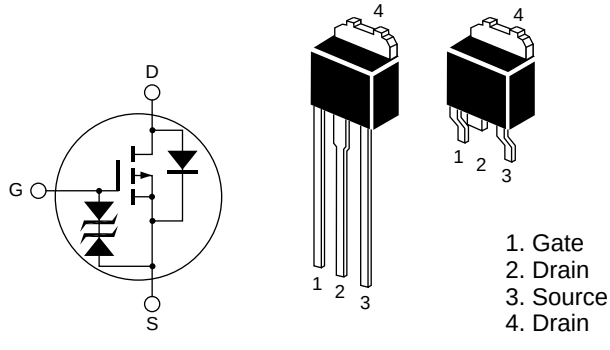
ADE-208-548C (Z)
4th. Edition
Jun. 1998

Features

- Low on-resistance
  $R_{DS(on)}$ = 0.065 Ω typ. (at V_{GS} = –10V, I_D = –5A)
- Low drive current
- High speed switching
- 4V gate drive devices.

Outline

DPAK–2



1. Gate
2. Drain
3. Source
4. Drain

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	–30	V
Gate to source voltage	V_{GSS}	±20	V
Drain current	I_D	–10	A
Drain peak current	$I_{D(pulse)}$ Note1	–40	A
Body to drain diode reverse drain current	I_{DR}	–10	A
Channel dissipation	Pch Note2	20	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

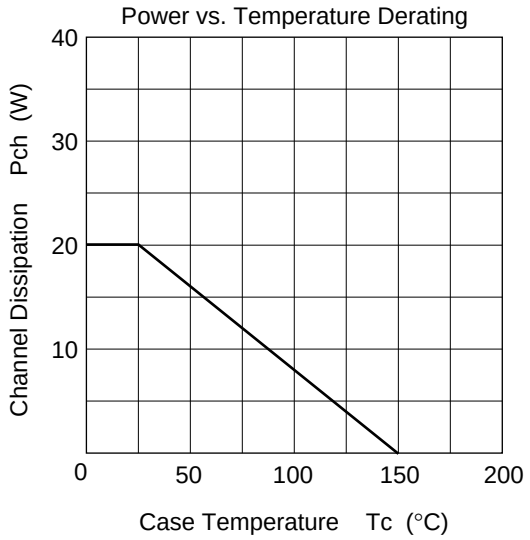
Notes: 1. PW ≤ 10μs, duty cycle ≤ 1 %
2. Value at Tc = 25°C

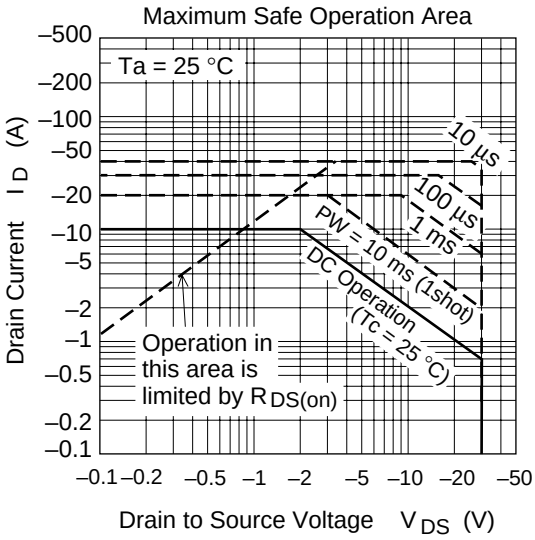
Electrical Characteristics (Ta = 25°C)

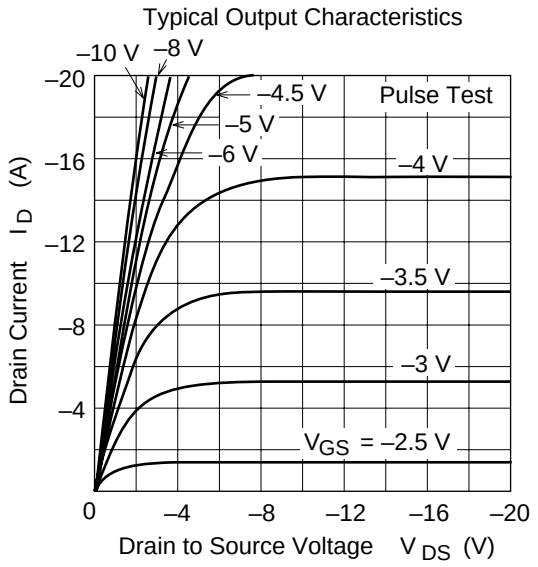
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	–30	—	—	V	I_D = –10mA, V_{GS} = 0
Gate to source breakdown voltage	$V_{(BR)GSS}$	±20	—	—	V	I_G = ±100µA, V_{DS} = 0
Zero gate voltege drain current	I_{DSS}	—	—	–10	µA	V_{DS} = –30 V, V_{GS} = 0
Gate to source leak current	I_{GSS}	—	—	±10	µA	V_{GS} = ±16V, V_{DS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	–1.0	—	–2.0	V	I_D = –1mA, V_{DS} = –10V
Static drain to source on state resistance	$R_{DS(on)}$	—	65	85	mΩ	I_D = –5A, V_{GS} = –10V Note3
	$R_{DS(on)}$	—	110	180	mΩ	I_D = –5A, V_{GS} = –4V Note3
Forward transfer admittance	$\|y_{fs}\|$	10	16	—	S	I_D = –5A, V_{DS} = –10V Note3
Input capacitance	Ciss	—	660	—	pF	V_{DS} = –10V
Output capacitance	Coss	—	440	—	pF	V_{GS} = 0
Reverse transfer capacitance	Crss	—	140	—	pF	f = 1MHz
Turn-on delay time	$t_{d(on)}$	—	12	—	ns	I_D = –5A, R_L = 2Ω
Rise time	t_r	—	65	—	ns	V_{GS} = –10V
Turn-off delay time	$t_{d(off)}$	—	85	—	ns	
Fall time	t_f	—	65	—	ns	
Body to drain diode forward voltage	V_{DF}	—	–1.05	—	V	I_F = –10A, V_{GS} = 0
Body to drain diode reverse recovery time	t_{rr}	—	65	—	ns	I_F = –10A, V_{GS} = 0 diF/ dt = 50A/µs

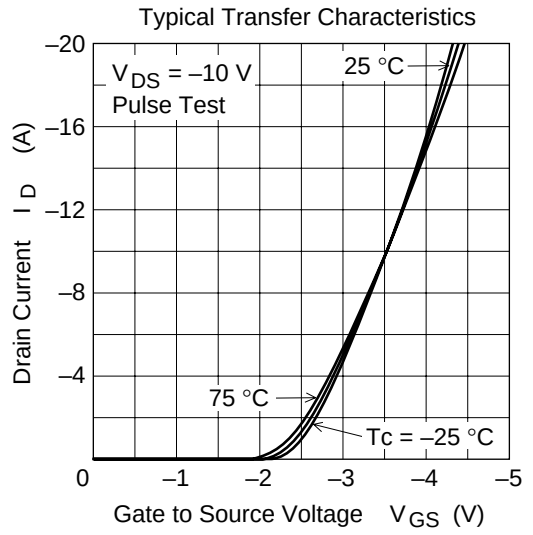
Note: 3. Pulse test

Main Characteristics

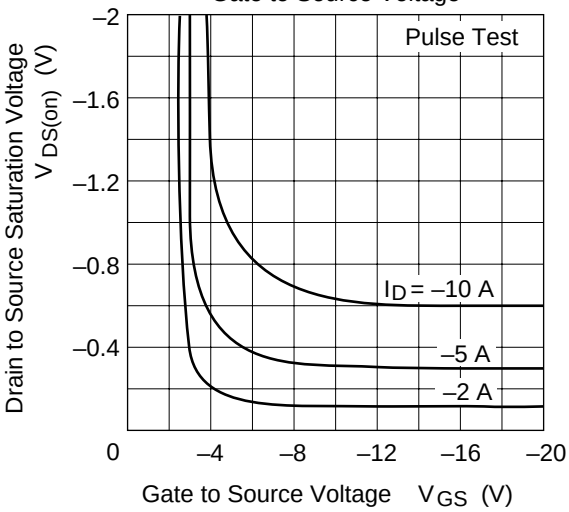




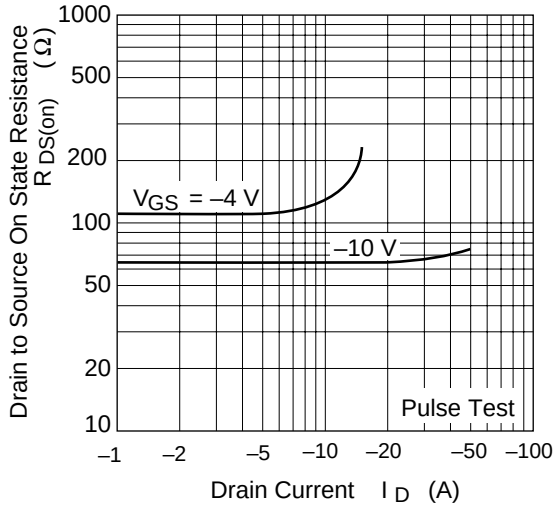




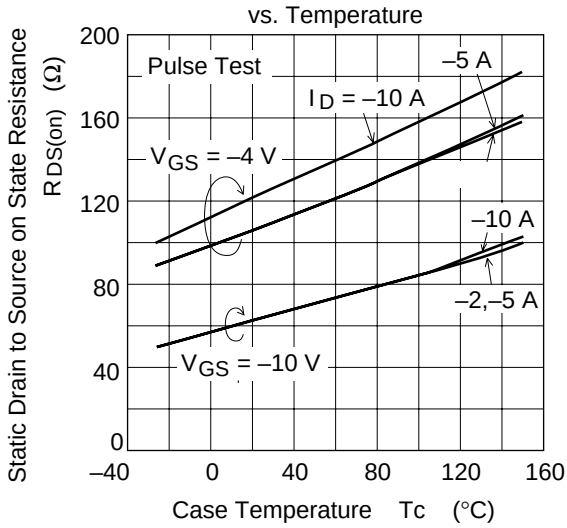
Drain to Source Saturation Voltage vs. Gate to Source Voltage



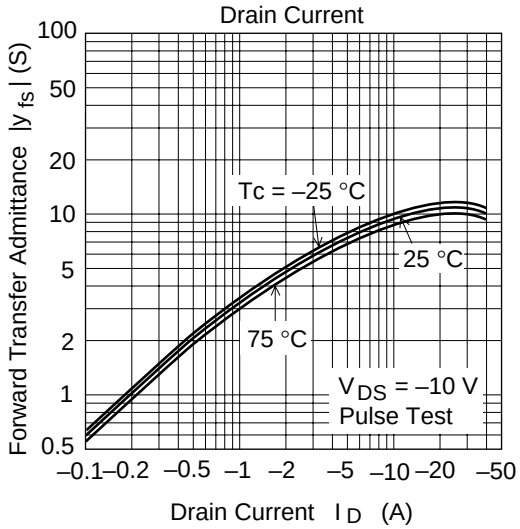
Static Drain to Source on State Resistance vs. Drain Current



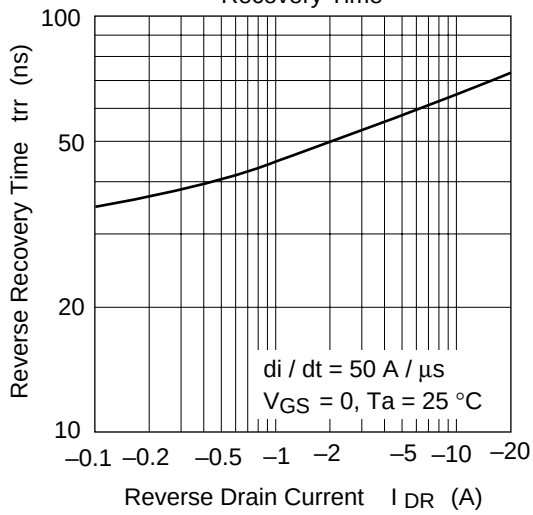
Static Drain to Source on State Resistance vs. Temperature



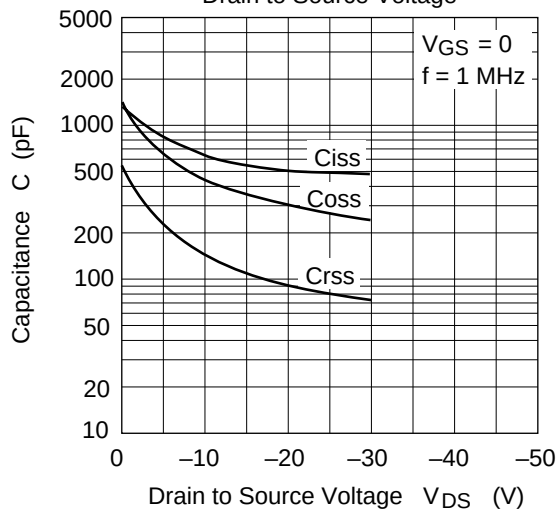
Forward Transfer Admittance vs. Drain Current



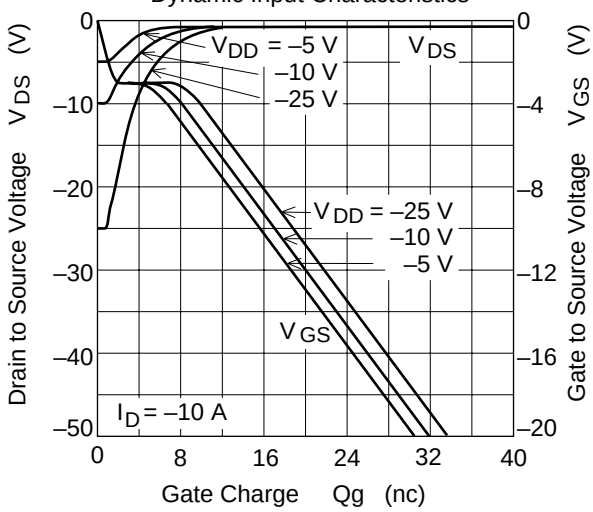
Body to Drain Diode Reverse Recovery Time



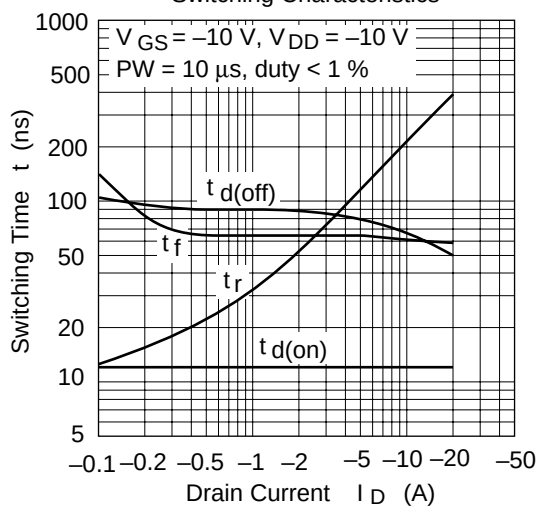
Typical Capacitance vs. Drain to Source Voltage

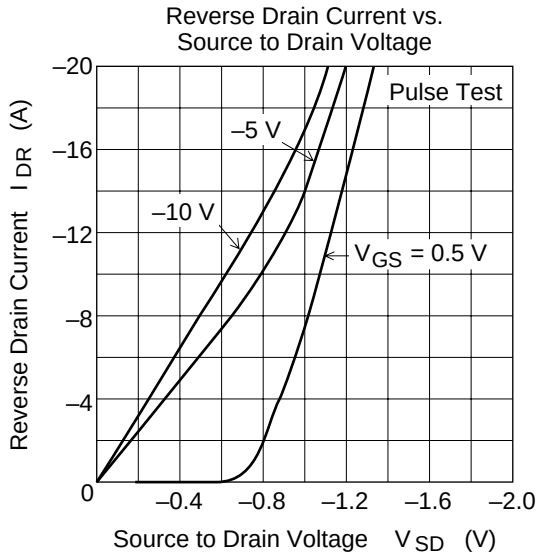


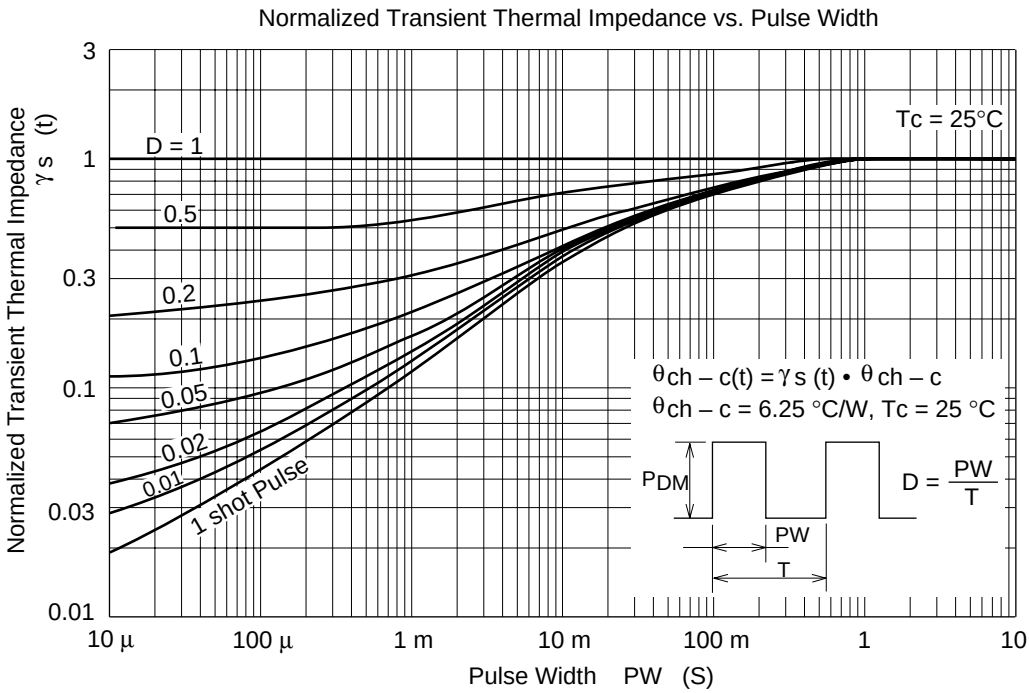
Dynamic Input Characteristics



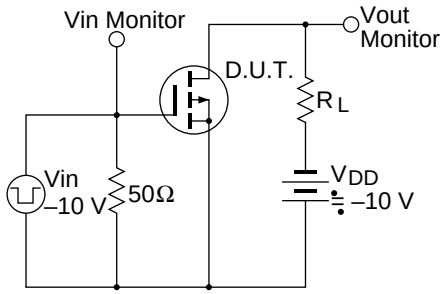
Switching Characteristics



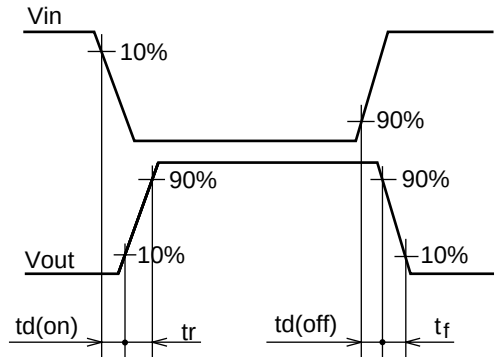

Reverse Drain Current vs.
Source to Drain Voltage
Pulse Test
–5 V
–10 V
VGS = 0.5 V
Reverse Drain Current IDR (A)
–20
–16
–12
–8
–4
0
–0.4
–0.8
–1.2
–1.6
–2.0
Source to Drain Voltage VSD (V)


Normalized Transient Thermal Impedance vs. Pulse Width
Tc = 25°C
D = 1
0.5
0.2
0.1
0.05
0.02
0.01
1 shot Pulse
θch – c(t) = γs (t) • θch – c
θch – c = 6.25 °C/W, Tc = 25 °C
PDM
PW
T
D = PW/T
Normalized Transient Thermal Impedance γs (t)
3
1
0.3
0.1
0.03
0.01
10 μ
100 μ
1 m
10 m
100 m
1
10
Pulse Width PW (S)

Switching Time Test Circuit



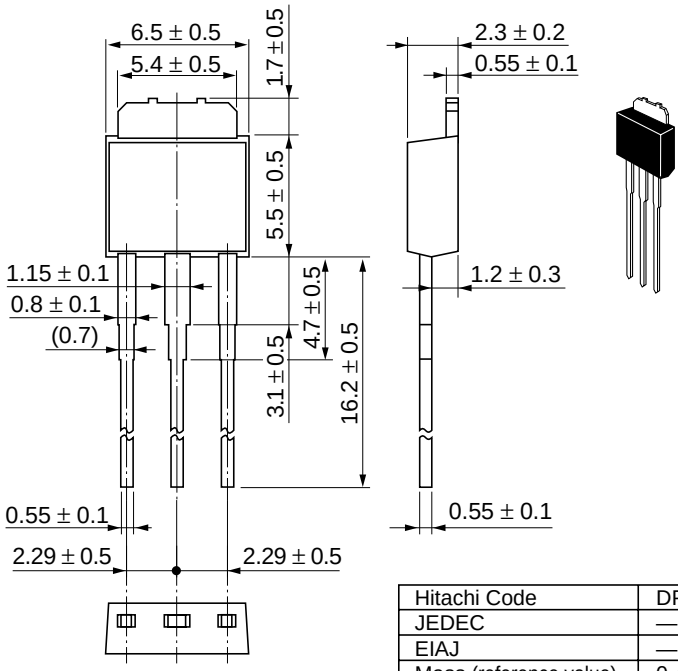
Waveforms



Package Dimensions

As of January, 2001

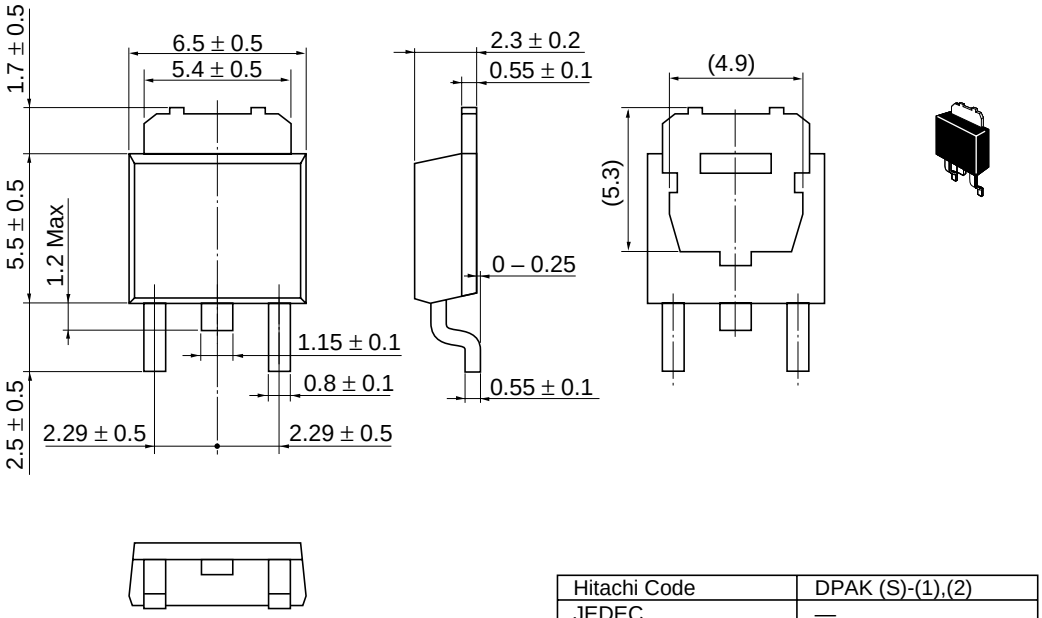
Unit: mm



Hitachi Code	DPAK (L)-(2)
JEDEC	—
EIAJ	—
Mass (reference value)	0.42 g

As of January, 2001

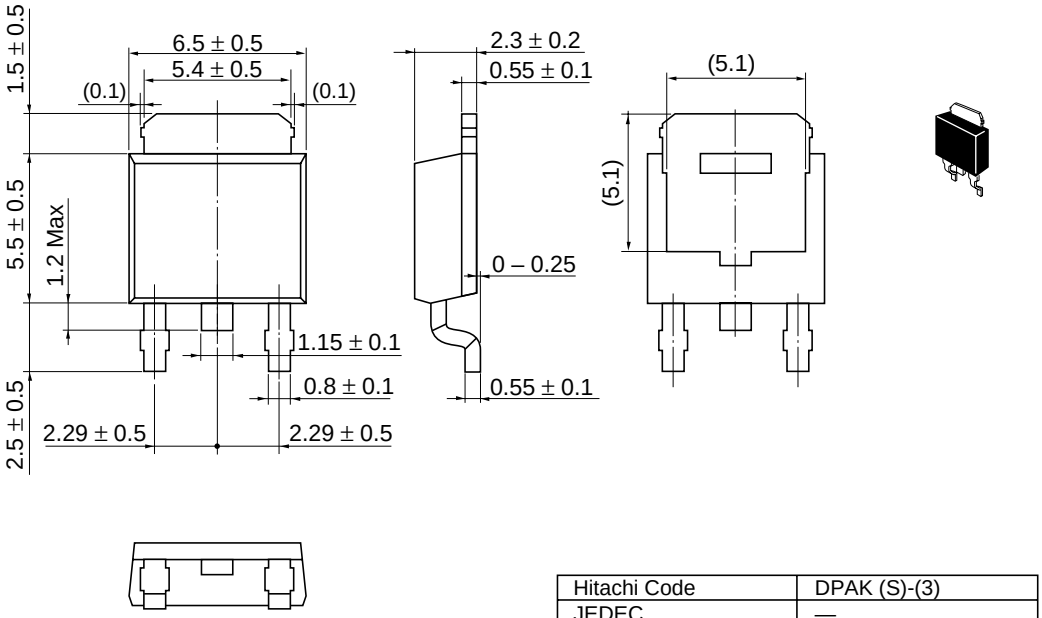
Unit: mm



Hitachi Code	DPAK (S)-(1),(2)
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.28 g

As of January, 2001

Unit: mm



Hitachi Code	DPAK (S)-(3)
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.28 g

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