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April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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EOL announced Product

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2SK1947

Silicon N Channel MOS FET

REJ03G0986-0300
Rev.3.00
May 13, 2009

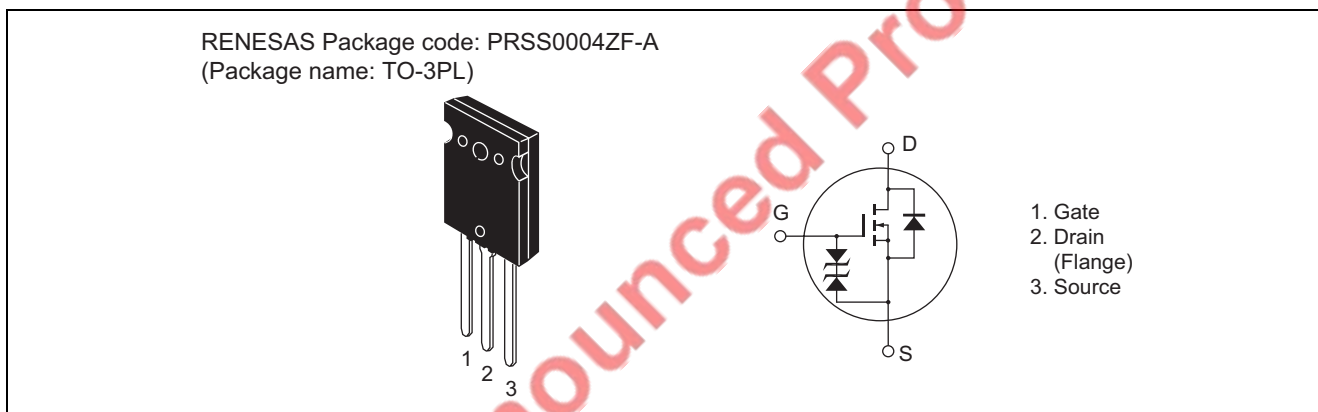
Application

High speed power switching

Features

- Low on-resistance
- High speed switching
- Low drive current
- Built-in fast recovery diode ($t_{tr} = 140 \text{ ns}$)
- Suitable for switching regulator, motor control

Outline



Absolute Maximum Ratings

($T_a = 25^\circ\text{C}$)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	250	V
Gate to source voltage	V_{GS}	± 30	V
Drain current	I_D	50	A
Drain peak current	$I_{D(pulse)}^{*1}$	200	A
Body to drain diode reverse drain current	I_{DR}	50	A
Channel dissipation	P_{ch}^{*2}	200	W
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

Notes: 1. $PW \leq 10 \mu\text{s}$, duty cycle $\leq 1\%$

2. Value at $T_c = 25^\circ\text{C}$

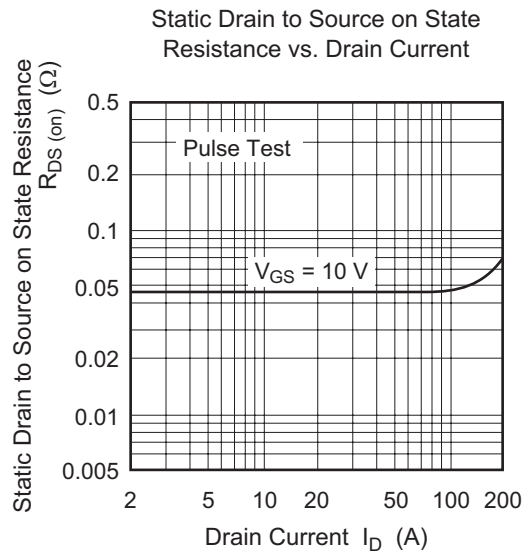
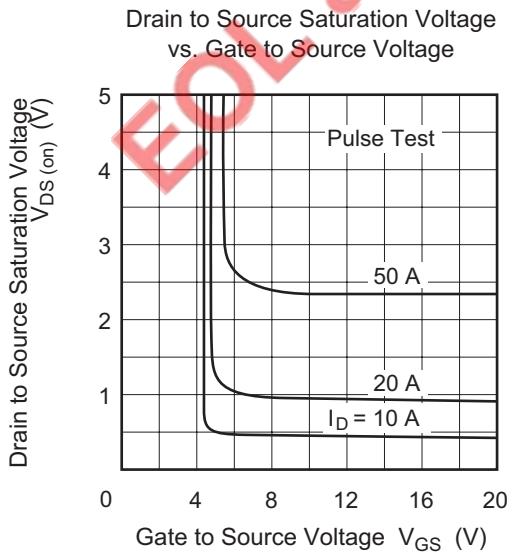
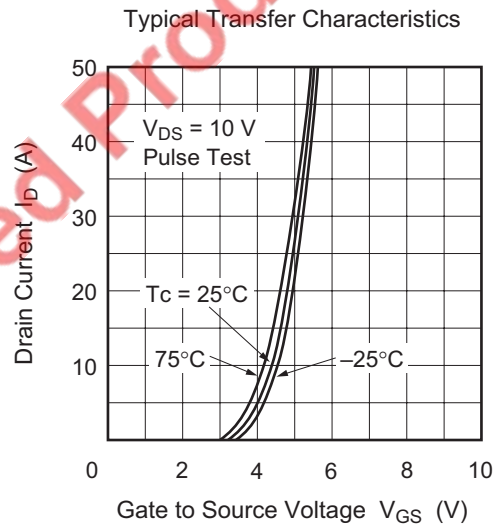
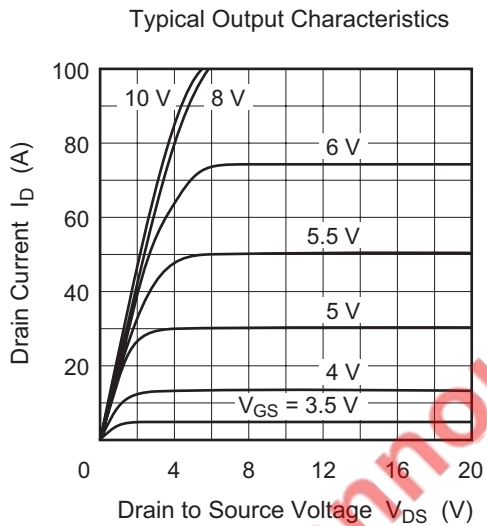
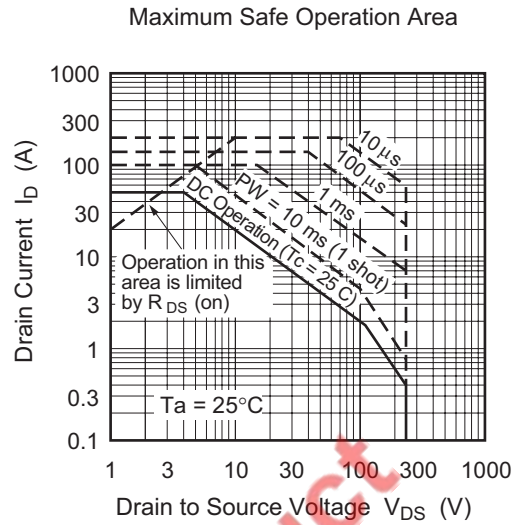
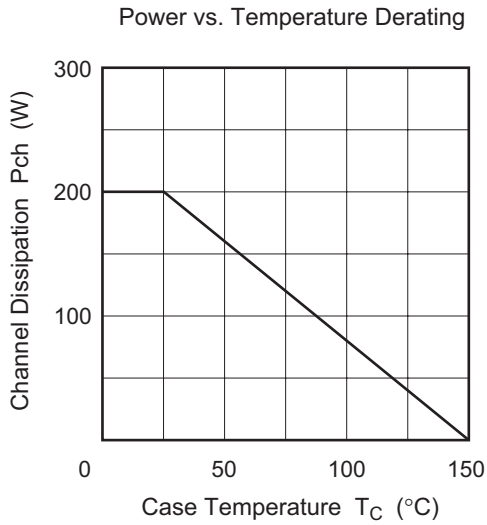
Electrical Characteristics

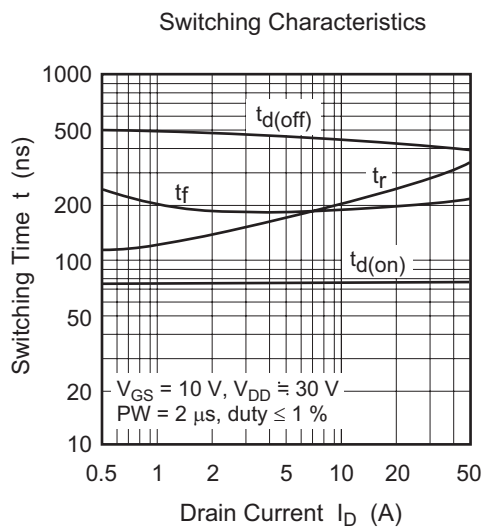
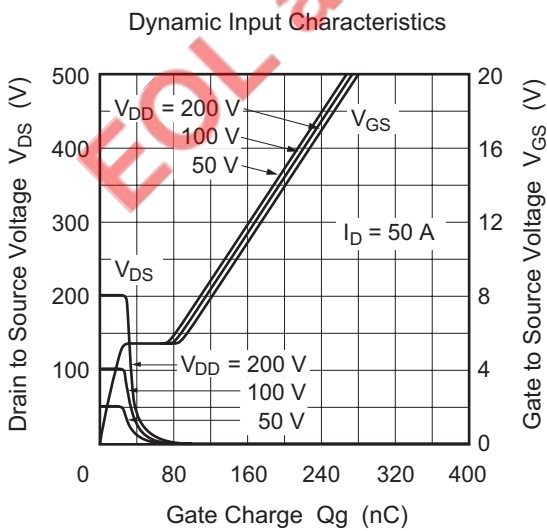
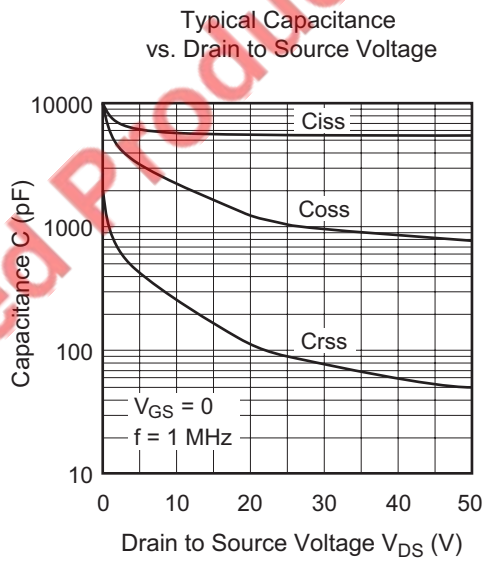
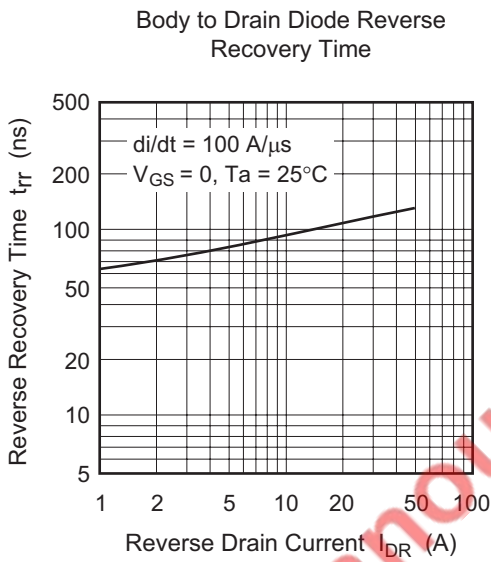
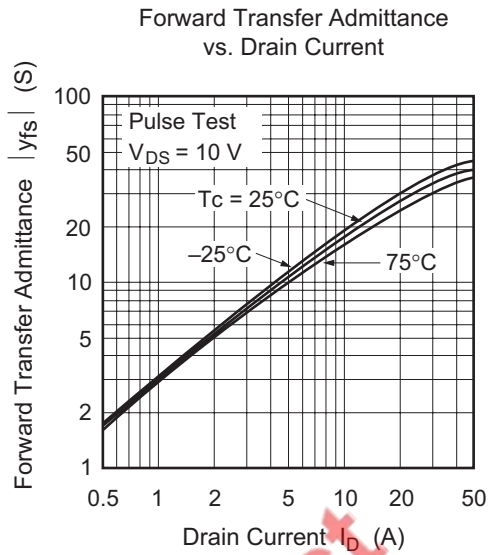
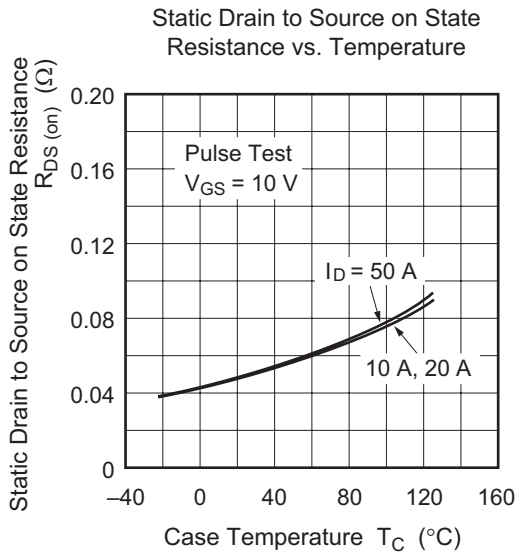
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	250	—	—	V	$I_D = 10 \text{ mA}, V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	± 30	—	—	V	$I_G = \pm 100 \mu\text{A}, V_{DS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 25 \text{ V}, V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	250	μA	$V_{DS} = 200 \text{ V}, V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	2.0	—	3.0	V	$I_D = 1 \text{ mA}, V_{DS} = 10 \text{ V}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.047	0.06	Ω	$I_D = 25 \text{ A}, V_{GS} = 10 \text{ V}^{*3}$
Forward transfer admittance	$ y_{fs} $	20	30	—	S	$I_D = 25 \text{ A}, V_{DS} = 10 \text{ V}^{*3}$
Input capacitance	C_{iss}	—	5810	—	pF	$V_{DS} = 10 \text{ V}, V_{GS} = 0,$ $f = 1 \text{ MHz}$
Output capacitance	C_{oss}	—	2360	—	pF	
Reverse transfer capacitance	C_{rss}	—	270	—	pF	
Turn-on delay time	$t_{d(on)}$	—	75	—	ns	$I_D = 25 \text{ A}, V_{GS} = 10 \text{ V},$ $R_L = 1.2 \Omega$
Rise time	t_r	—	270	—	ns	
Turn-off delay time	$t_{d(off)}$	—	420	—	ns	
Fall time	t_f	—	200	—	ns	
Body to drain diode forward voltage	V_{DF}	—	1.2	—	V	$I_F = 50 \text{ A}, V_{GS} = 0$
Body to drain diode reverse recovery time	t_{rr}	—	140	—	ns	$I_F = 50 \text{ A}, V_{GS} = 0,$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

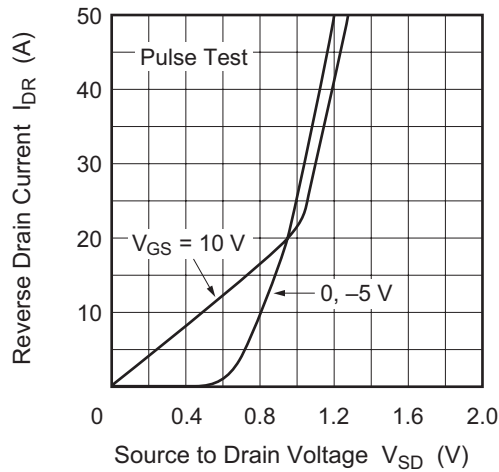
Note: 3. Pulse Test

Main Characteristics



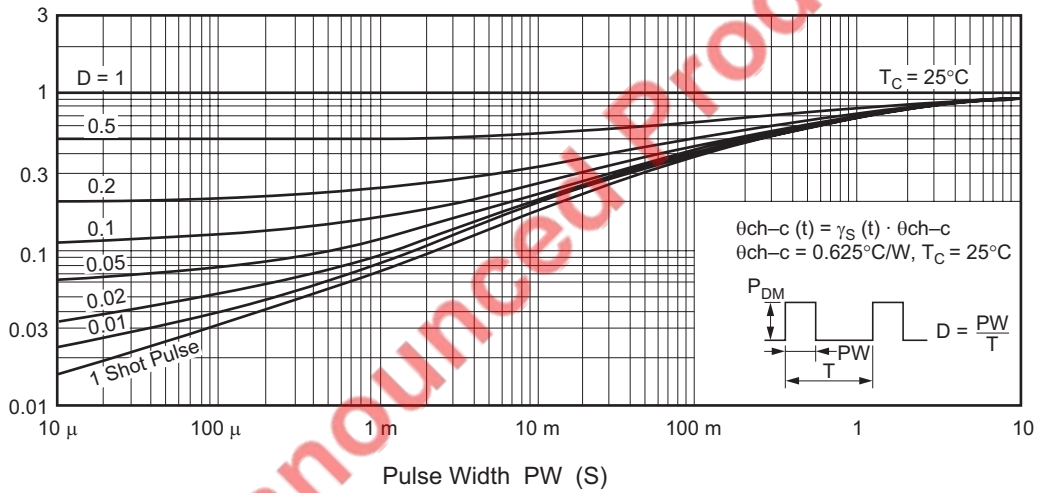


Reverse Drain Current vs. Source to Drain Voltage

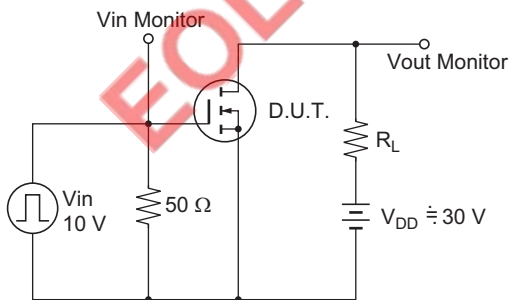


Normalized Transient Thermal Impedance $\gamma_S(t)$

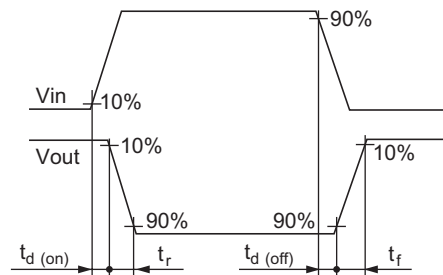
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



Waveforms



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]	Unit: mm
TO-3PL	—	PRSS0004ZF-A	TO-3PL / TO-3PLV	9.9g	

The technical drawing illustrates the TO-3PL package dimensions. The top view shows a square body with a width of 20.0 ± 0.3 mm and a height of 26.0 ± 0.3 mm. The distance between the mounting holes is 6.0 ± 0.2 mm. The diameter of the mounting holes is $\phi 3.3 \pm 0.2$ mm. The side view shows a total height of 5.0 ± 0.2 mm. The detail view shows the mounting hole dimensions: a diameter of $1.2^{+0.25}_{-0.1}$ mm, a distance of 1.4 mm from the hole center to the edge, a distance of 3.0 mm between holes, a distance of 2.2 mm from the hole center to the mounting hole center, and a distance of 2.5 ± 0.3 mm from the hole center to the mounting hole center. The mounting hole diameter is 5.45 ± 0.5 mm. The detail view also shows a distance of 1.0 mm from the hole center to the edge, a distance of 3.8 mm between holes, and a distance of 7.4 mm from the hole center to the mounting hole center. The mounting hole diameter is $0.6^{+0.25}_{-0.1}$ mm. The mounting hole distance is 2.8 ± 0.2 mm.

Ordering Information

Part Name	Quantity	Shipping Container
2SK1947-E	250 pcs	Box (Tube)

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