To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

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

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2SK3156

Silicon N Channel MOS FET
High Speed Power Switching

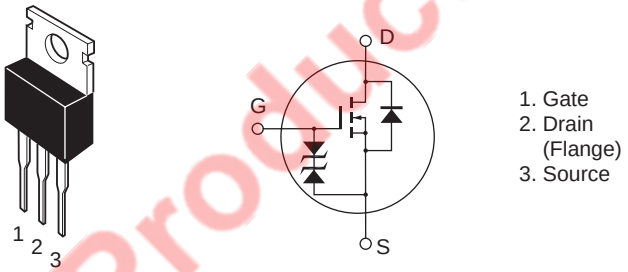
REJ03G1081-0301
(Previous: ADE-208-683A)
Rev.3.01
Apr 27, 2006

Features

- Low on-resistance
  R_{DS} =50 mΩ typ.
- High speed switching
- 4 V gate drive device can be driven from 5 V source

Outline

RENESAS Package code: PRSS0004AC-A
(Package name: TO-220AB)



1. Gate
2. Drain
   (Flange)
3. Source

Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	150	V
Gate to source voltage	V_{GSS}	±20	V
Drain current	I_D	20	A
Drain peak current	$I_{D(pulse)}$ Note1	80	A
Body-drain diode reverse drain current	I_{DR}	20	A
Avalanche current	I_{AP} Note3	20	A
Avalanche energy	E_{AR} Note3	30	mJ
Channel dissipation	Pch Note2	75	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
3. Value at Tch = 25°C, Rg ≥ 50 Ω

Electrical Characteristics

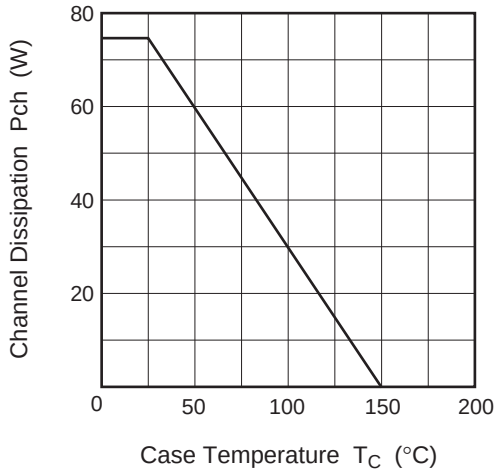
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	150	—	—	V	I_D = 10 mA, V_{GS} = 0
Gate to source breakdown voltage	$V_{(BR)GSS}$	±20	—	—	V	I_G = ±100 µA, V_{DS} = 0
Gate to source leak current	I_{GSS}	—	—	±10	µA	V_{GS} = ±16 V, V_{DS} = 0
Zero gate voltage drain current	I_{DSS}	—	—	10	µA	V_{DS} = 150 V, V_{GS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.5	V	I_D = 1 mA, V_{DS} = 10 V
Static drain to source on state resistance	$R_{DS(on)}$	—	50	70	mΩ	I_D = 10 A, V_{GS} = 10 V Note4
	$R_{DS(on)}$	—	60	80	mΩ	I_D = 10 A, V_{GS} = 4 V Note4
Forward transfer admittance	$\|y_{fs}\|$	13	22	—	S	I_D = 10 A, V_{DS} = 10 V Note4
Input capacitance	Ciss	—	1750	—	pF	V_{DS} = 10 V, V_{GS} = 0, f = 1 MHz
Output capacitance	Coss	—	600	—	pF	
Reverse transfer capacitance	Crss	—	300	—	pF	
Turn-on delay time	$t_{d(on)}$	—	18	—	ns	I_D = 10 A, V_{GS} = 10 V, R_L = 3 Ω
Rise time	t_r	—	125	—	ns	
Turn-off delay time	$t_{d(off)}$	—	400	—	ns	
Fall time	t_f	—	190	—	ns	
Body–drain diode forward voltage	V_{DF}	—	0.9	—	V	I_F = 20 A, V_{GS} = 0
Body–drain diode reverse recovery time	t_{rr}	—	170	—	ns	I_F = 20 A, V_{GS} = 0, di_F/dt = 50 A/µs

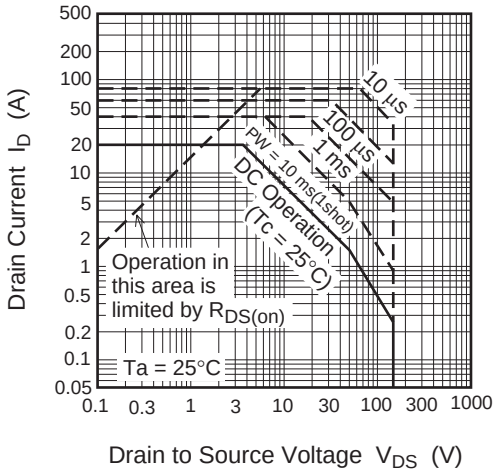
Note: 4. Pulse test

Main Characteristics

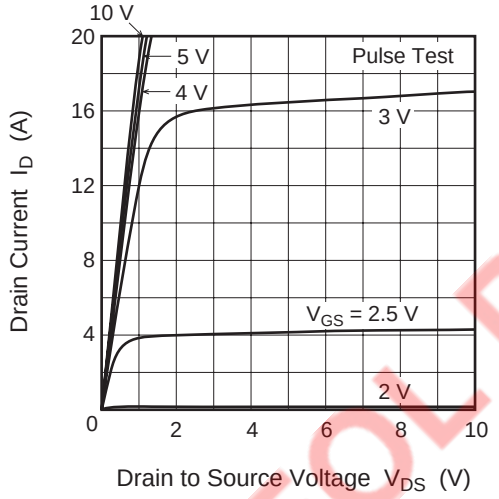
Power vs. Temperature Derating



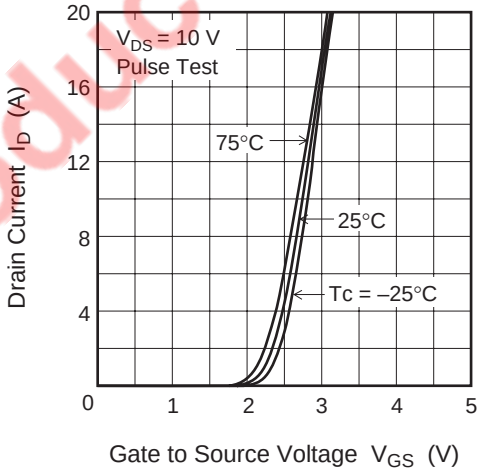
Maximum Safe Operation Area



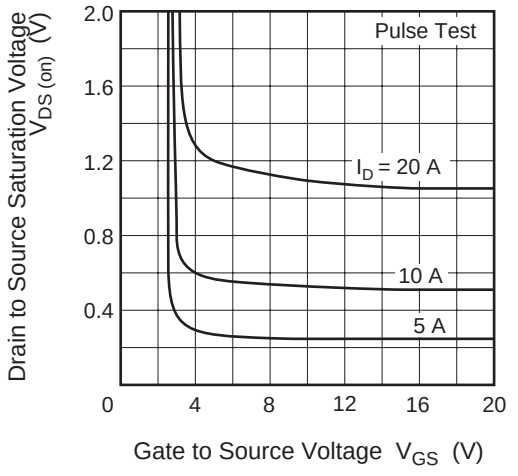
Typical Output Characteristics



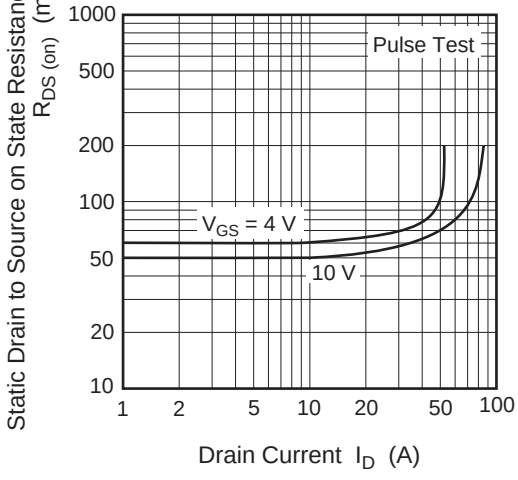
Typical Transfer Characteristics



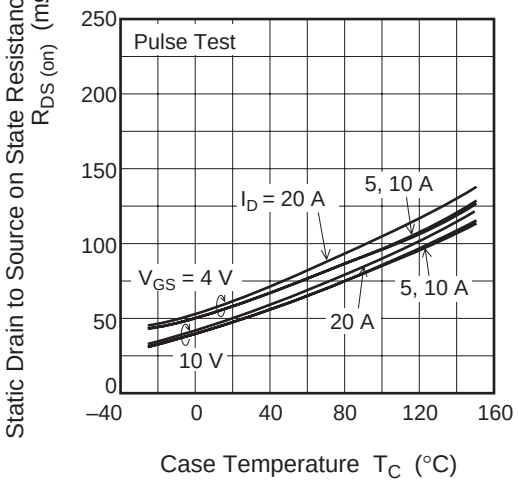
Drain to Source Saturation Voltage vs. Gate to Source Voltage



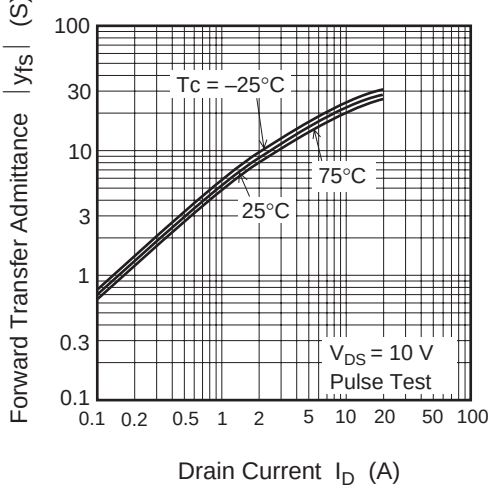
Static Drain to Source on State Resistance vs. Drain Current



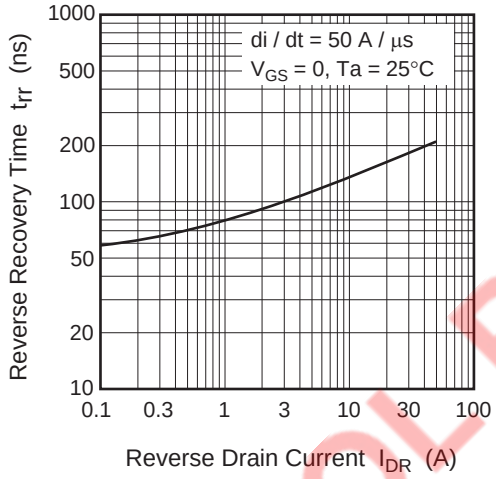
Static Drain to Source on State Resistance vs. Temperature



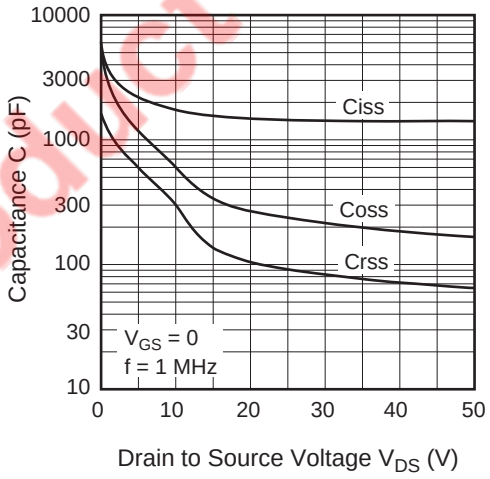
Forward Transfer Admittance vs. Drain Current



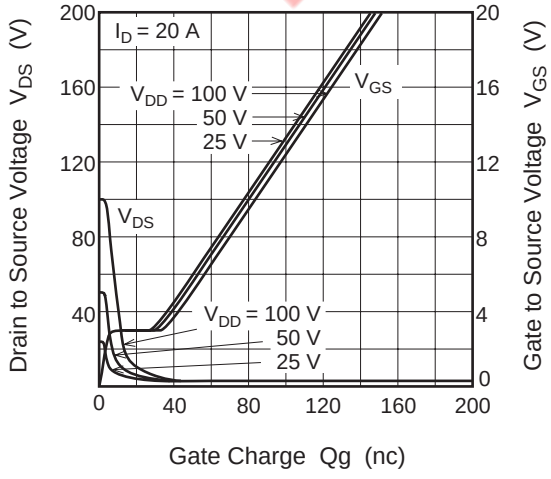
Body to Drain Diode Reverse Recovery Time



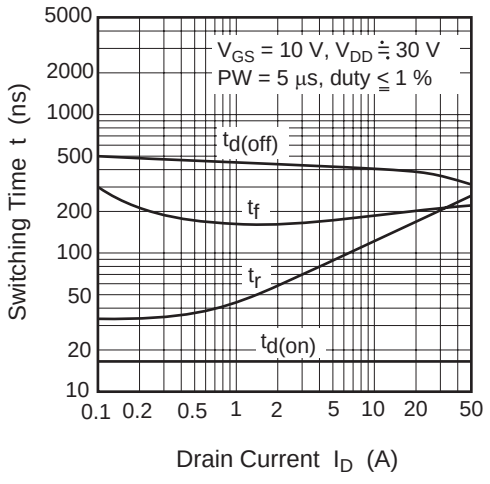
Typical Capacitance vs. Drain to Source Voltage



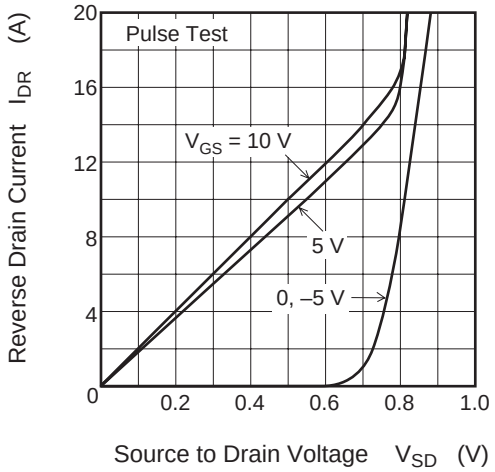
Dynamic Input Characteristics



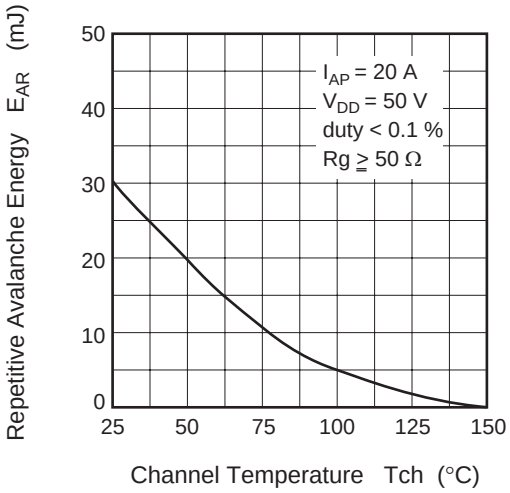
Switching Characteristics



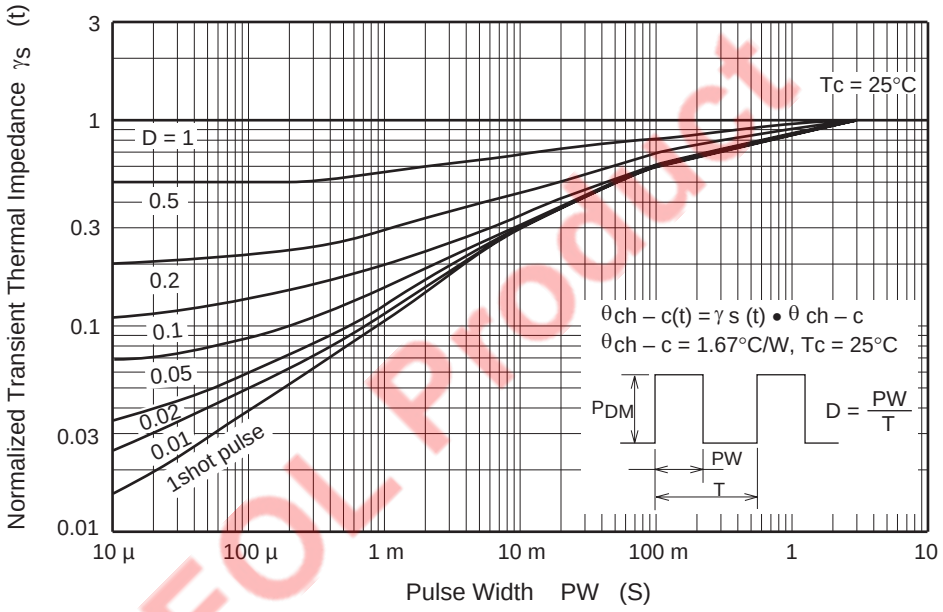
Reverse Drain Current vs.
Source to Drain Voltage



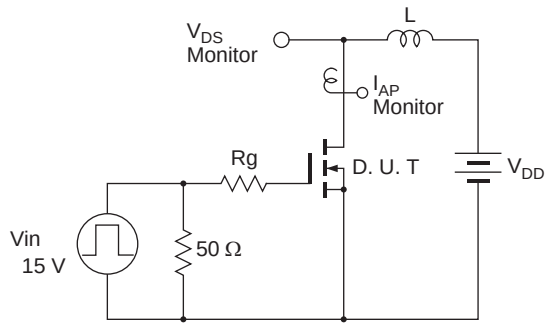
Maximum Avalanche Energy vs.
Channel Temperature Derating



Normalized Transient Thermal Impedance vs. Pulse Width

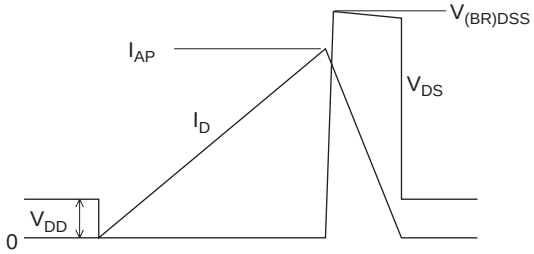


Avalanche Test Circuit

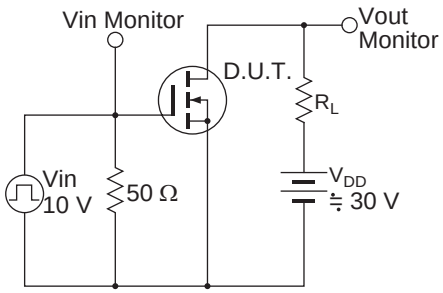


Avalanche Waveform

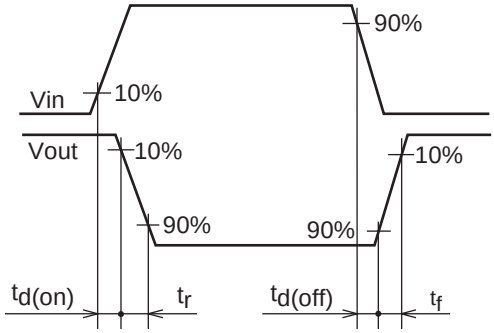
$$E_{AR} = \frac{1}{2} \bullet L \bullet I_{AP}^2 \bullet \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



Switching Time Test Circuit



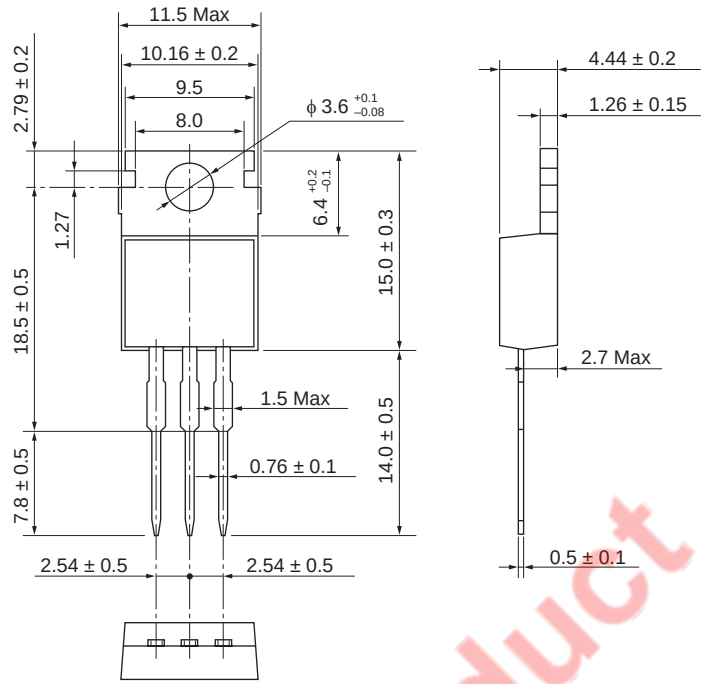
Switching Time Waveforms



Package Dimensions

JEITA Package Code	RENESAS Code	Package Name	MASS[Typ.]
SC-46	PRSS0004AC-A	TO-220AB / TO-220ABV	1.8g

Unit: mm



Ordering Information

Part Name	Quantity	Shipping Container
2SK3156-E	500 pcs	Box (Sack)

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

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