

H7N0203AB

Silicon N Channel MOS FET
High Speed Power Switching

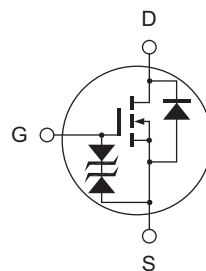
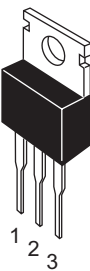
REJ03G1119-0500
(Previous: ADE-208-1490C)
Rev.5.00
Sep 07, 2005

Features

- Low on-resistance
 $R_{DS(on)} = 2.4 \text{ m}\Omega$ typ.
- Low drive current
- 4.5 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	Value	Unit
Drain to source voltage	V_{DS}	20	V
Gate to source voltage	V_{GS}	±20	V
Drain current	I_D	90	A
Drain peak current	$I_{D(pulse)}$ ^{Note 1}	360	A
Body-drain diode reverse drain current	I_{DR}	90	A
Avalanche current	I_{AP} ^{Note 2}	20	A
Avalanche energy	E_{AR} ^{Note 2}	40	mJ
Channel dissipation	P_{ch} ^{Note 3}	100	W
Channel to case thermal impedance	θ_{ch-c}	1.25	°C/W
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	−55 to +150	°C

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

Electrical Characteristics

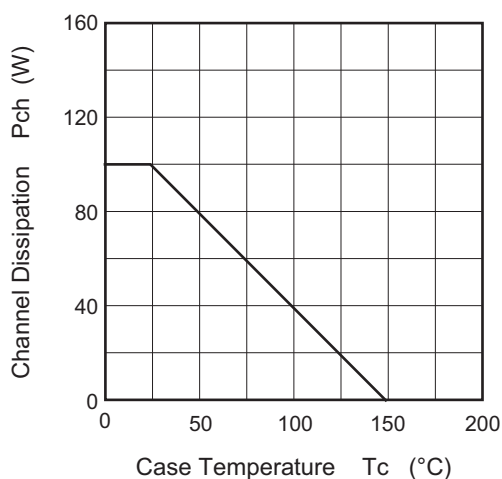
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DS}$	20	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GS}$	±20	—	—	V	$I_G = \pm 100 \mu A$, $V_{DS} = 0$
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}	—	—	10	μA	$V_{DS} = 20 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.5	V	$I_D = 1 \text{ mA}$, $V_{DS} = 10 \text{ V}$ ^{Note 4}
Static drain to source on state resistance	$R_{DS(on)}$	—	2.4	3.0	mΩ	$I_D = 45 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note 4}
		—	3.5	5.1	mΩ	$I_D = 45 \text{ A}$, $V_{GS} = 4.5 \text{ V}$ ^{Note 4}
Forward transfer admittance	$ y_{fs} $	80	140	—	S	$I_D = 45 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note 4}
Input capacitance	C_{iss}	—	6800	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	1850	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	750	—	pF	$f = 1 \text{ MHz}$
Total gate charge	Q_g	—	110	—	nC	$V_{DD} = 10 \text{ V}$
Gate to source charge	Q_{gs}	—	22	—	nC	$V_{GS} = 10 \text{ V}$
Gate to drain charge	Q_{gd}	—	20	—	nC	$I_D = 90 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	32	—	ns	$V_{GS} = 10 \text{ V}$, $I_D = 45 \text{ A}$
Rise time	t_r	—	380	—	ns	$R_L = 0.22 \Omega$
Turn-off delay time	$t_{d(off)}$	—	110	—	ns	$R_g = 4.7 \Omega$
Fall time	t_f	—	35	—	ns	
Body-drain diode forward voltage	V_{DF}	—	0.90	—	V	$I_F = 90 \text{ A}$, $V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	60	—	ns	$I_F = 90 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 50 \text{ A}/\mu s$

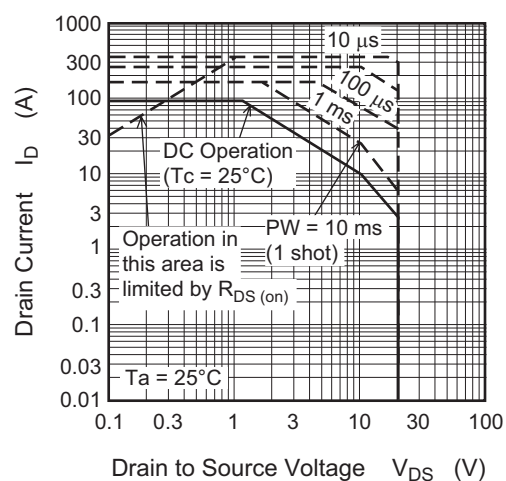
Note: 4. Pulse test

Main Characteristics

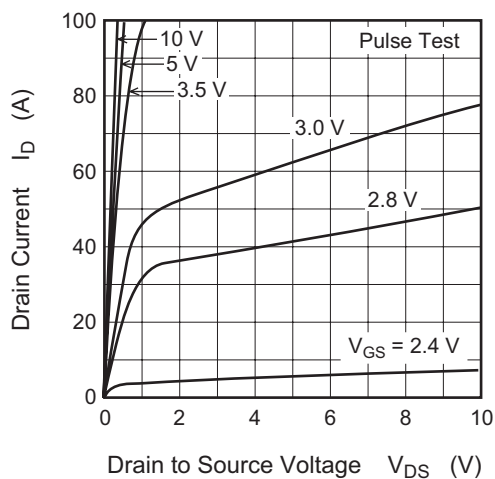
Power vs. Temperature Derating



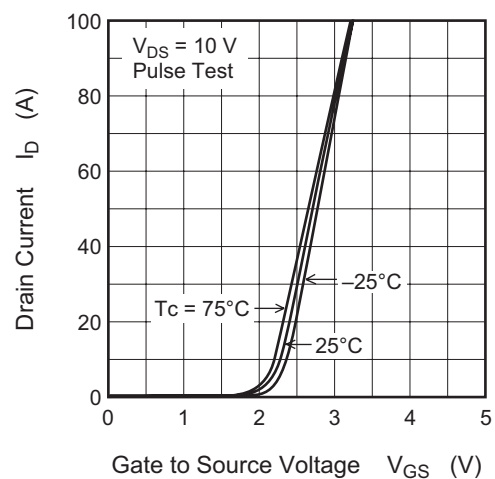
Maximum Safe Operation Area



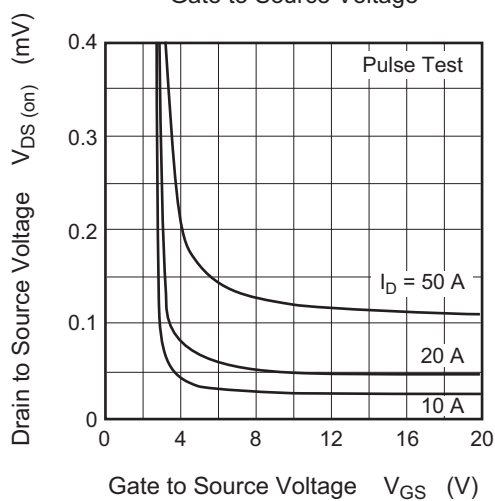
Typical Output Characteristics



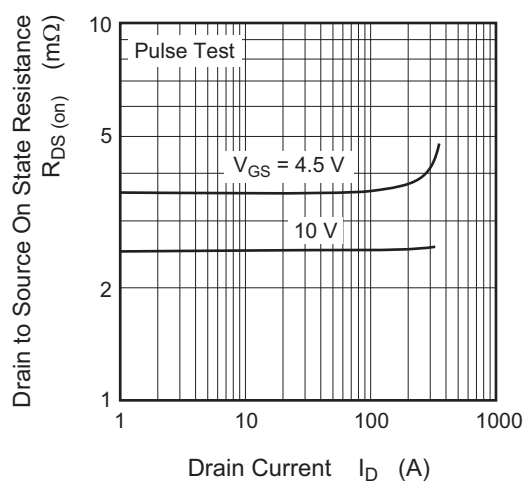
Typical Transfer Characteristics



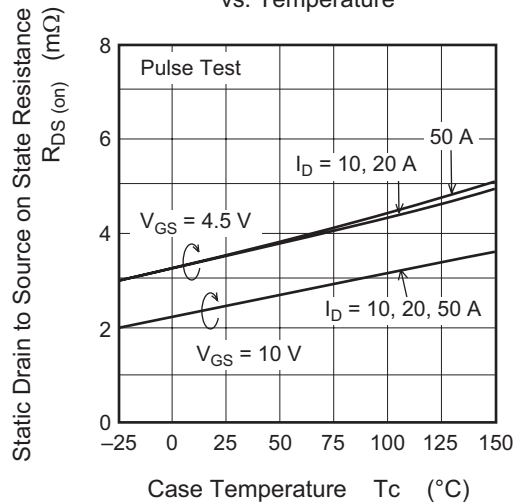
Drain to Source Saturation Voltage vs. Gate to Source Voltage



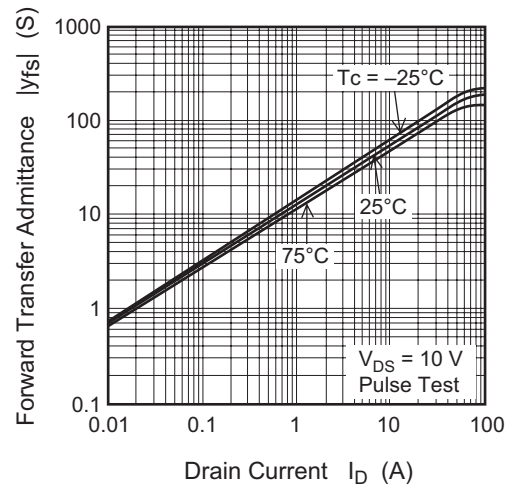
Static Drain to Source on State Resistance vs. Drain Current



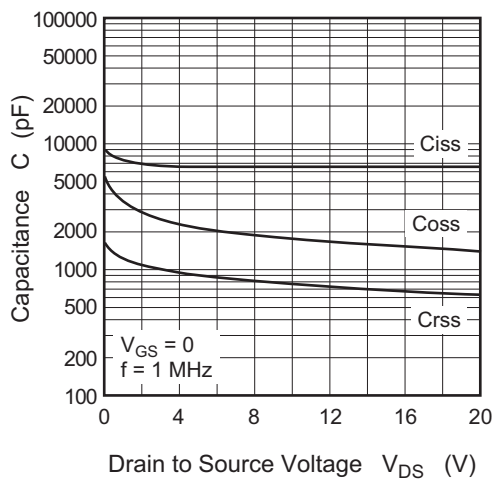
Static Drain to Source on State Resistance vs. Temperature



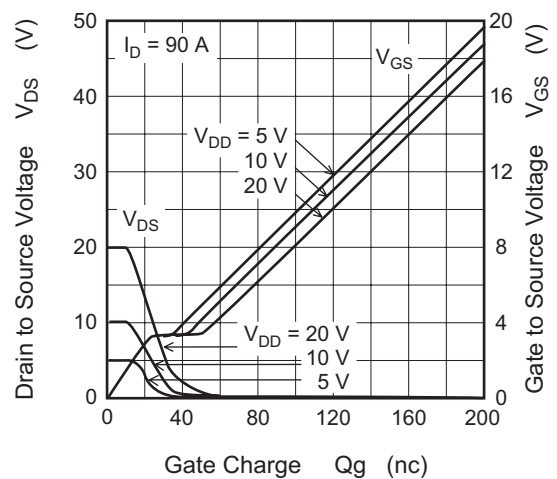
Forward Transfer Admittance vs. Drain Current



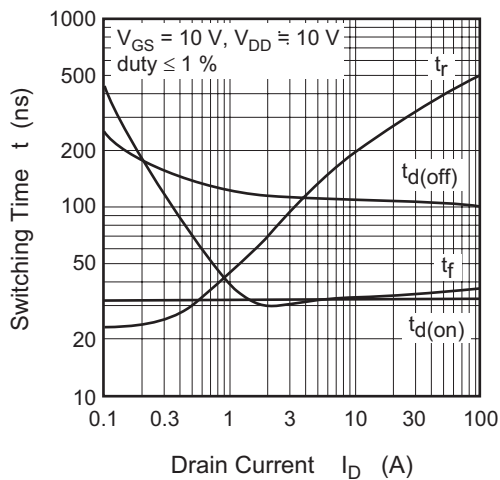
Typical Capacitance vs. Drain to Source Voltage



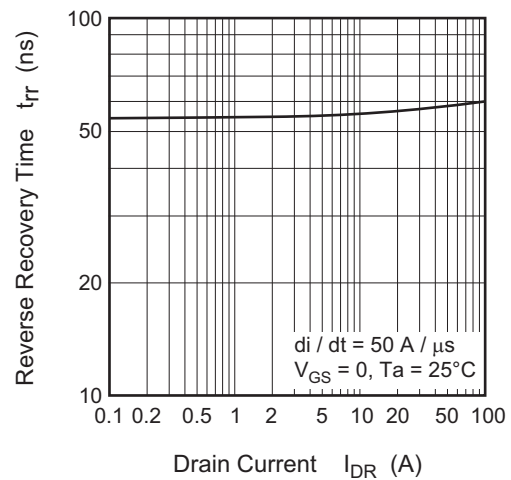
Dynamic Input Characteristics

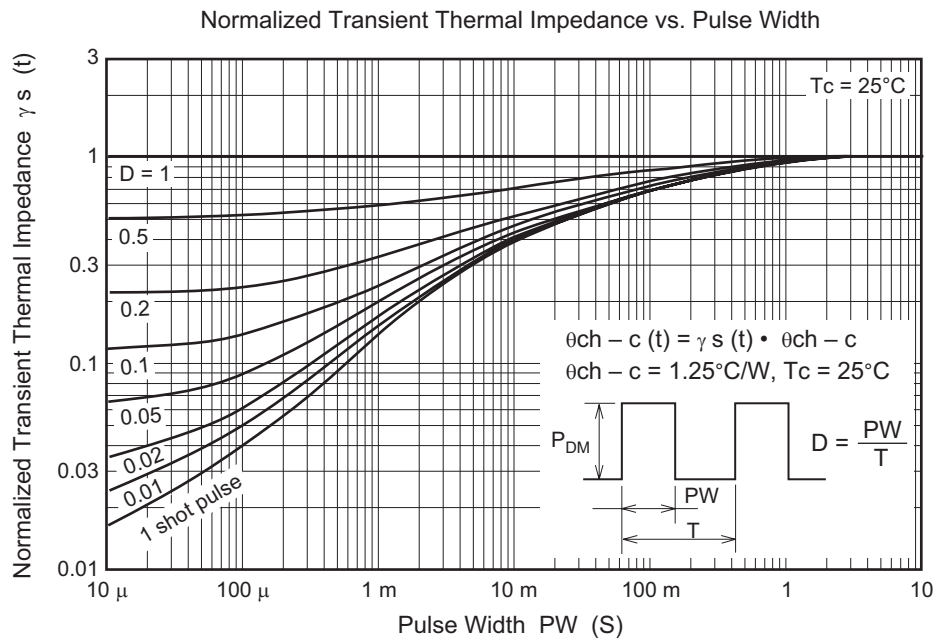
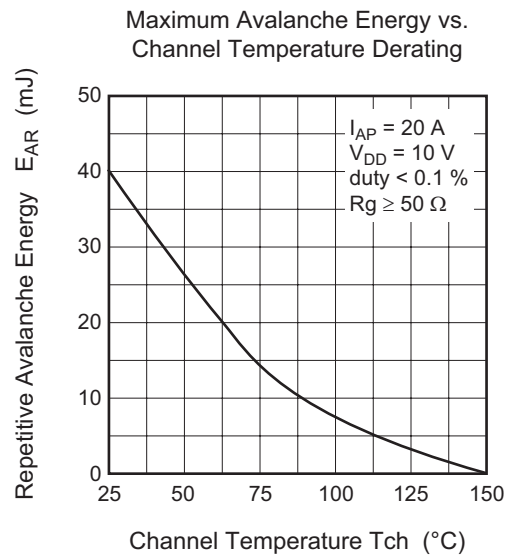
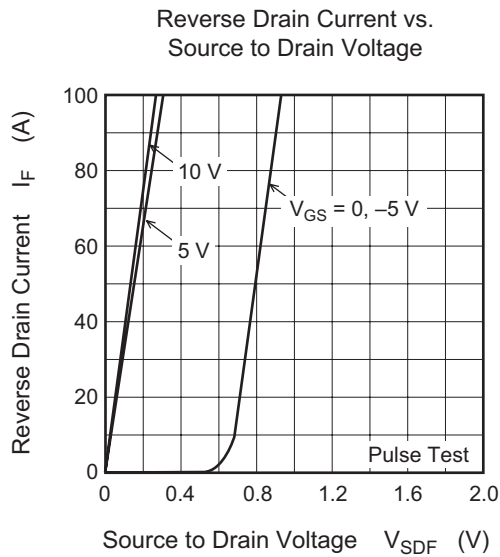


Switching Characteristics

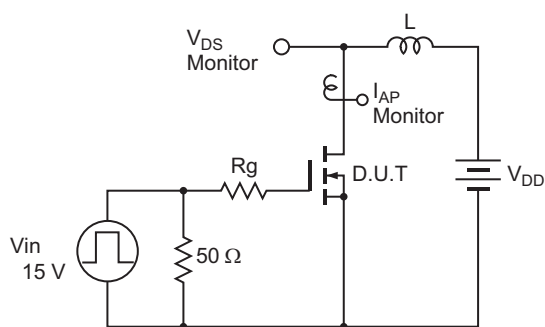


Static Drain to Source on State Resistance vs. Drain Current



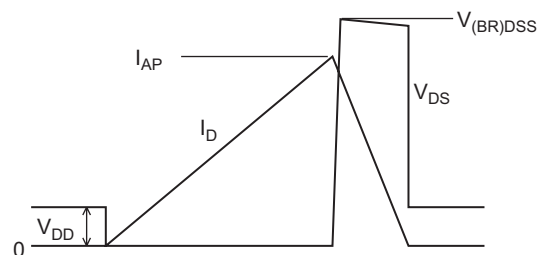


Avalanche Test Circuit

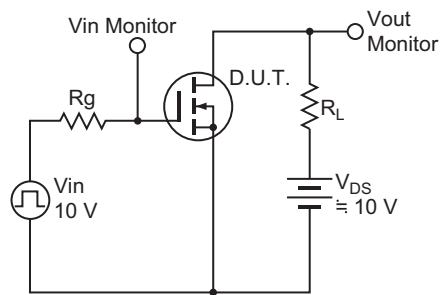


Avalanche Waveform

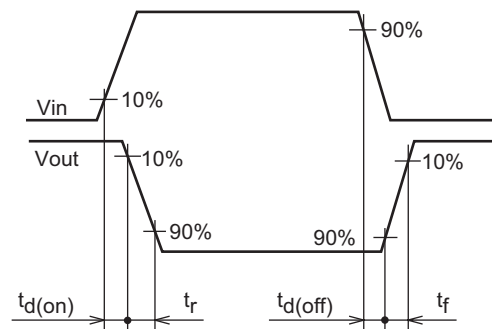
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



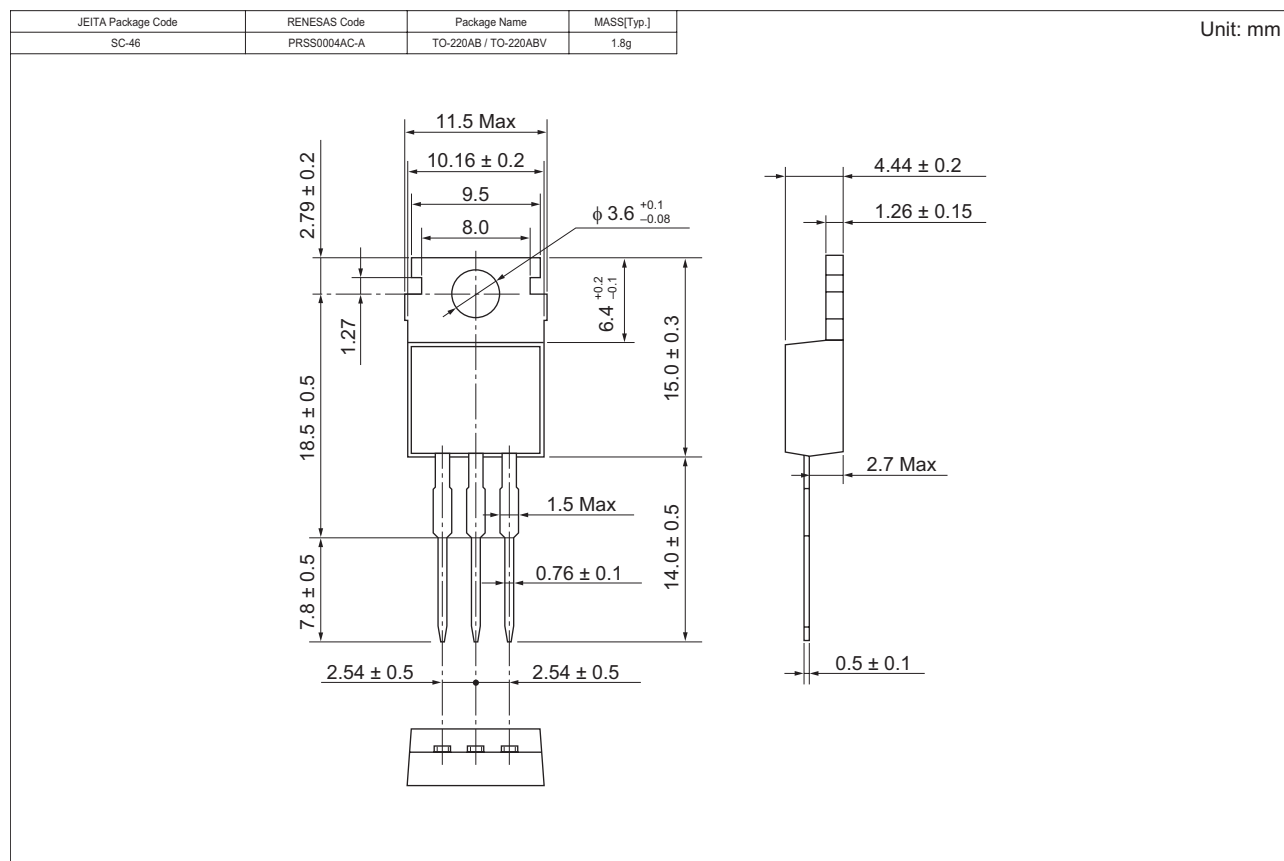
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
H7N0203AB-E	500 pcs	Box (Sack)

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