

To our customers,

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## Old Company Name in Catalogs and Other Documents

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

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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

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N-CHANNEL MOSFET  
FOR HIGH-SPEED SWITCHING

The 2SK2158A is an N-channel vertical type MOSFET featuring an operating voltage as low as 1.5 V. Because it can be driven on a low voltage and it is not necessary to consider driving current, the 2SK2158A is suitable for use in low-voltage portable systems such as headphone stereo sets and camcorders.

FEATURES

- Capable of drive gate with 1.5 V
- Because of high input impedance, there is no need to consider driving current.
- Bias resistance can be omitted, enabling reduction in total number of parts.

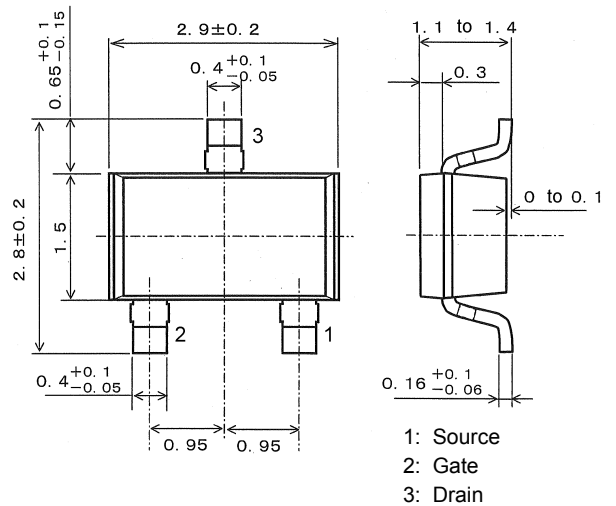
ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK2158A-T1B-AT	SC-59 (Mini Mold)
2SK2158A-T2B-AT	

Marking: G23

**Remark** “-AT” indicates Pb-free (This product does not contain Pb in external electrode and other parts.). “-T1B”, “-T2B” indicates the unit orientation (8 mm embossed carrier tape, 3,000 pcs/reel).

PACKAGE DRAWING (Unit: mm)

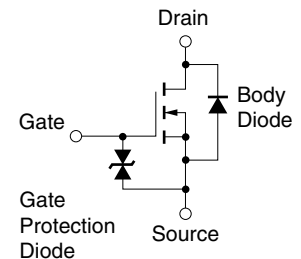


ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C)

Drain to Source Voltage (V <sub>GS</sub> = 0 V)	V <sub>DSS</sub>	50	V
Gate to Source Voltage (V <sub>DS</sub> = 0 V)	V <sub>GSS</sub>	±7.0	V
Drain Current (DC)	I <sub>D(DC)</sub>	±0.1	A
Drain Current (pulse) <sup>Note</sup>	I <sub>D(pulse)</sub>	±0.2	A
Total Power Dissipation	P <sub>T</sub>	200	mW
Channel Temperature	T <sub>ch</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-55 to +150	°C

**Note** PW ≤ 10 ms, Duty Cycle ≤ 50%

EQUIVALENT CIRCUIT



**Remark** The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

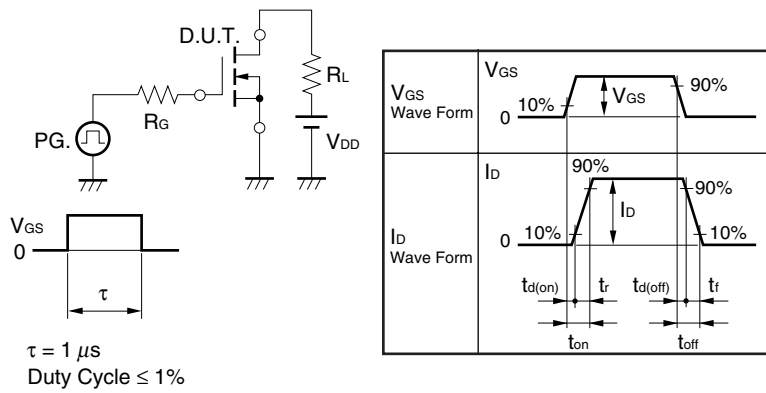
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**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)**

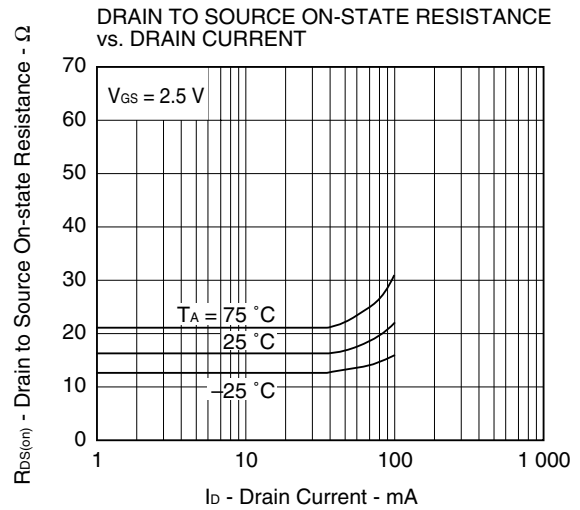
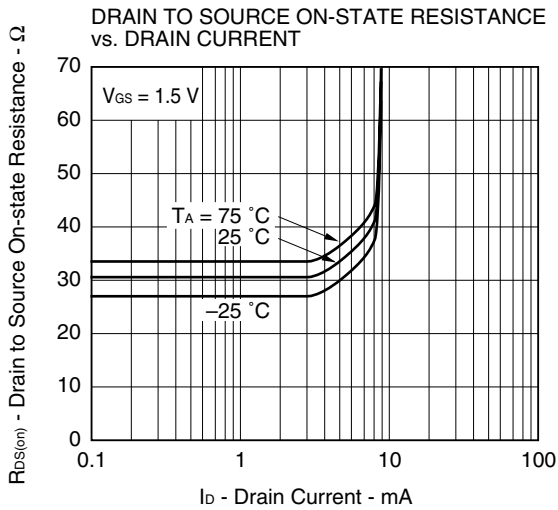
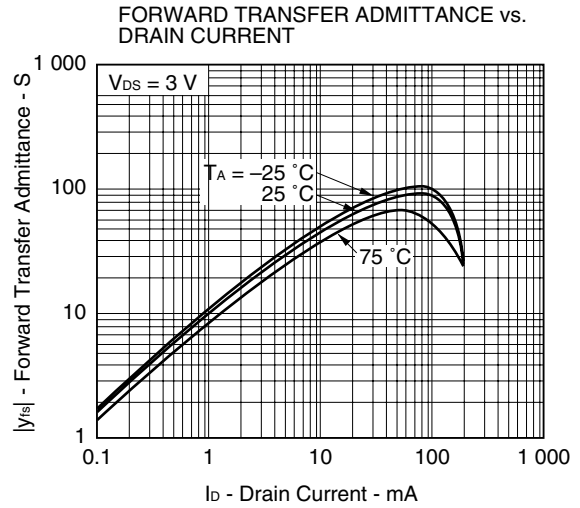
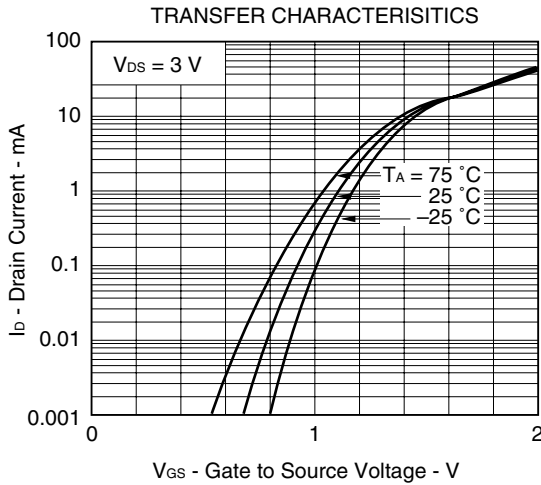
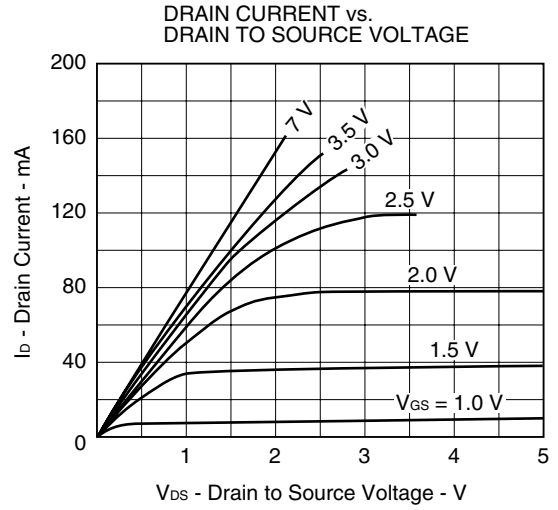
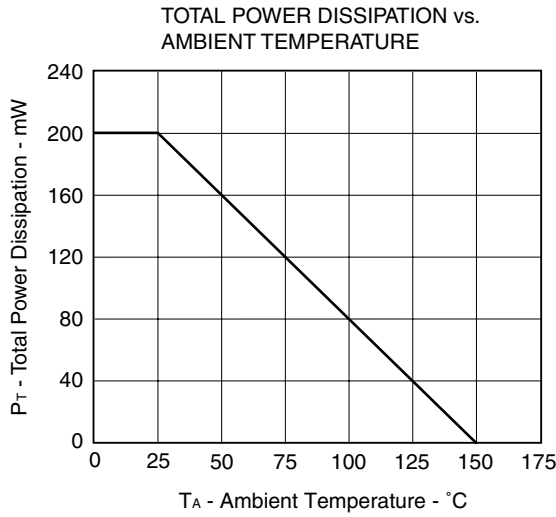
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-off Current	I <sub>DSS</sub>	V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 0 V			1.0	μA
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±7.0 V, V <sub>DS</sub> = 0 V			±3.0	μA
Gate Cut-off Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 3.0 V, I <sub>D</sub> = 1.0 μA	0.5	0.7	1.1	V
Forward Transfer Admittance <b>Note</b>	y <sub>fs</sub>	V <sub>DS</sub> = 3.0 V, I <sub>D</sub> = 10 mA	20			mS
Drain to Source On-state Resistance <b>Note</b>	R <sub>DS(on)1</sub>	V <sub>GS</sub> = 1.5 V, I <sub>D</sub> = 1.0 mA		32	50	Ω
	R <sub>DS(on)2</sub>	V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 10 mA		16	20	Ω
	R <sub>DS(on)3</sub>	V <sub>GS</sub> = 4.0 V, I <sub>D</sub> = 10 mA		12	15	Ω
Input Capacitance	C <sub>iSS</sub>	V <sub>DS</sub> = 3.0 V		6		pF
Output Capacitance	C <sub>oSS</sub>	V <sub>GS</sub> = 0 V		8		pF
Reverse Transfer Capacitance	C <sub>rSS</sub>	f = 1.0 MHz		1		pF
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 3.0 V, I <sub>D</sub> = 20 mA		9		ns
Rise Time	t <sub>r</sub>	V <sub>GS(on)</sub> = 3.0 V		48		ns
Turn-off Delay Time	t <sub>d(off)</sub>	R <sub>G</sub> = 10 Ω		21		ns
Fall Time	t <sub>f</sub>			31		ns

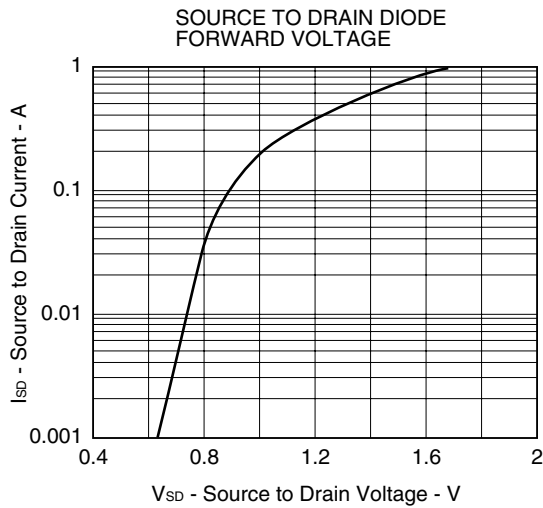
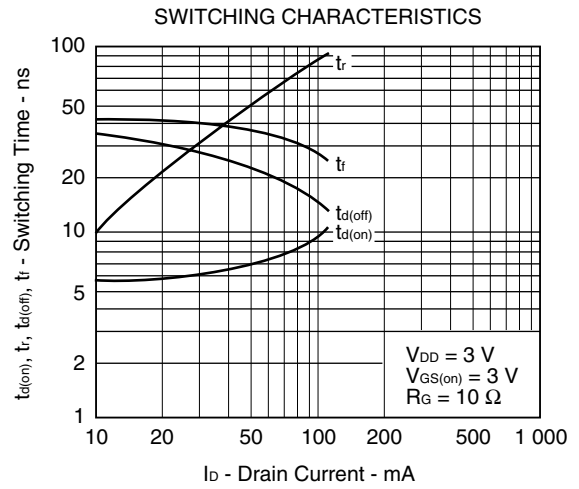
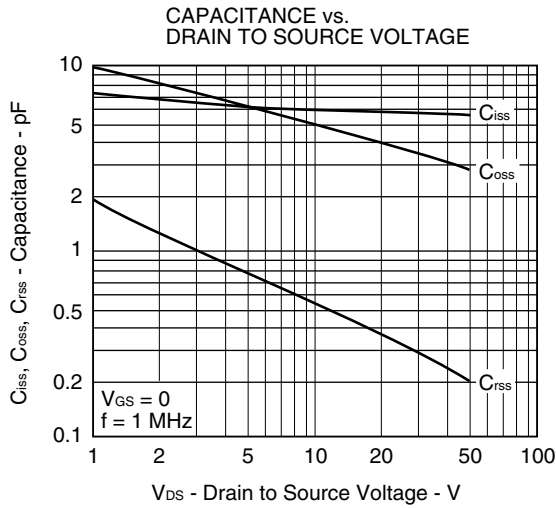
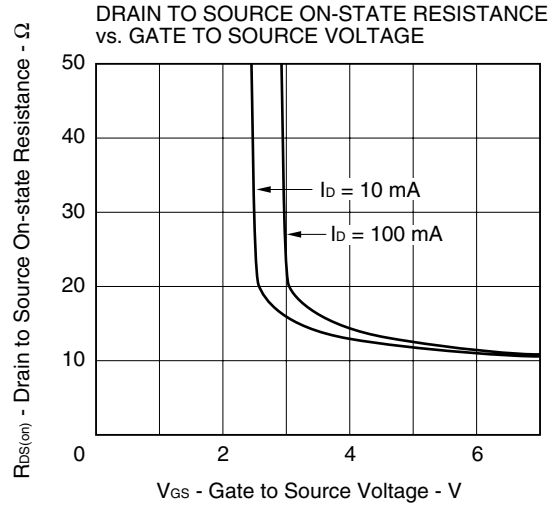
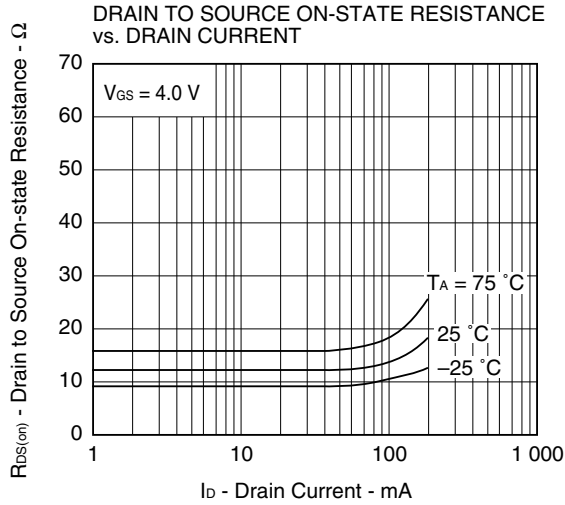
**Note** Pulsed

**TEST CIRCUIT SWITCHING TIME**



TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)





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