

To our customers,

Old Company Name in Catalogs and Other Documents

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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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MOS FIELD EFFECT TRANSISTOR

N0300N

N-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

The N0300N is a switching device which can be driven directly by a 4.5 V power source.

The device features a low on-state resistance and excellent switching characteristics, and is suitable for applications such as power switch of portable machine and so on.

FEATURES

- 4.5 V drive available
- Low on-state resistance
 $R_{DS(on)1} = 50 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 2.0 \text{ A)}$
 $R_{DS(on)2} = 83 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 2.0 \text{ A)}$
- Built-in gate protection diode

ORDERING INFORMATION

PART NUMBER	PACKAGE
N0300N-T1B-AT ^{Note}	SC-96 (Mini Mold Thin Type)

Note Pb-free (This product does not contain Pb in the external electrode and other parts.)

Marking: XY

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

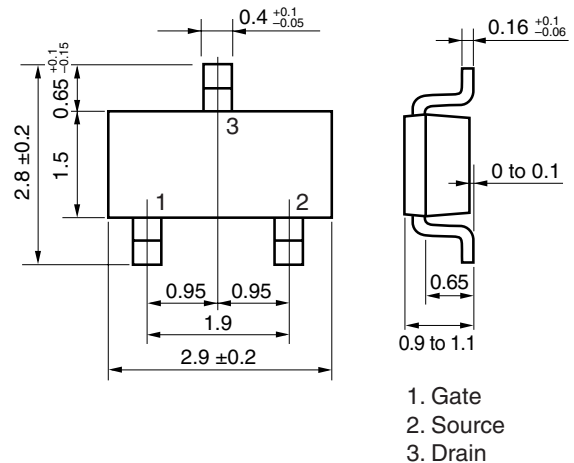
Drain to Source Voltage (V _{GS} = 0 V)	V _{DSS}	30	V
Gate to Source Voltage (V _{DS} = 0 V)	V _{GSS}	±20	V
Drain Current (DC)	I _{D(DC)}	±4.5	A
Drain Current (pulse) ^{Note1}	I _{D(pulse)}	±18	A
Total Power Dissipation	P _{T1}	0.2	W
Total Power Dissipation ^{Note2}	P _{T2}	1.25	W
Channel Temperature	T _{ch}	150	°C
Storage Temperature	T _{stg}	−55 to +150	°C

Notes 1. PW ≤ 10 μs, Duty Cycle ≤ 1%

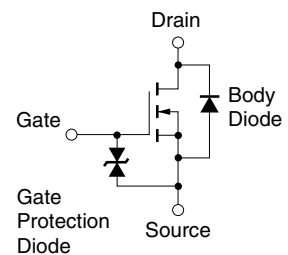
2. Mounted on FR-4 board of 50 mm x 50 mm x 1.6 mm, t ≤ 5 sec

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.

PACKAGE DRAWING (Unit: mm)



EQUIVALENT CIRCUIT



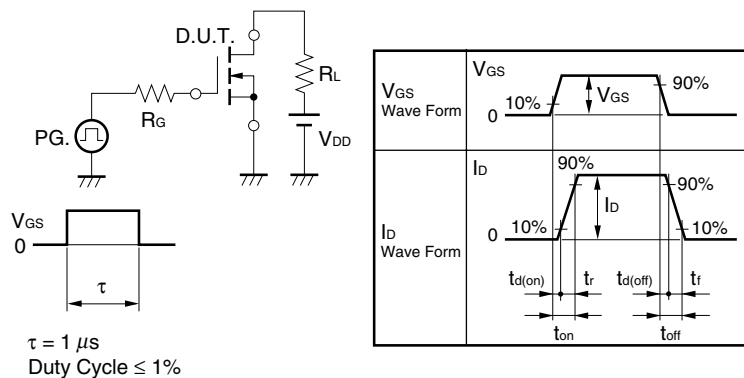
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ELECTRICAL CHARACTERISTICS (T_A = 25°C)

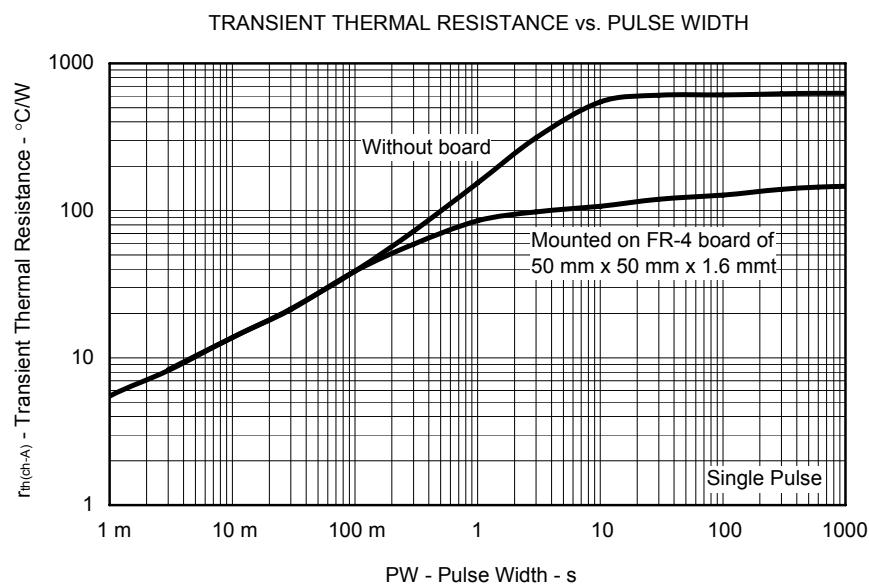
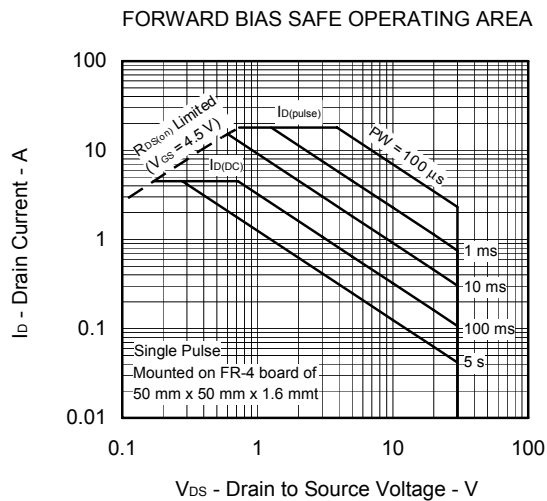
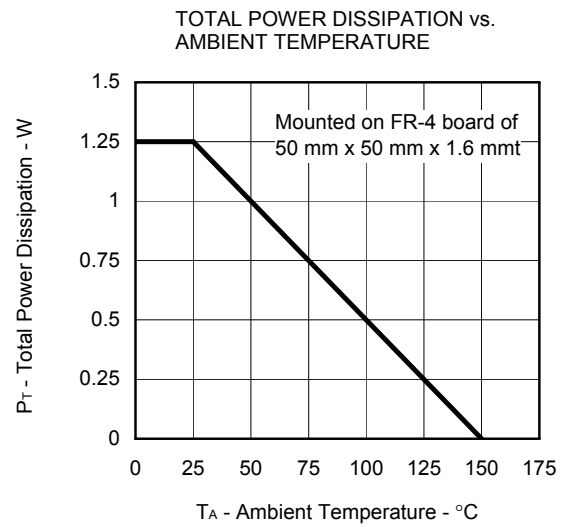
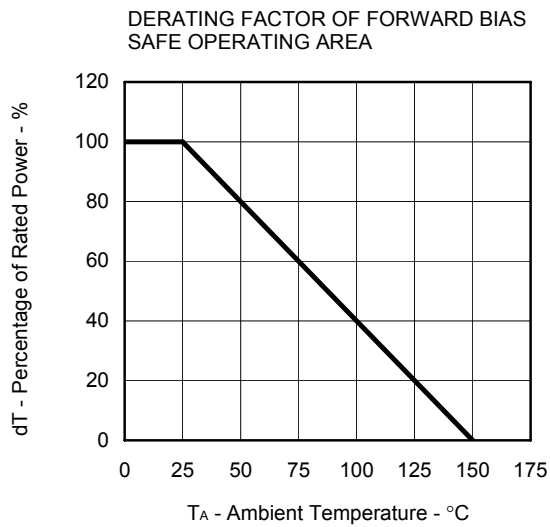
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V			1	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0 V			±10	μA
Gate to Source Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1.0 mA	1.0		2.5	V
Forward Transfer Admittance ^{Note}	y _{fs}	V _{DS} = 10 V, I _D = 2.0 A	1.0			S
Drain to Source On-state Resistance ^{Note}	R _{DS(on)1}	V _{GS} = 10 V, I _D = 2.0 A		38	50	mΩ
	R _{DS(on)2}	V _{GS} = 4.5 V, I _D = 2.0 A		48	83	mΩ
Input Capacitance	C _{iss}	V _{DS} = 10 V,		350		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V,		65		pF
Reverse Transfer Capacitance	C _{rss}	f = 1.0 MHz		30		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 15 V, I _D = 2.0 A,		6.5		ns
Rise Time	t _r	V _{GS} = 10 V,		3.0		ns
Turn-off Delay Time	t _{d(off)}	R _G = 6 Ω		16.5		ns
Fall Time	t _f			3.0		ns
Total Gate Charge	Q _G	V _{DD} = 24 V, V _{GS} = 10 V, I _D = 4.5 A		7.4		nC
Body Diode Forward Voltage ^{Note}	V _{F(S-D)}	I _F = 4.5 A, V _{GS} = 0 V		0.9		V

Note Pulsed

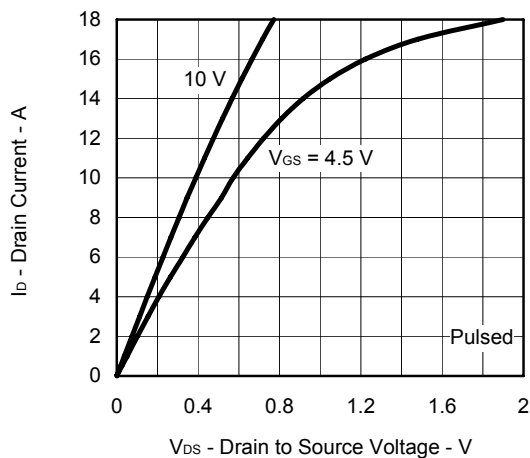
TEST CIRCUIT SWITCHING TIME



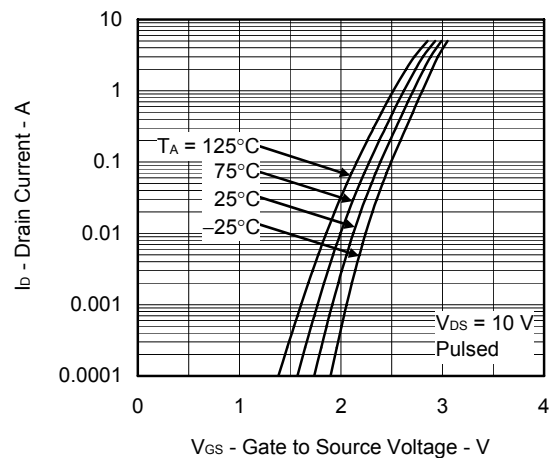
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



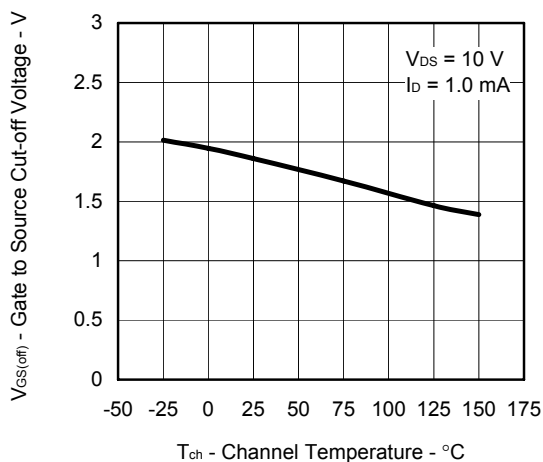
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



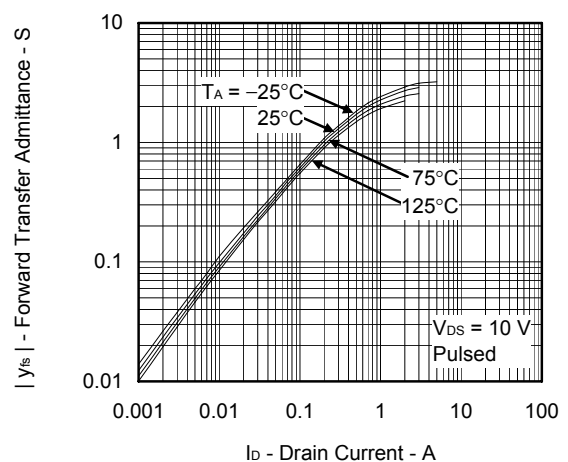
FORWARD TRANSFER CHARACTERISTICS



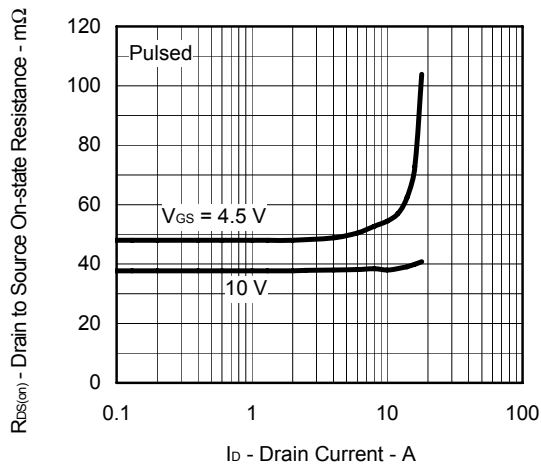
GATE TO SOURCE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



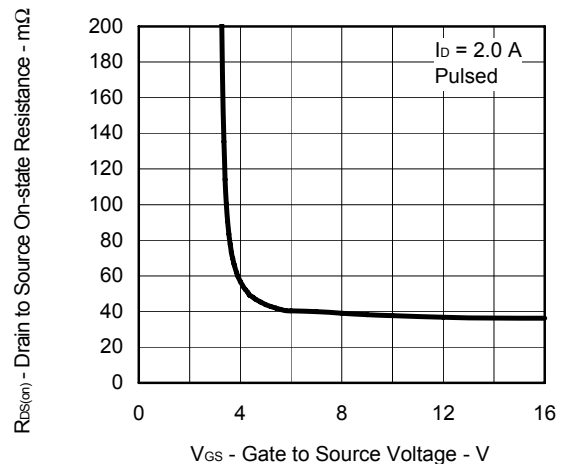
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



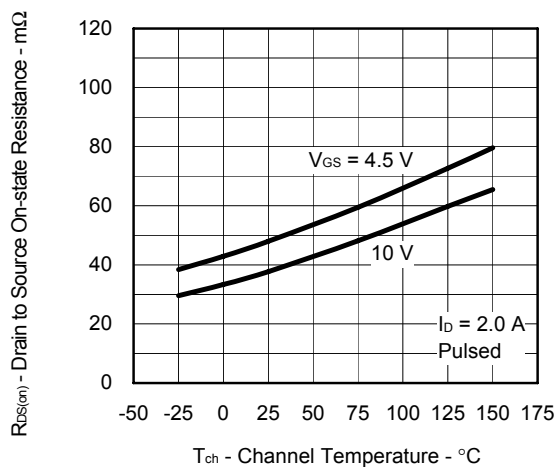
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT



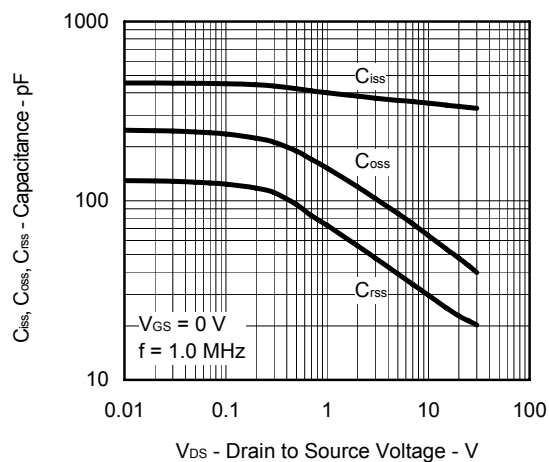
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



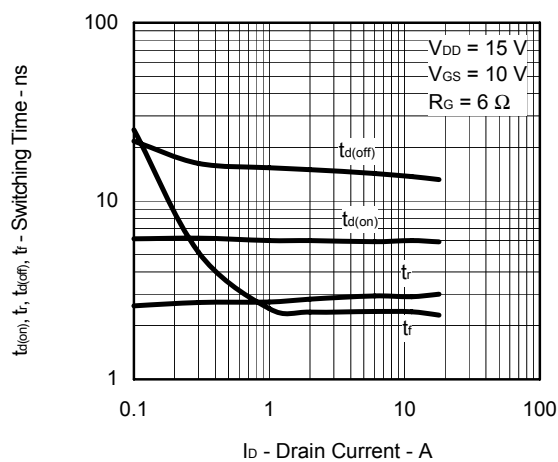
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



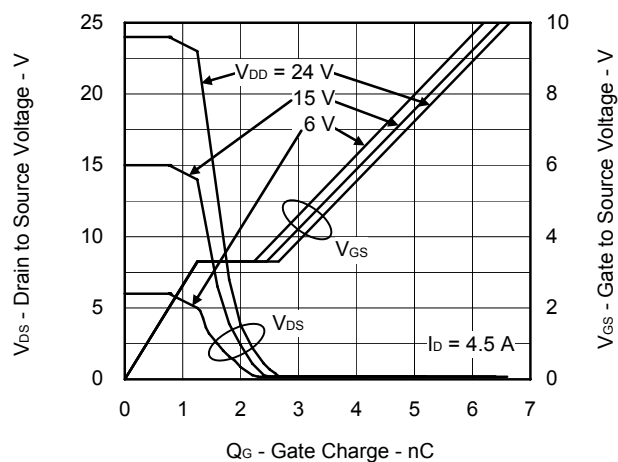
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



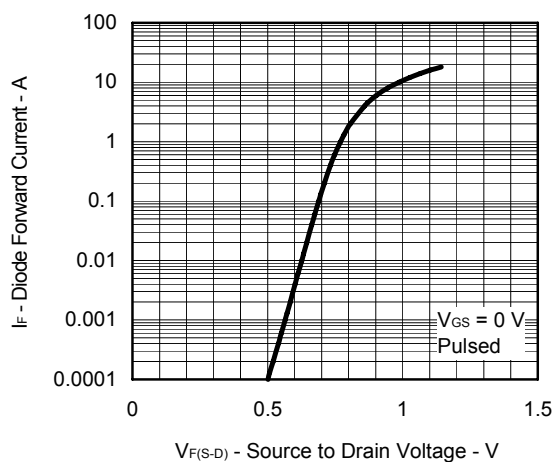
SWITCHING CHARACTERISTICS



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



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