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

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DATA SHEET

MOS FIELD EFFECT TRANSISTOR
N0300N

N-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

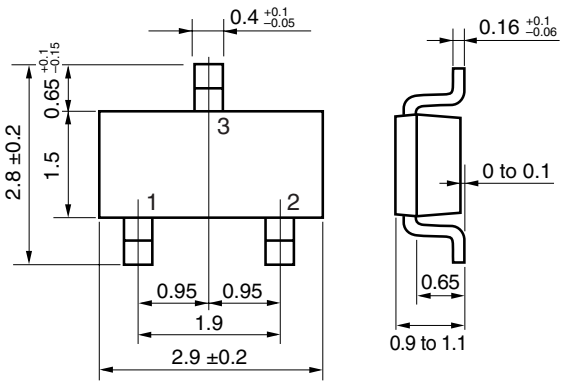
The N0300N is a switching device which can be driven directly by a 4.5 V power source.

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 mΩ MAX. (V_{GS} = 10 V, I_D = 2.0 A)
  $R_{DS(on)2}$ = 83 mΩ MAX. (V_{GS} = 4.5 V, I_D = 2.0 A)
- Built-in gate protection diode

PACKAGE DRAWING (Unit: mm)



1. Gate
2. Source
3. Drain

ORDERING INFORMATION

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

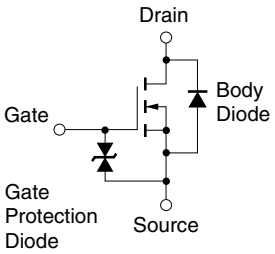
Note Pb-free (This product does not contain Pb in the external electrode and other parts.)

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

EQUIVALENT CIRCUIT



Notes 1. PW ≤ 10 μs, Duty Cycle ≤ 1%

2. Mounted on FR-4 board of 50 mm x 50 mm x 1.6 mmt, 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.

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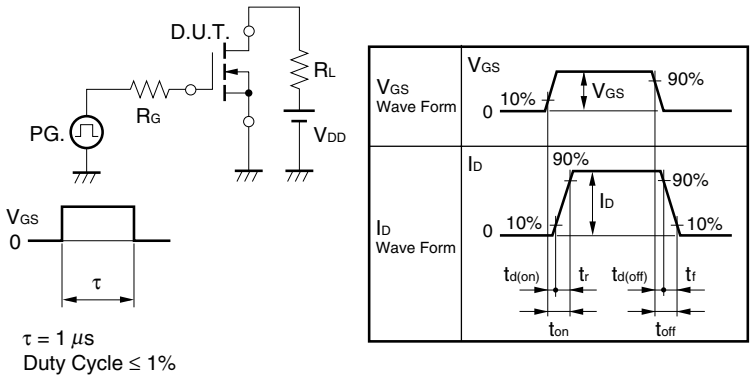
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ELECTRICAL CHARACTERISTICS (T_A = 25°C)

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

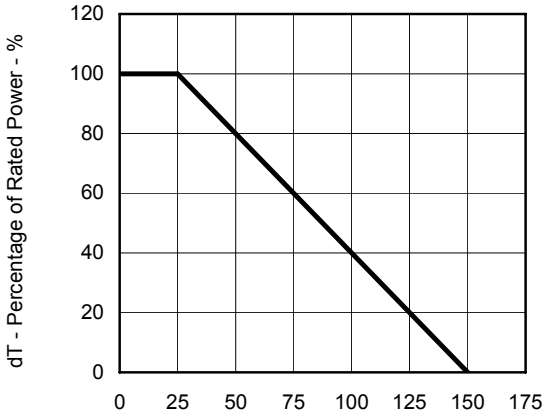


τ = 1 μs
Duty Cycle ≤ 1%

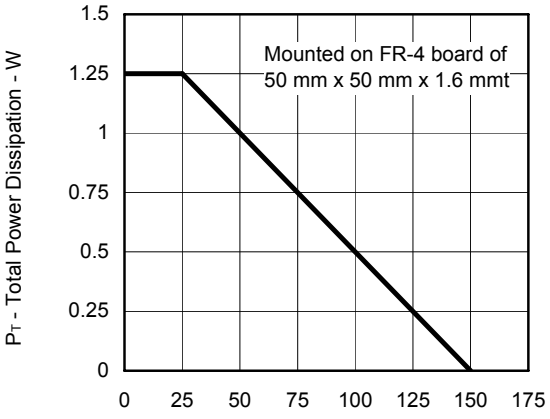
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TYPICAL CHARACTERISTICS (T_A = 25°C)

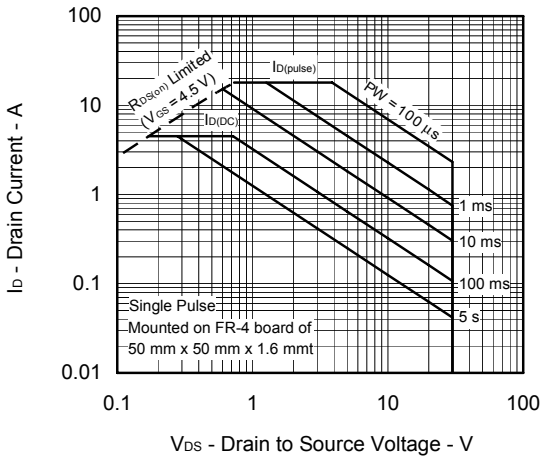
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



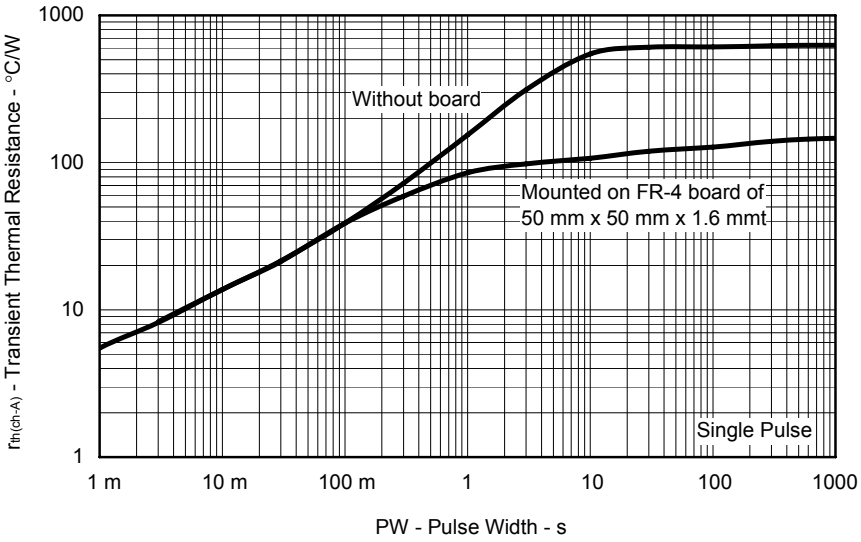
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



FORWARD BIAS SAFE OPERATING AREA

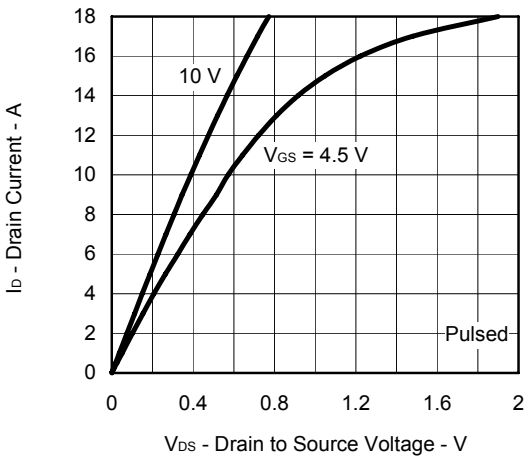


TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH

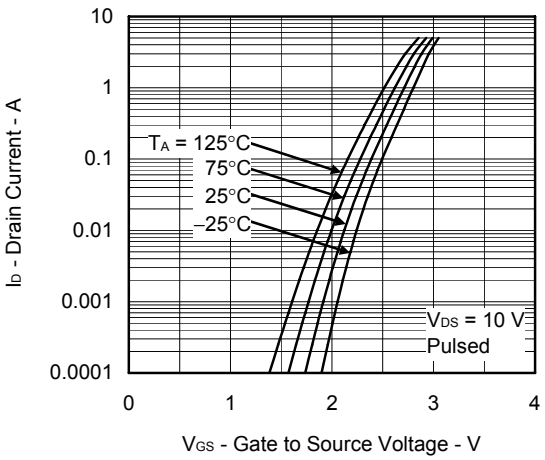


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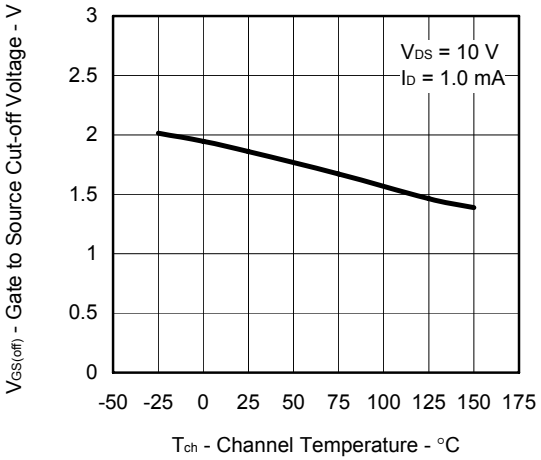
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



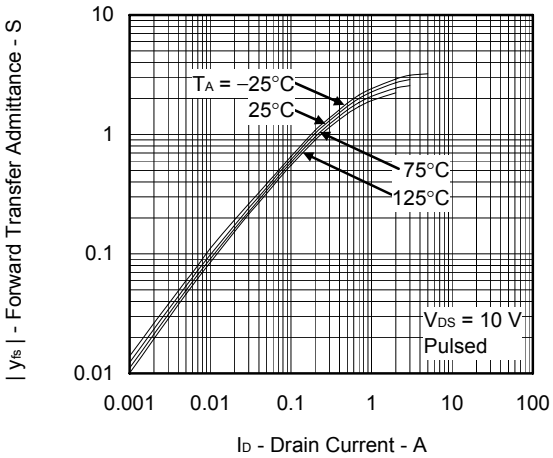
FORWARD TRANSFER CHARACTERISTICS



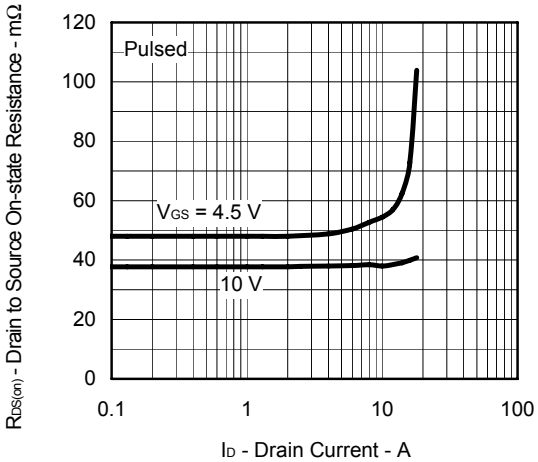
GATE TO SOURCE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



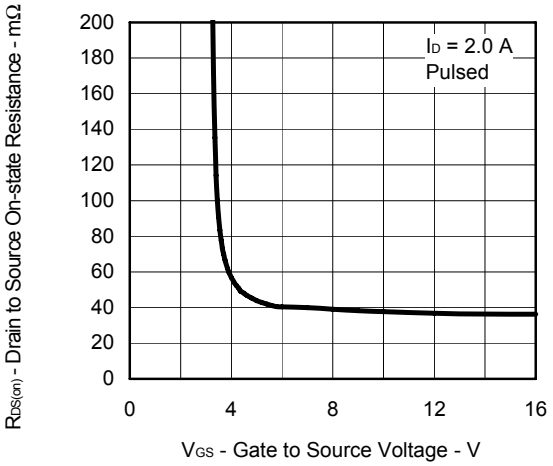
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT

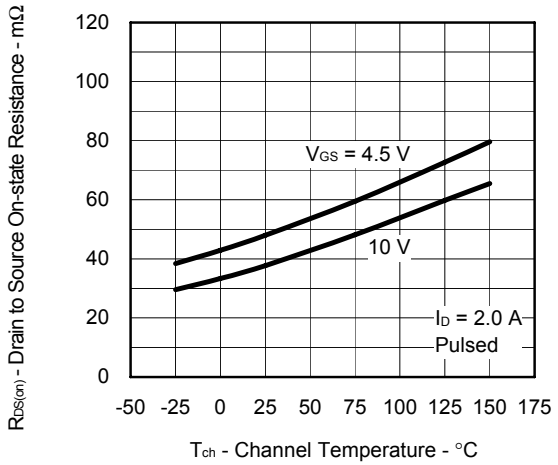


DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE

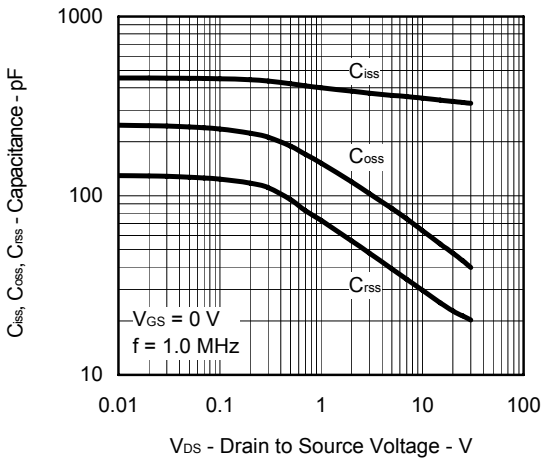


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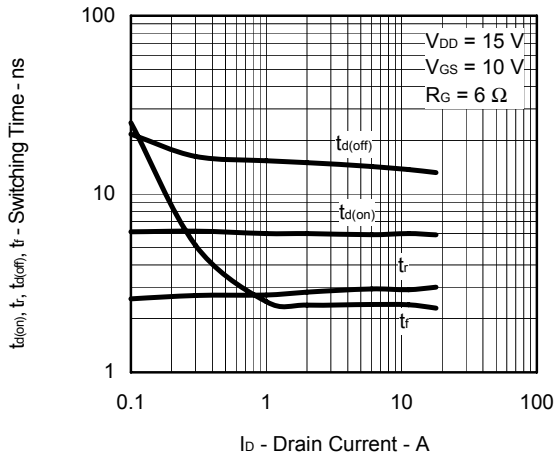
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



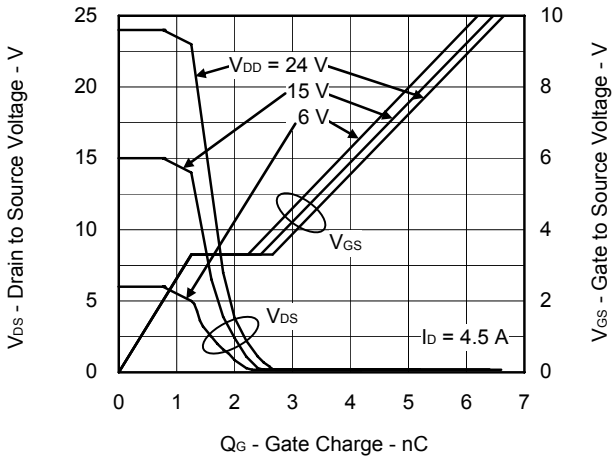
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



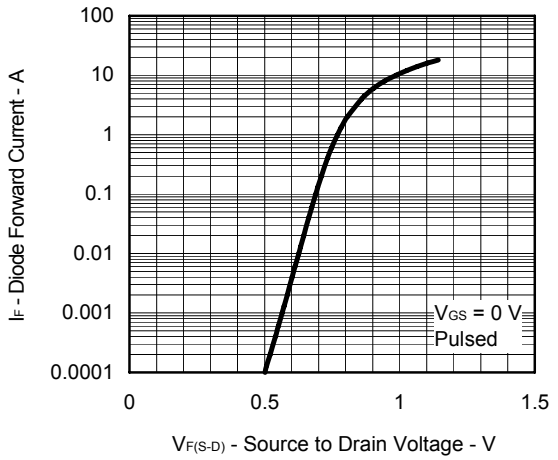
SWITCHING CHARACTERISTICS



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



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