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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RENESAS

MOS FIELD EFFECT TRANSISTOR
μPA679TB

N/P-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

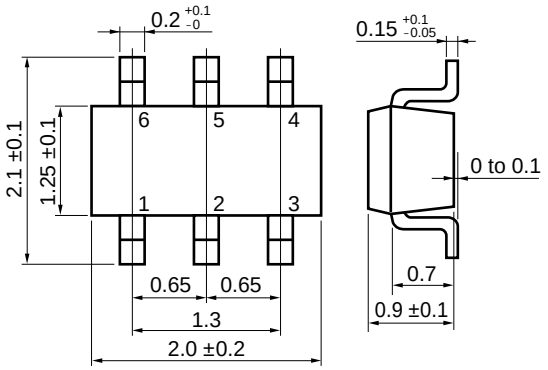
The μPA679TB is a switching device, which can be driven directly by a 2.5 V power source.

The μPA679TB 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

- 2.5 V drive available
- Low on-state resistance
  - N-ch $R_{DS(on)1}$ = 0.57 Ω MAX. (V_{GS} = 4.5 V, I_D = 0.30 A)
  - $R_{DS(on)3}$ = 0.88 Ω MAX. (V_{GS} = 2.5 V, I_D = 0.15 A)
  - P-ch $R_{DS(on)1}$ = 1.45 Ω MAX. (V_{GS} = –4.5 V, I_D = –0.20 A)
  - $R_{DS(on)3}$ = 2.98 Ω MAX. (V_{GS} = –2.5 V, I_D = –0.15 A)
- Two MOS FET circuits in same size package as SC-70

PACKAGE DRAWING (Unit: mm)



ORDERING INFORMATION

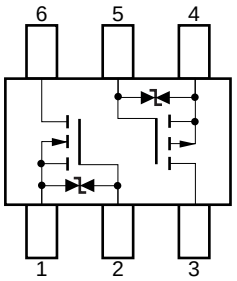
PART NUMBER	PACKAGE
μPA679TB	SC-88 (SSP)

Marking: YA

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (V_{GS} = 0 V)	V_{DSS}	20 / –20	V
Gate to Source Voltage (V_{DS} = 0 V)	V_{GSS}	±12 / ∓12	V
Drain Current (DC)	$I_{D(DC)}$	±0.35 / ∓0.25	A
Drain Current (pulse) Note1	$I_{D(pulse)}$	±1.40 / ∓1.00	A
Total Power Dissipation (2 units) Note2	P_T	0.2	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C

PIN CONNECTION (Top View)



1. Source 1
2. Gate 1
3. Drain 2
4. Source 2
5. Gate 2
6. Drain 1

Notes 1. PW ≤ 10 μs, Duty Cycle ≤ 1%

2. Mounted on FR-4 board of 2500 mm^2 x 1.1 mm

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.

Caution This product is electrostatic-sensitive device due to low ESD capability and shoud be handled with caution for electrostatic discharge.
V_{ESD} = ±100 V TYP. (C = 200 pF, R = 0 Ω, Single pulse)

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Date Published February 2003 NS CP(K)
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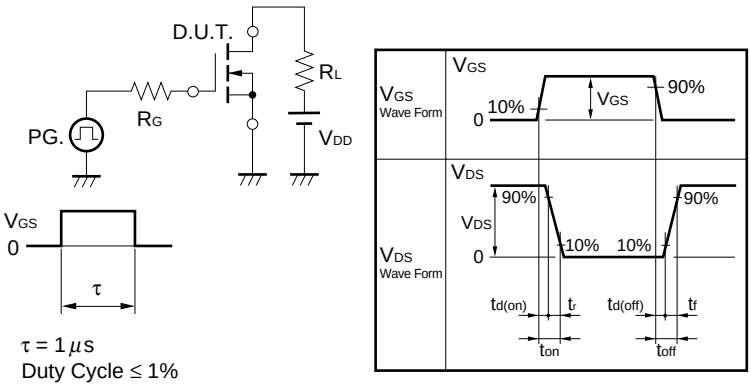
ELECTRICAL CHARACTERISTICS

(1) N-ch PART (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20.0 V, V_{GS} = 0 V			1.0	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±12.0 V, V_{DS} = 0 V			±10	μA
Gate Cut-off Voltage Note	$V_{GS(off)}$	V_{DS} = 10.0 V, I_D = 1.0 mA	0.50	1.00	1.50	V
Forward Transfer Admittance Note	$\|y_{fs}\|$	V_{DS} = 10.0 V, I_D = 0.30 A	0.25	0.75		S
Drain to Source On-state Resistance Note	$R_{DS(on)1}$	V_{GS} = 4.5 V, I_D = 0.30 A		0.38	0.57	Ω
	$R_{DS(on)2}$	V_{GS} = 4.0 V, I_D = 0.30 A		0.41	0.60	Ω
	$R_{DS(on)3}$	V_{GS} = 2.5 V, I_D = 0.15 A		0.60	0.88	Ω
Input Capacitance	C_{iss}	V_{DS} = 10.0 V		28		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		11		pF
Reverse Transfer Capacitance	C_{rss}	f = 1.0 MHz		7		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 10.0 V, I_D = 0.30 A		20		ns
Rise Time	t_r	V_{GS} = 4.0 V		51		ns
Turn-off Delay Time	$t_{d(off)}$	R_G = 10 Ω		94		ns
Fall Time	t_f			87		ns
Body Diode Forward Voltage	$V_{F(S-D)}$	I_F = 0.35 A, V_{GS} = 0 V		0.84		V

Note Pulsed: PW ≤ 350 μs, Duty cycle ≤ 2%

TEST CIRCUIT SWITCHING TIME



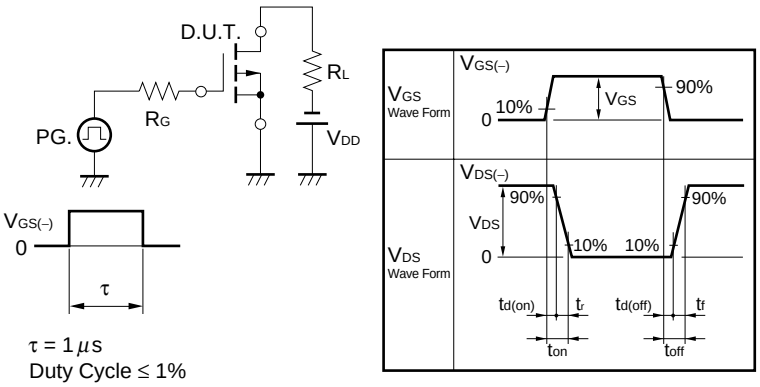
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(2) P-ch PART (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = –20.0 V, V_{GS} = 0 V			–1.0	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ∓12.0 V, V_{DS} = 0 V			∓10	μA
Gate Cut-off Voltage Note	$V_{GS(off)}$	V_{DS} = –10.0 V, I_D = –1.0 mA	–0.80	–1.30	–1.80	V
Forward Transfer Admittance Note	$\|y_{fs}\|$	V_{DS} = –10.0 V, I_D = –0.20 A	0.2	0.6		S
Drain to Source On-state Resistance Note	$R_{DS(on)1}$	V_{GS} = –4.5 V, I_D = –0.20 A		1.17	1.45	Ω
	$R_{DS(on)2}$	V_{GS} = –4.0 V, I_D = –0.20 A		1.25	1.55	Ω
	$R_{DS(on)3}$	V_{GS} = –2.5 V, I_D = –0.15 A		2.25	2.98	Ω
Input Capacitance	C_{iss}	V_{DS} = –10.0 V		29		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		15		pF
Reverse Transfer Capacitance	C_{rss}	f = 1.0 MHz		3		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = –10.0 V, I_D = –0.20 A		23		ns
Rise Time	t_r	V_{GS} = –4.0 V		39		ns
Turn-off Delay Time	$t_{d(off)}$	R_G = 10 Ω		50		ns
Fall Time	t_f			33		ns
Body Diode Forward Voltage	$V_{F(S-D)}$	I_F = 0.25 A, V_{GS} = 0 V		0.88		V

Note Pulsed: PW ≤ 350 μs, Duty cycle ≤ 2%

TEST CIRCUIT SWITCHING TIME

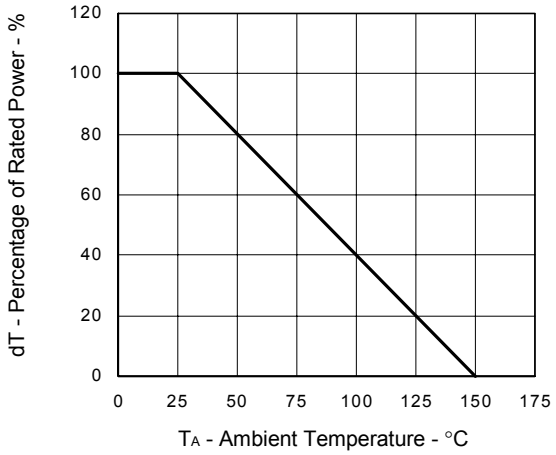


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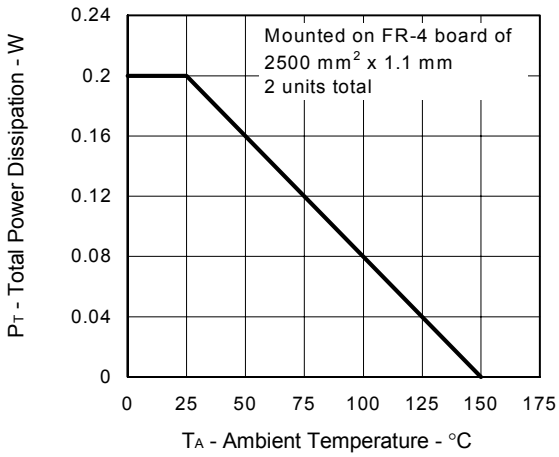
TYPICAL CHARACTERISTICS

(1) N-ch PART (T_A = 25°C)

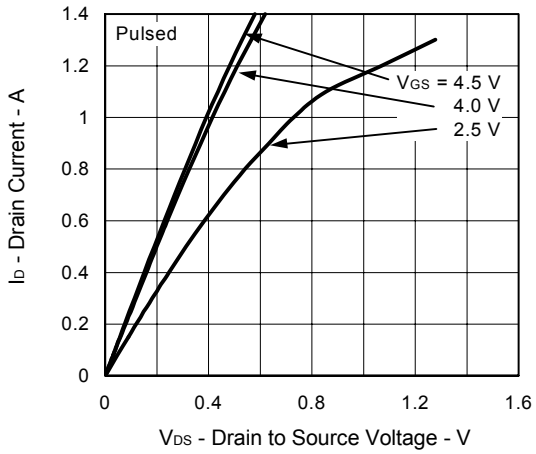
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



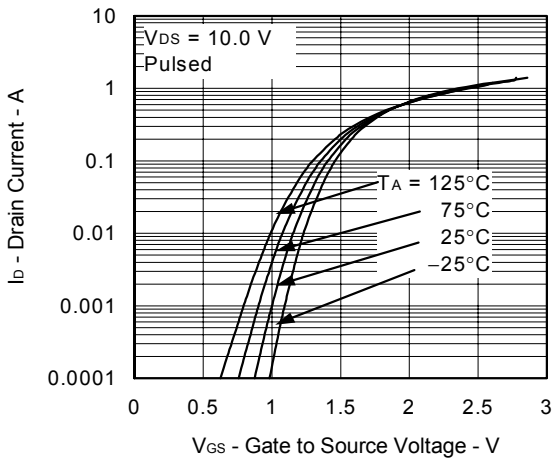
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



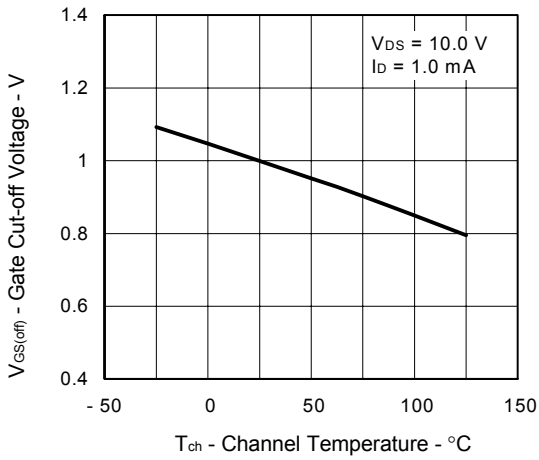
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



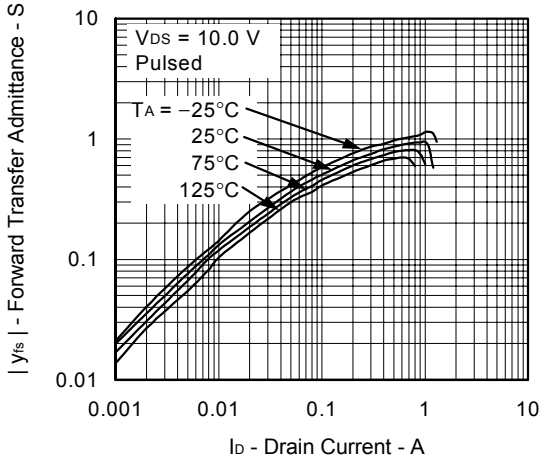
FORWARD TRANSFER CHARACTERISTICS



GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE

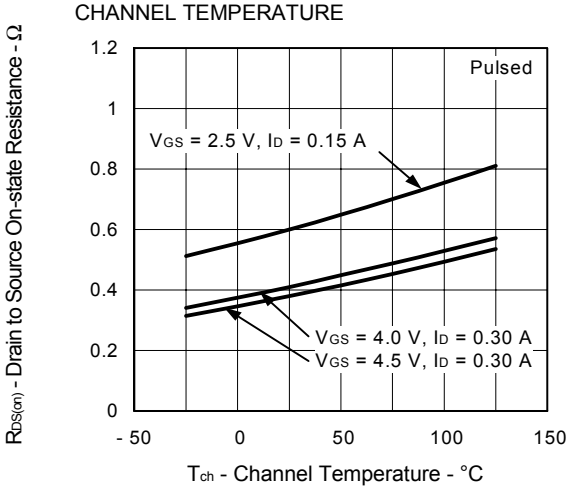


FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT

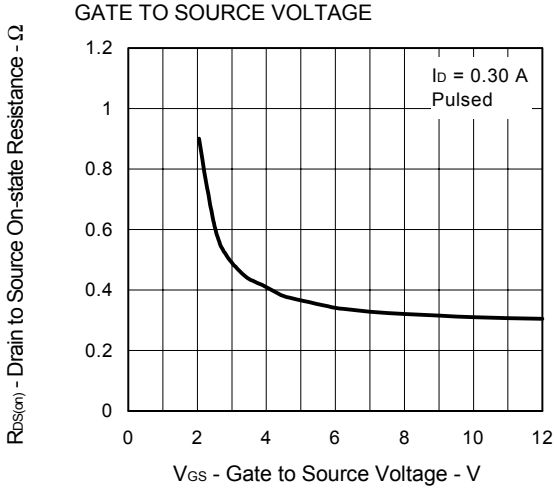


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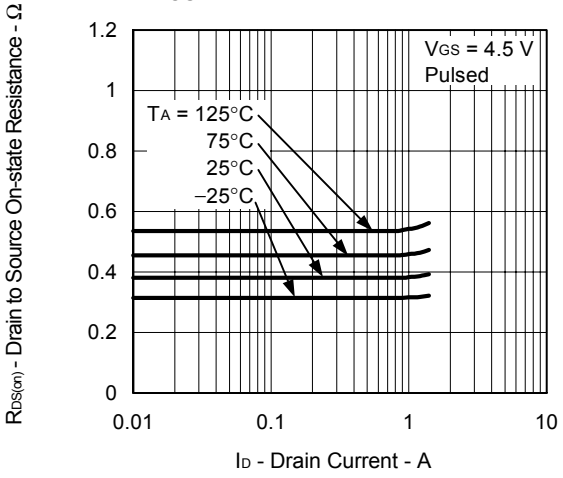
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



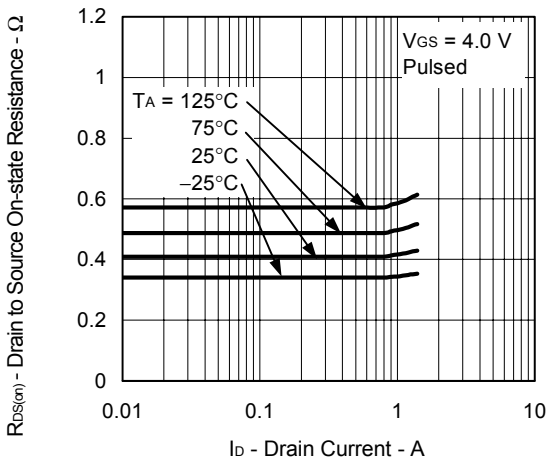
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



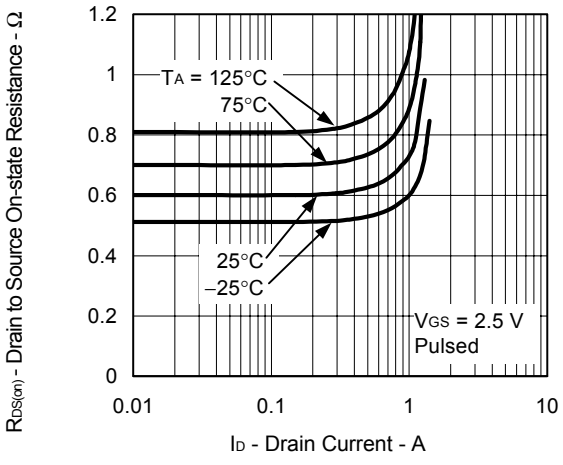
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



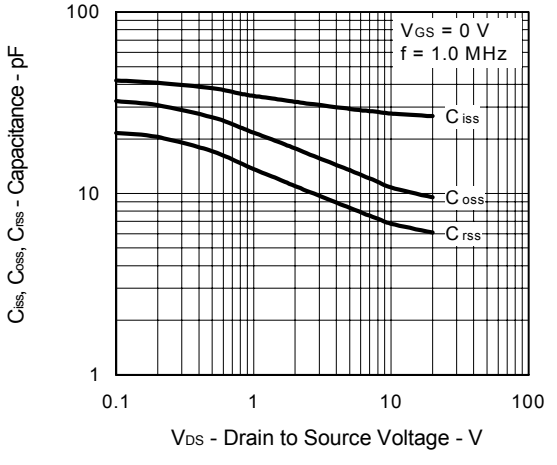
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT

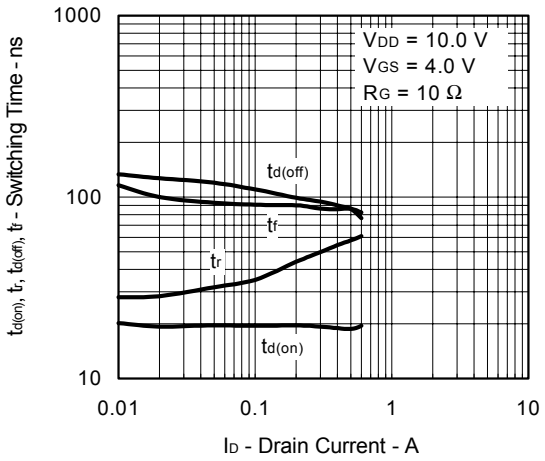


CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE

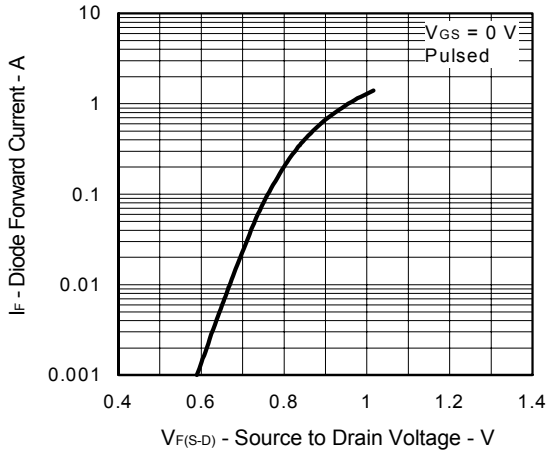


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SWITCHING CHARACTERISTICS



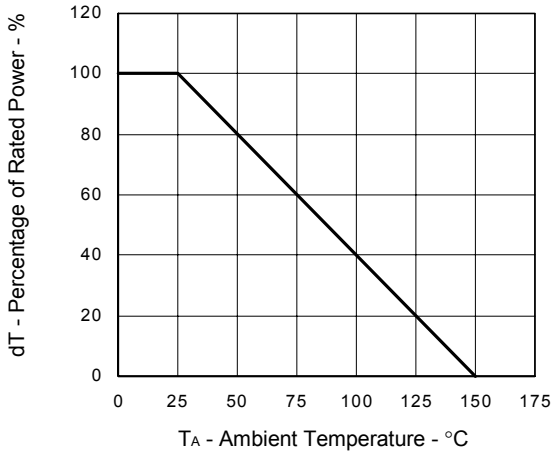
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



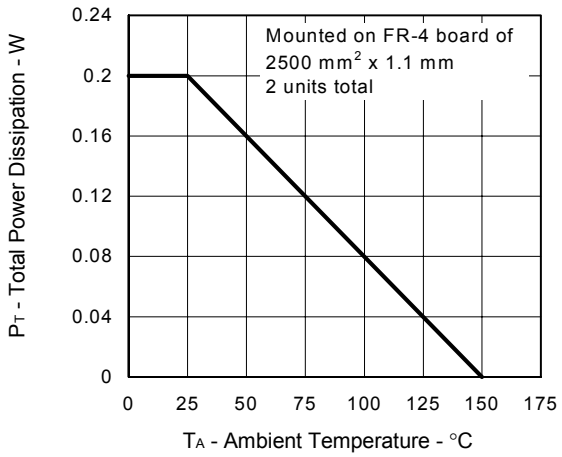
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(2) P-ch PART (T_A = 25°C)

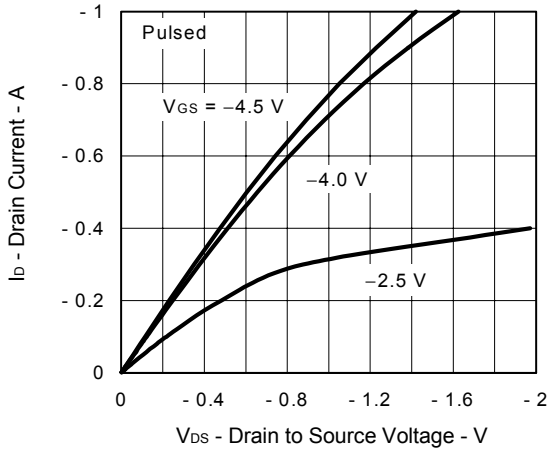
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



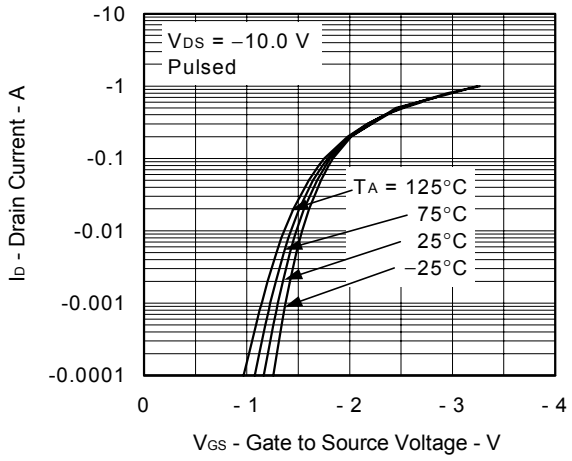
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



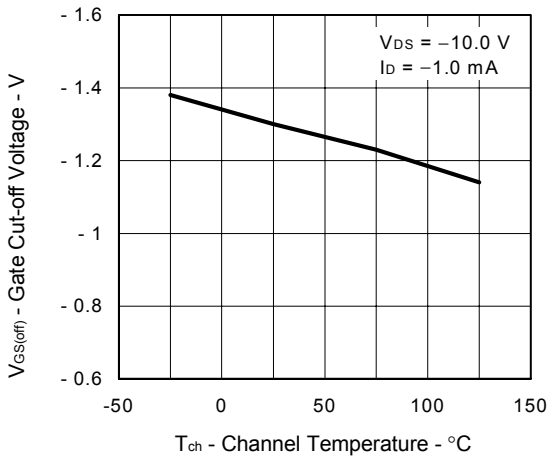
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



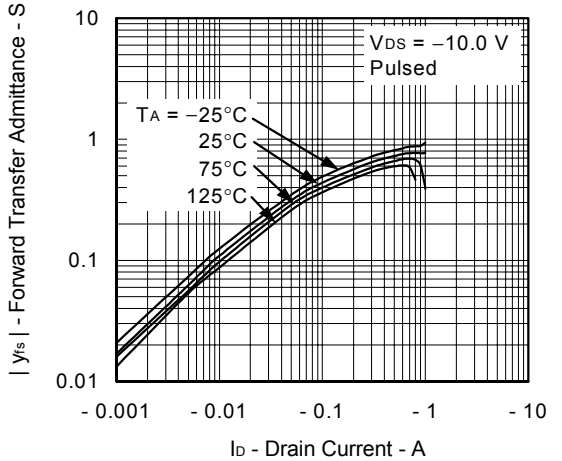
FORWARD TRANSFER CHARACTERISTICS



GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE

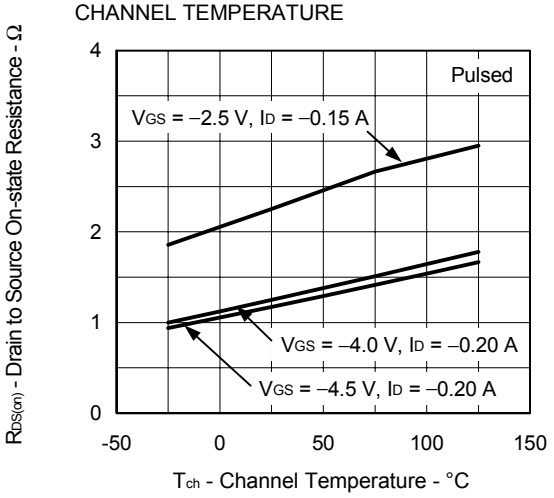


FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT

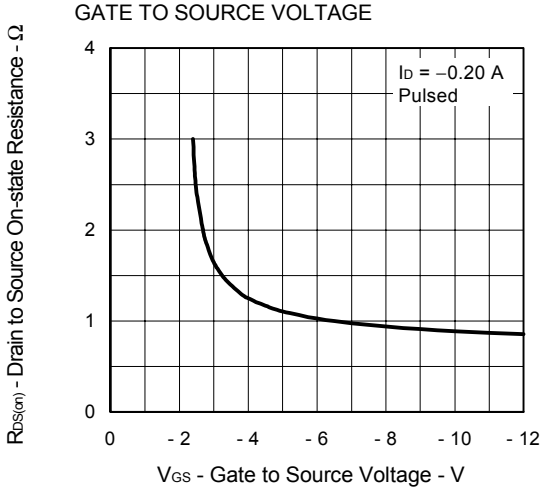


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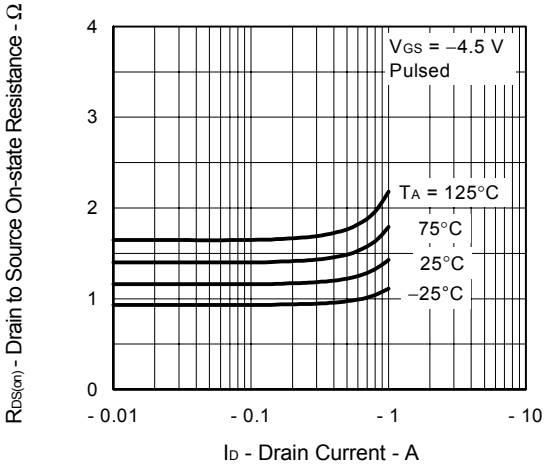
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



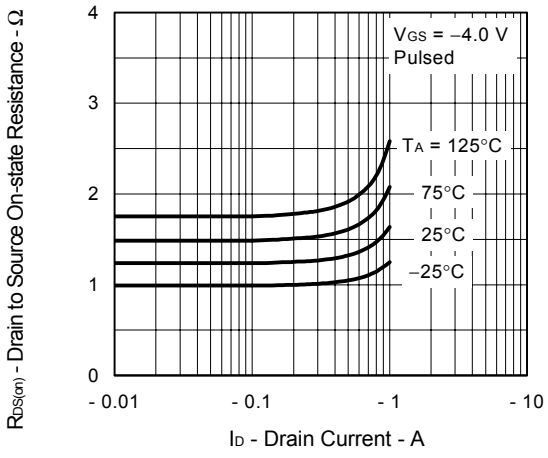
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



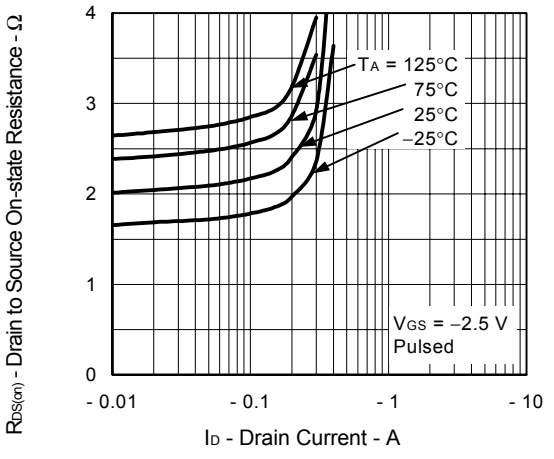
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



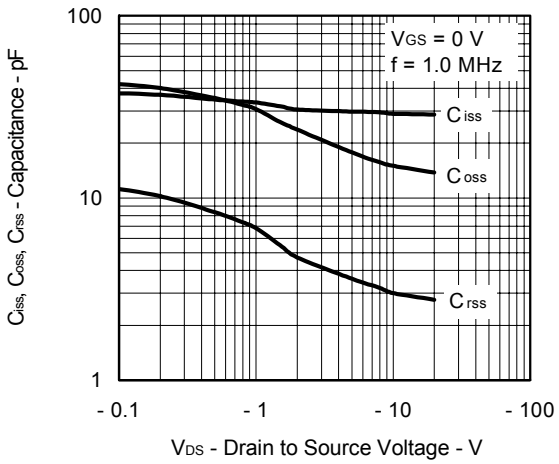
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT

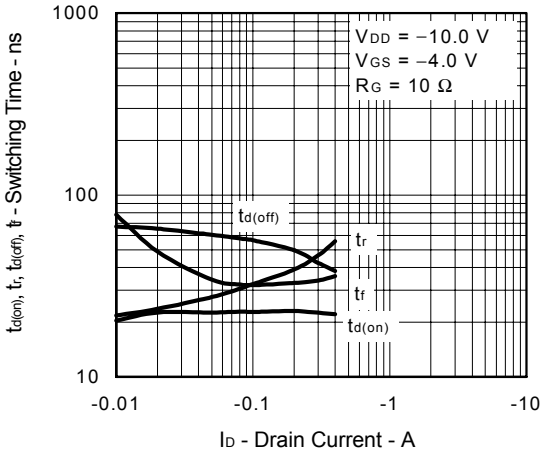


CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE

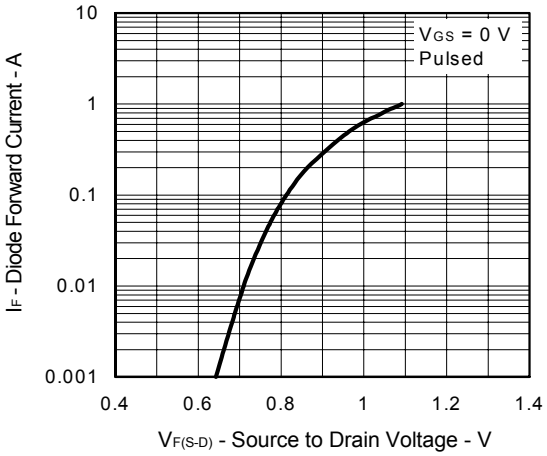


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SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



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