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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RENESAS

MOS FIELD EFFECT TRANSISTOR
μPA1951

P-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

The μPA1951 is a switching device, which can be driven directly by a 1.8 V power source.

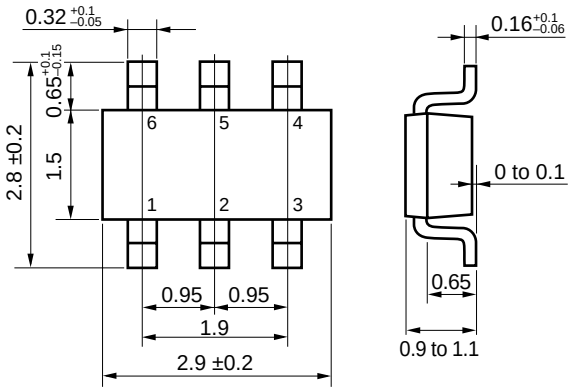
The device features a low on-state resistance and excellent switching characteristics, and is suitable for applications such as power switch of portable machine and so on.

FEATURES

- 1.8 V drive available
- Low on-state resistance

$R_{DS(on)1}$ = 88 mΩ MAX. (V_{GS} = –4.5V, I_D = –1.5 A)
$R_{DS(on)2}$ = 114 mΩ MAX. (V_{GS} = –3.0 V, I_D = –1.5 A)
$R_{DS(on)3}$ = 133 mΩ MAX. (V_{GS} = –2.5 V, I_D = –1.5 A)
$R_{DS(on)4}$ = 234 mΩ MAX. (V_{GS} = –1.8 V, I_D = –1.0 A)

PACKAGE DRAWING (Unit: mm)



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

ORDERING INFORMATION

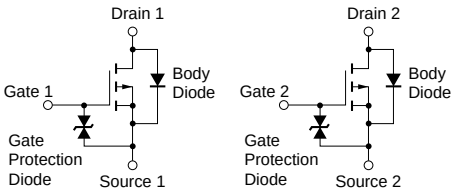
PART NUMBER	PACKAGE
μPA1951TE	SC-95 (Mini Mold Thin Type)

Marking: TN

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (V_{GS} = 0 V)	V_{DSS}	–12	V
Gate to Source Voltage (V_{DS} = 0 V)	V_{GSS}	∓8.0	V
Drain Current (DC)	$I_{D(DC)}$	∓2.5	A
Drain Current (pulse) **Note1**	$I_{D(pulse)}$	∓10	A
Total Power Dissipation (2 units) **Note2**	P_{T1}	1.15	W
Total Power Dissipation (1 unit) **Note2**	P_{T2}	0.57	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C

EQUIVALENT CIRCUITS



Notes 1. PW ≤ 10 μs, Duty Cycle ≤ 1%
2. Mounted on FR-4 board of 5000 mm^2 x 1.1 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.

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Date Published August 2002 NS CP(K)
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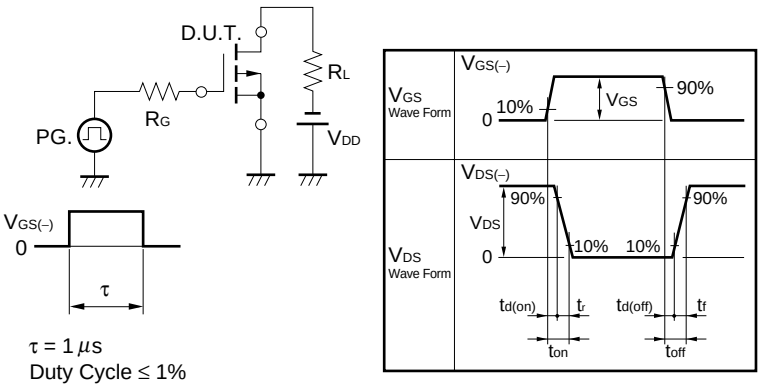
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ELECTRICAL CHARACTERISTICS (T_A = 25°C)

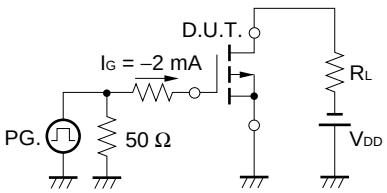
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = –12 V, V_{GS} = 0 V			–10	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ∓8.0 V, V_{DS} = 0 V			∓10	μA
Gate Cut-off Voltage	$V_{GS(off)}$	V_{DS} = –10 V, I_D = –1.0 mA	–0.45	–0.75	–1.5	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = –10 V, I_D = –1.5 A	1.0	4.7		S
Drain to Source On-state Resistance	$R_{DS(on)1}$	V_{GS} = –4.5 V, I_D = –1.5 A		70	88	mΩ
	$R_{DS(on)2}$	V_{GS} = –3.0 V, I_D = –1.5 A		85	114	mΩ
	$R_{DS(on)3}$	V_{GS} = –2.5 V, I_D = –1.5 A		100	133	mΩ
	$R_{DS(on)4}$	V_{GS} = –1.8 V, I_D = –1.0 A		140	234	mΩ
Input Capacitance	C_{iss}	V_{DS} = –10 V		270		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		90		pF
Reverse Transfer Capacitance	C_{rss}	f = 1.0 MHz		45		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = –6.0 V, I_D = –1.5 A		14		ns
Rise Time	t_r	V_{GS} = –4.0 V		90		ns
Turn-off Delay Time	$t_{d(off)}$	R_G = 10 Ω		150		ns
Fall Time	t_f			130		ns
Total Gate Charge	Q_G	V_{DD} = –10 V		2.4		nC
Gate to Source Charge	Q_{GS}	V_{GS} = –4.0 V		0.6		nC
Gate to Drain Charge	Q_{GD}	I_D = –2.5 A		0.8		nC
Body Diode Forward Voltage	$V_{F(S-D)}$	I_F = 2.5 A, V_{GS} = 0 V		0.87		V

TEST CIRCUIT 1 SWITCHING TIME



τ = 1 μs
Duty Cycle ≤ 1%

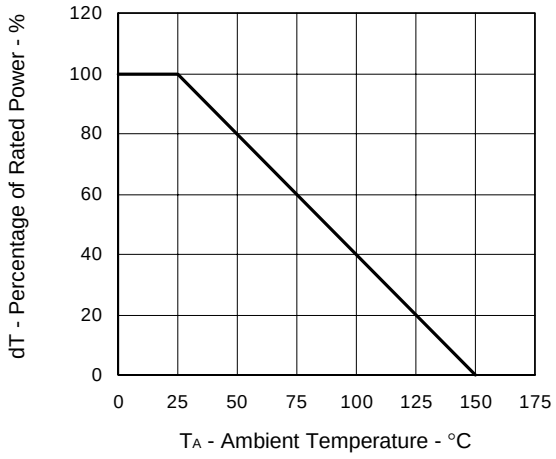
TEST CIRCUIT 2 GATE CHARGE



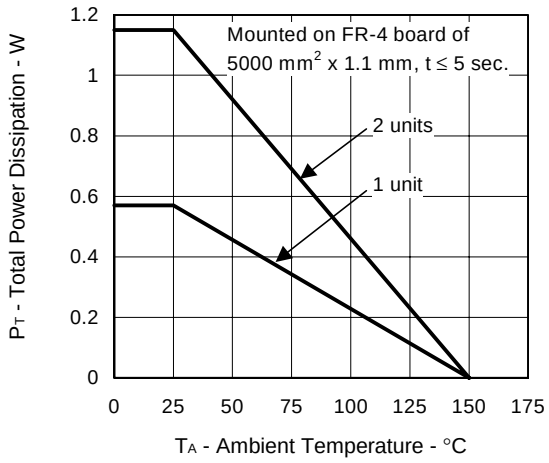
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TYPICAL CHARACTERISTICS (T_A = 25°C)

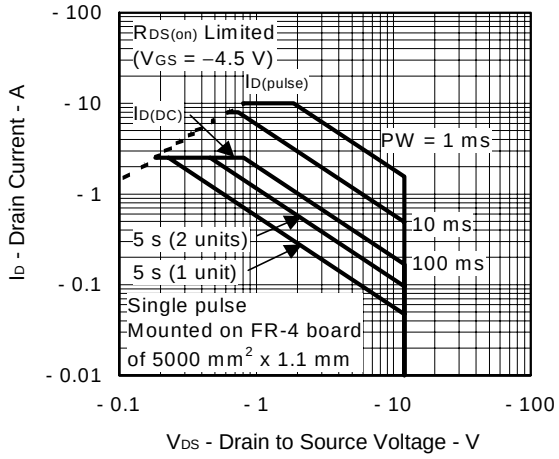
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



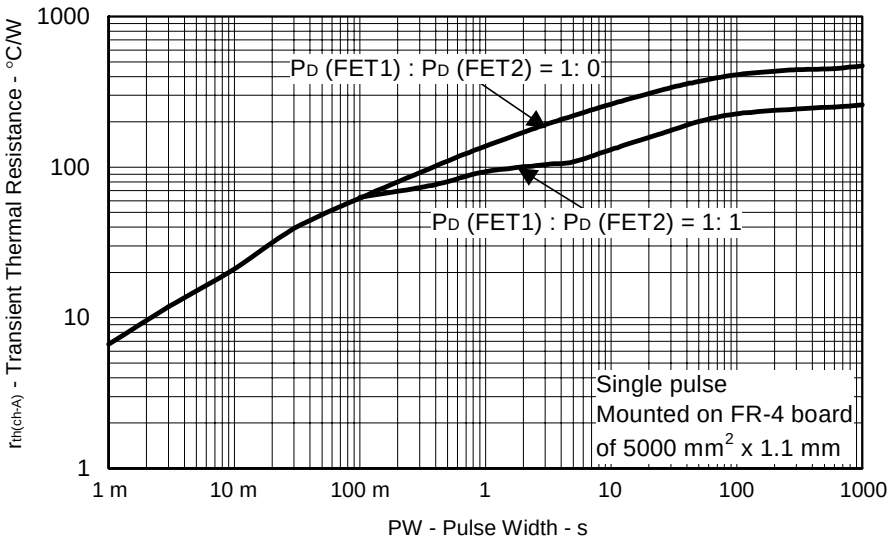
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



FORWARD BIAS SAFE OPERATING AREA

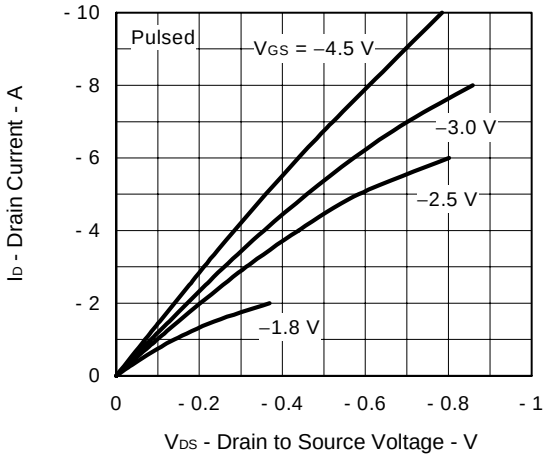


TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH

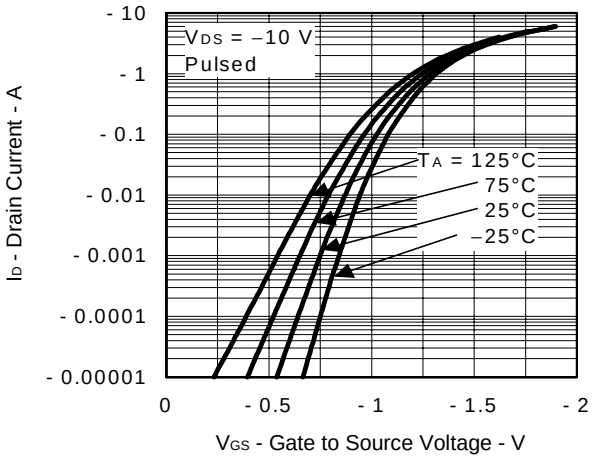


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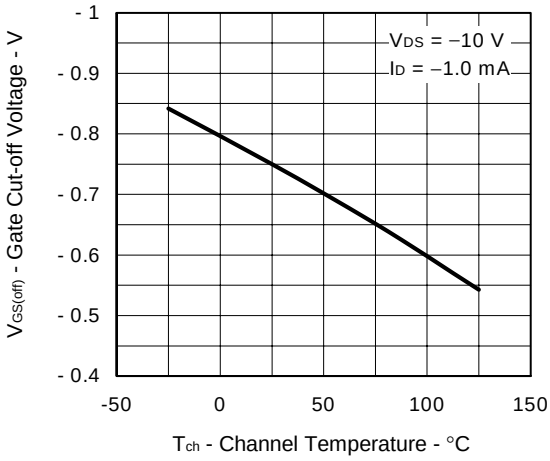
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



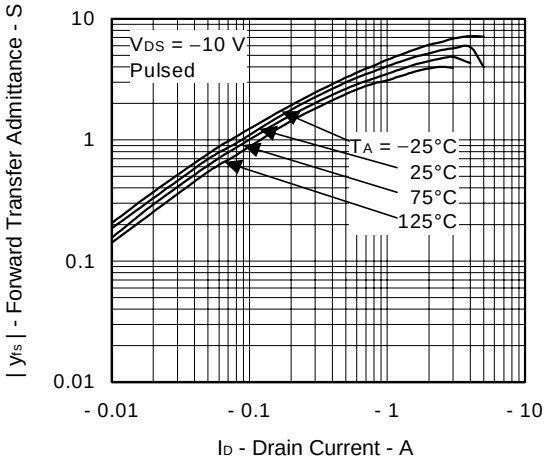
FORWARD TRANSFER CHARACTERISTICS



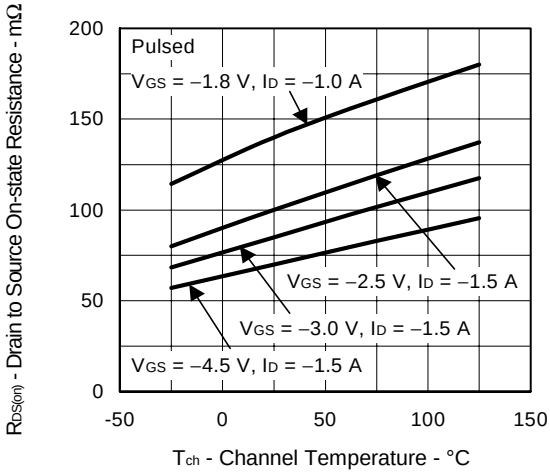
GATE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



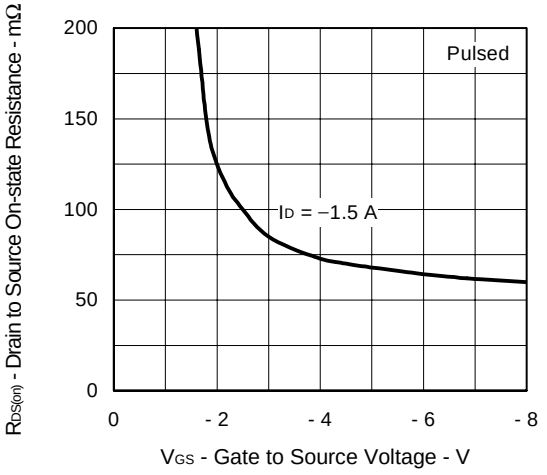
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



DRAIN TO SOURCE ON-STATE RESISTANCE vs.
CHANNEL TEMPERATURE

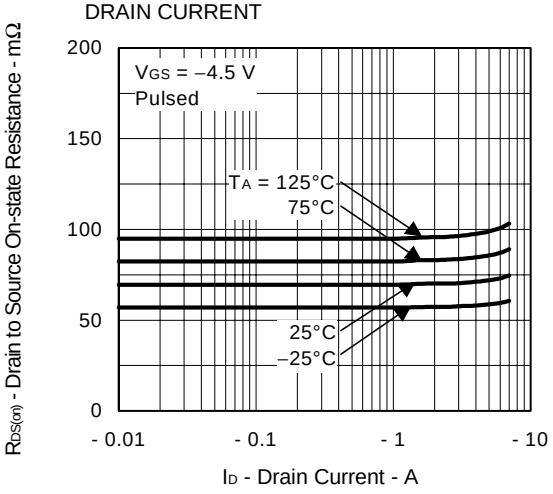


DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE

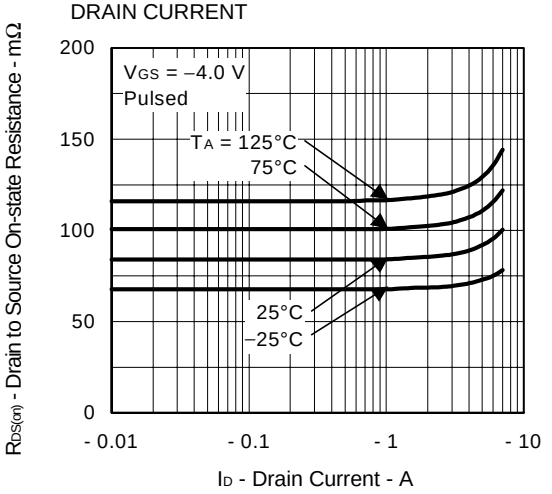


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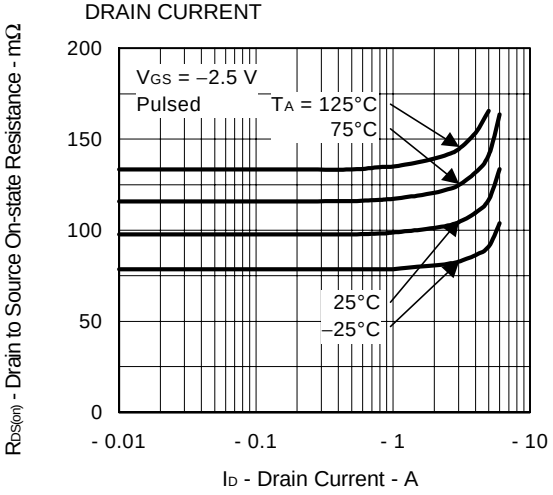
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



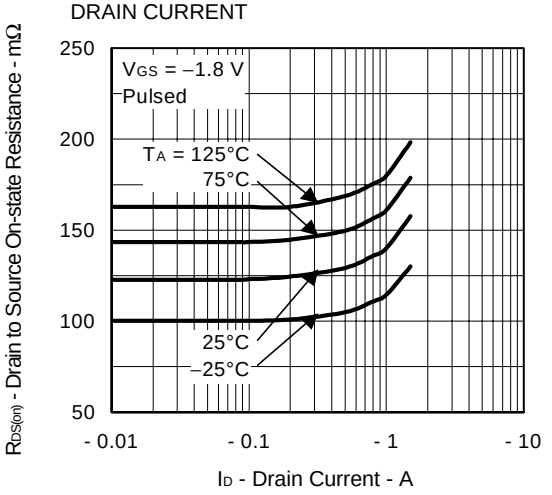
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



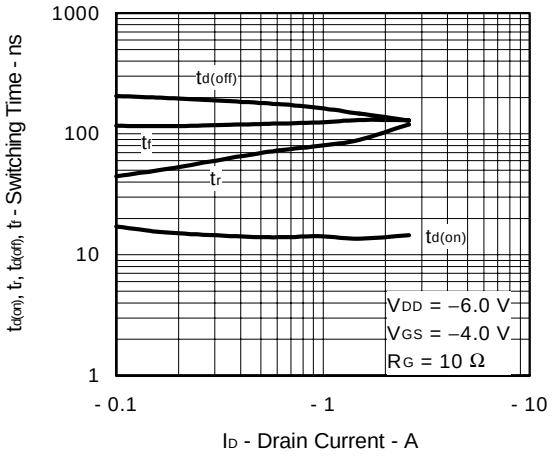
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



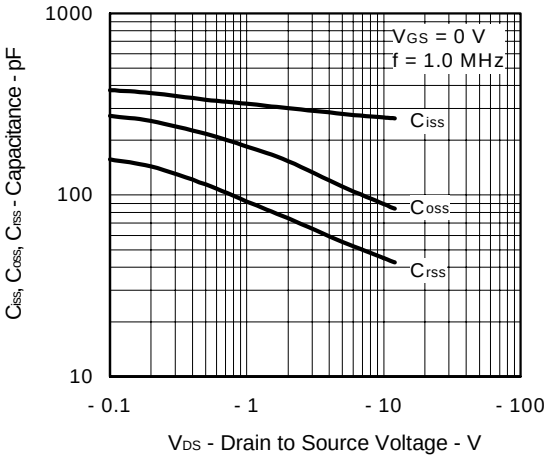
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



SWITCHING CHARACTERISTICS

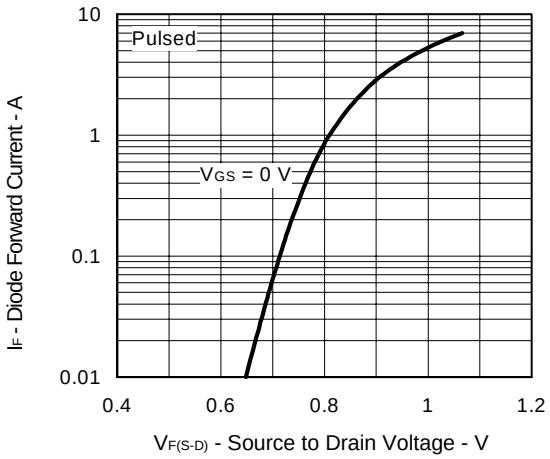


CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE

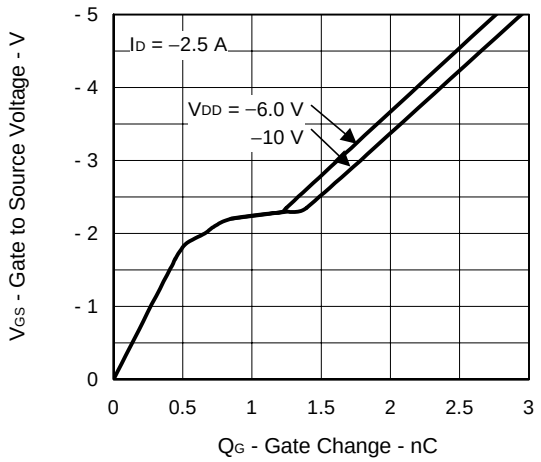


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SOURCE TO DRAIN DIODE FORWARD VOLTAGE



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



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