

**MOS FIELD EFFECT TRANSISTOR
 μ PA1951****P-CHANNEL MOS FIELD EFFECT TRANSISTOR
FOR SWITCHING****DESCRIPTION**

The μ PA1951 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
 - $R_{DS(on)1} = 88 \text{ m}\Omega \text{ MAX. } (V_{GS} = -4.5 \text{ V}, I_D = -1.5 \text{ A})$
 - $R_{DS(on)2} = 114 \text{ m}\Omega \text{ MAX. } (V_{GS} = -3.0 \text{ V}, I_D = -1.5 \text{ A})$
 - $R_{DS(on)3} = 133 \text{ m}\Omega \text{ MAX. } (V_{GS} = -2.5 \text{ V}, I_D = -1.5 \text{ A})$
 - $R_{DS(on)4} = 234 \text{ m}\Omega \text{ MAX. } (V_{GS} = -1.8 \text{ V}, I_D = -1.0 \text{ A})$

ORDERING INFORMATION

PART NUMBER	PACKAGE
μ PA1951TE	SC-95 (Mini Mold Thin Type)

Marking: TN

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

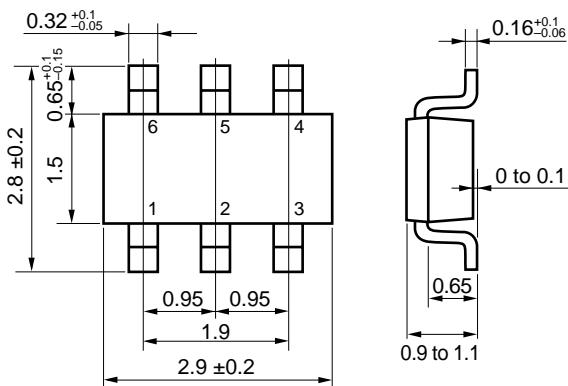
Drain to Source Voltage ($V_{GS} = 0 \text{ V}$)	V_{DSS}	-12	V
Gate to Source Voltage ($V_{DS} = 0 \text{ V}$)	V_{GSS}	± 8.0	V
Drain Current (DC)	$I_D(\text{DC})$	± 2.5	A
Drain Current (pulse) <small>Note1</small>	$I_D(\text{pulse})$	± 10	A
Total Power Dissipation (2 units) <small>Note2</small>	P_{T1}	1.15	W
Total Power Dissipation (1 unit) <small>Note2</small>	P_{T2}	0.57	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

Notes 1. $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1\%$

2. Mounted on FR-4 board of $5000 \text{ mm}^2 \times 1.1 \text{ mm}$, $t \leq 5 \text{ sec.}$

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)

6: Drain 1

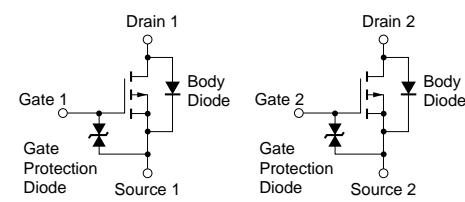
1: Gate 1

5: Source 1

4: Drain 2

3: Gate 2

2: Source 2

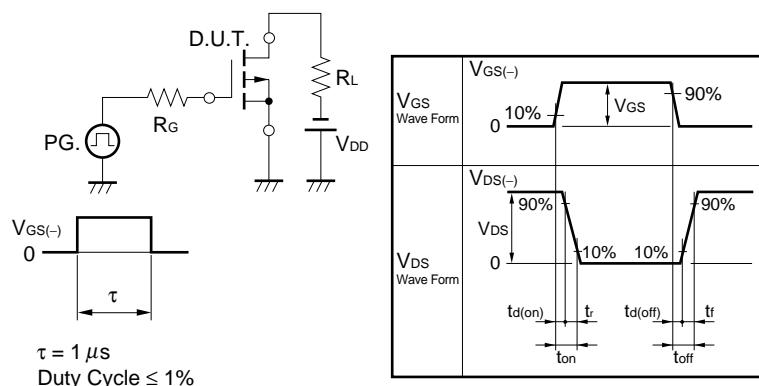
EQUIVALENT CIRCUITS

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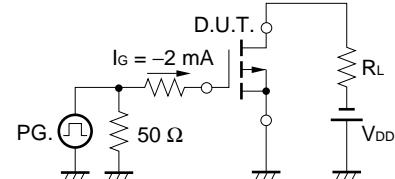
ELECTRICAL CHARACTERISTICS (TA = 25°C)

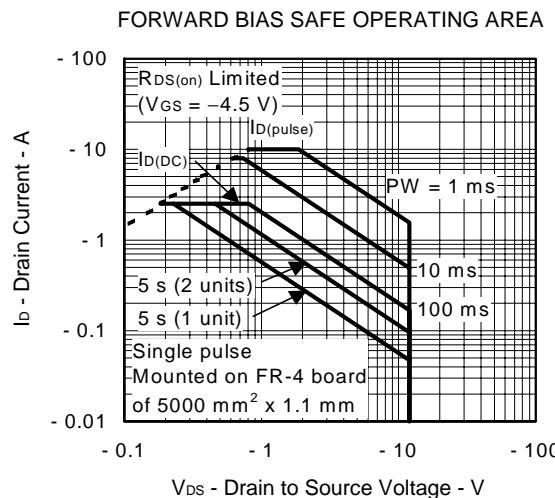
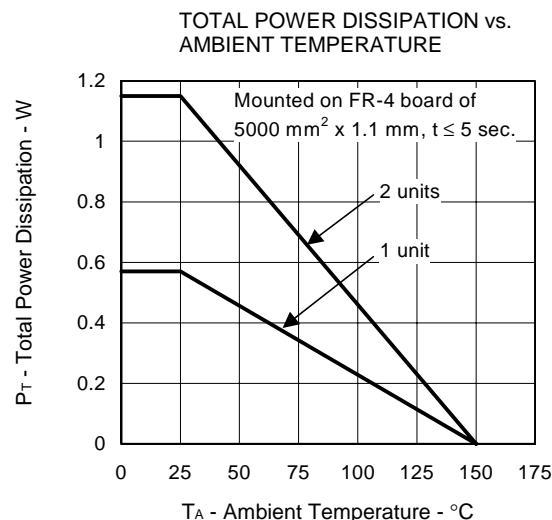
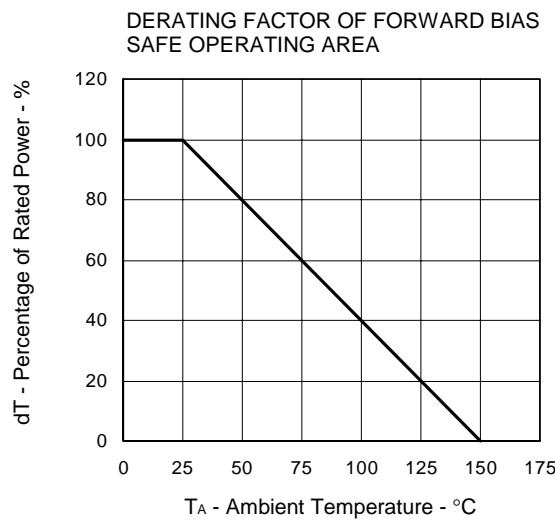
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -12 \text{ V}$, $V_{GS} = 0 \text{ V}$			-10	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 8.0 \text{ V}$, $V_{DS} = 0 \text{ V}$			± 10	μA
Gate Cut-off Voltage	$V_{GS(\text{off})}$	$V_{DS} =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

TEST CIRCUIT 1 SWITCHING TIME

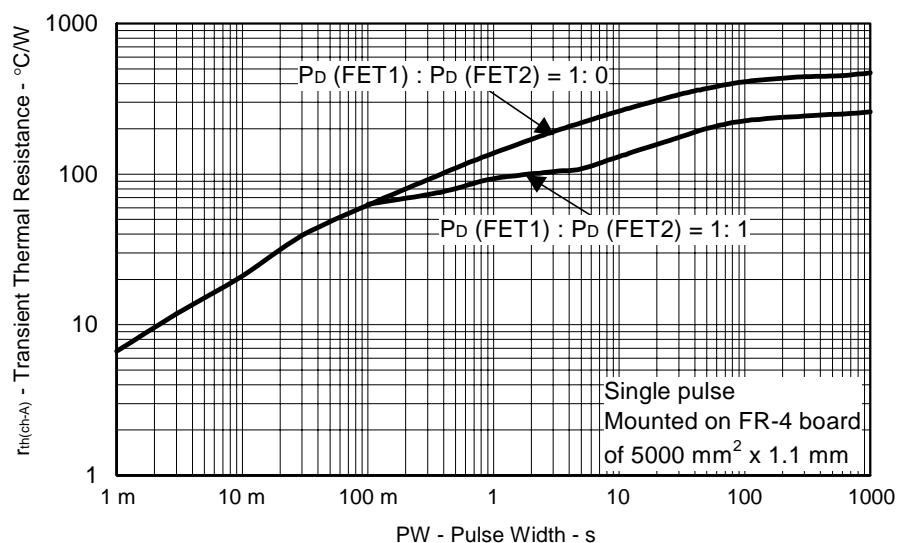


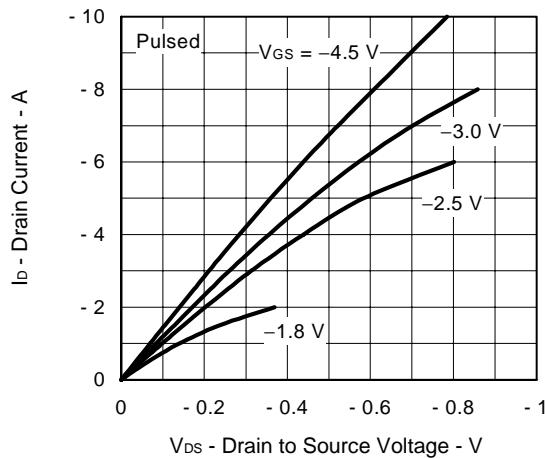
TEST CIRCUIT 2 GATE CHARGE



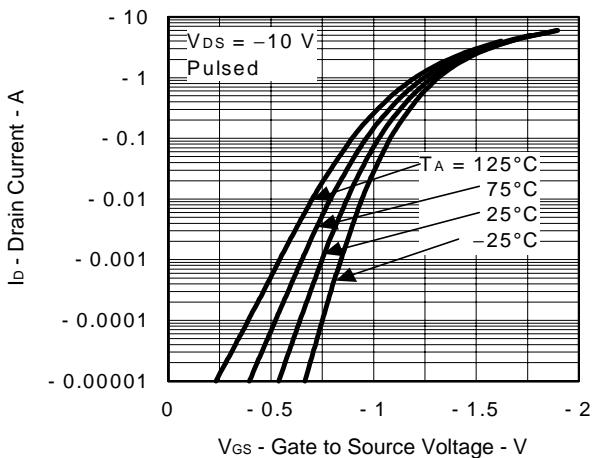
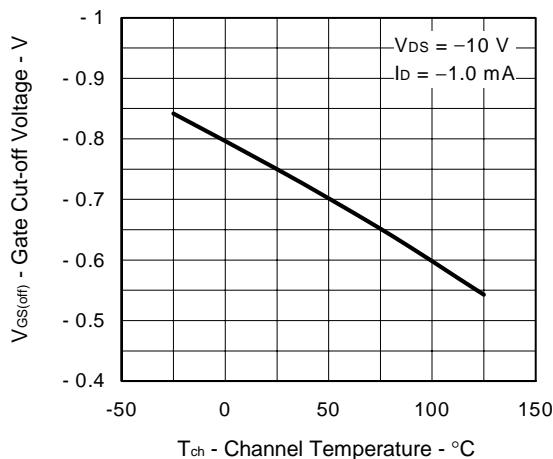
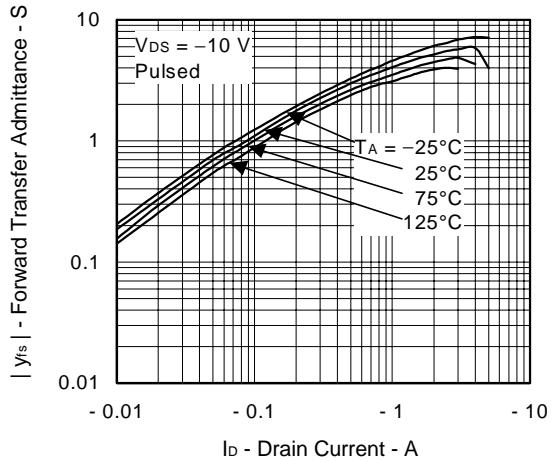
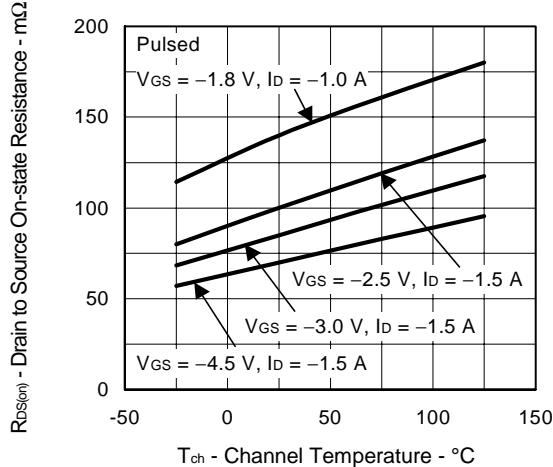
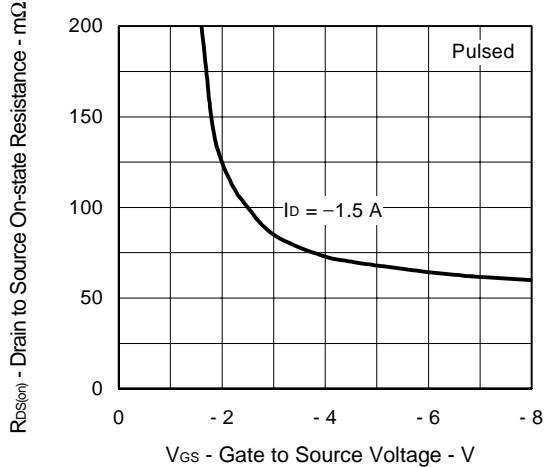
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

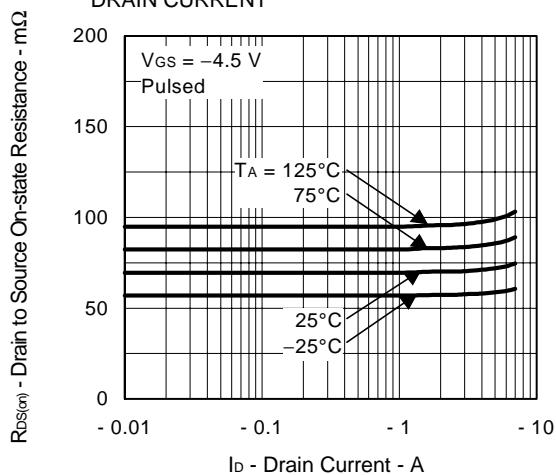
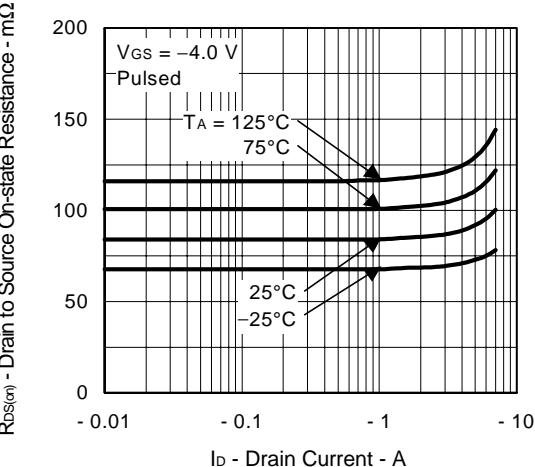
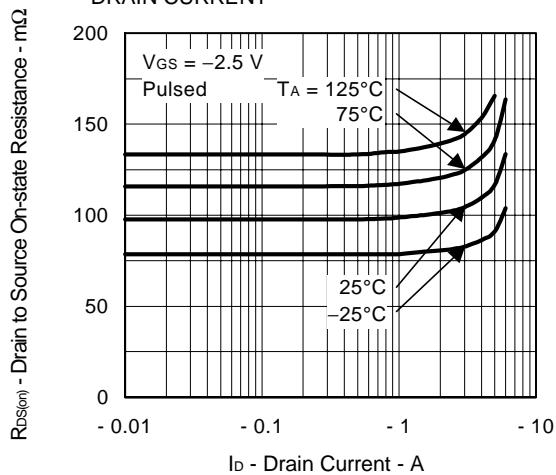
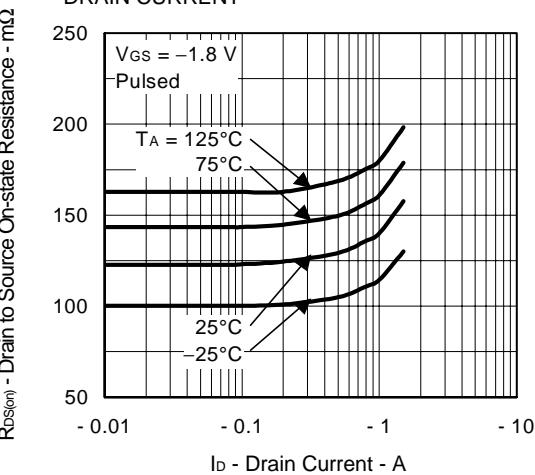
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



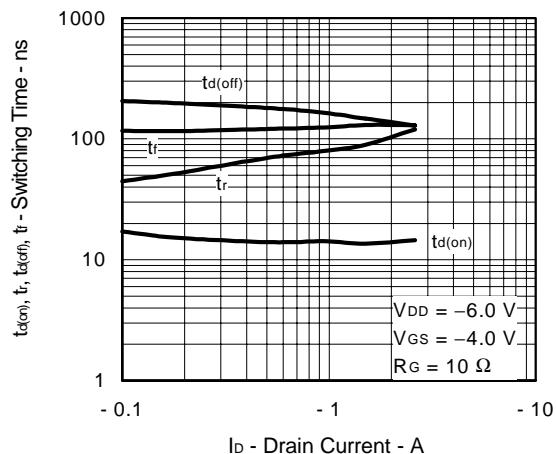
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE

FORWARD TRANSFER CHARACTERISTICS

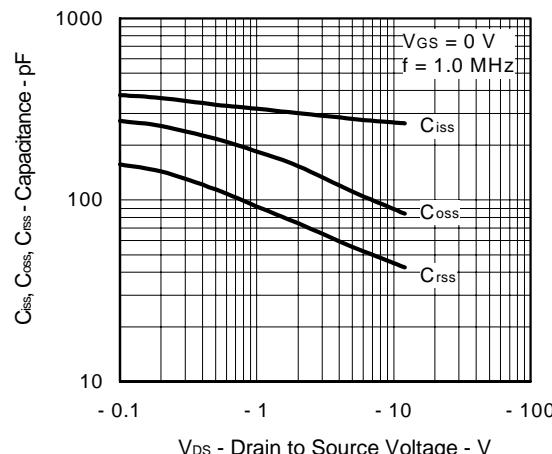
GATE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATUREFORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENTDRAIN TO SOURCE ON-STATE RESISTANCE vs.
CHANNEL TEMPERATUREDRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE

DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENTDRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENTDRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENTDRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT

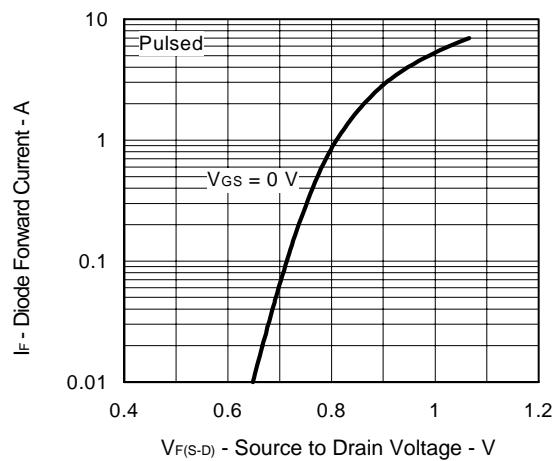
SWITCHING CHARACTERISTICS



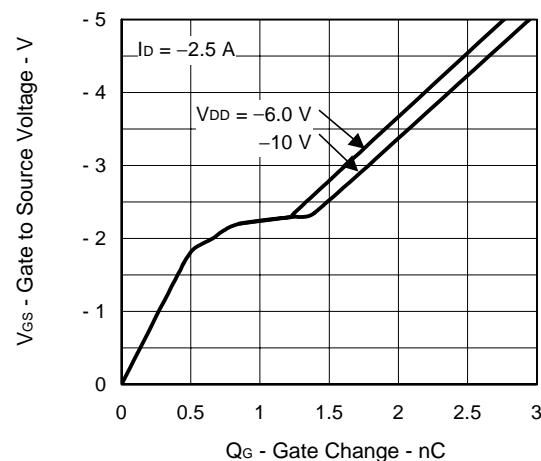
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



[MEMO]

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