To our customers,

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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
2SK3576

N-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

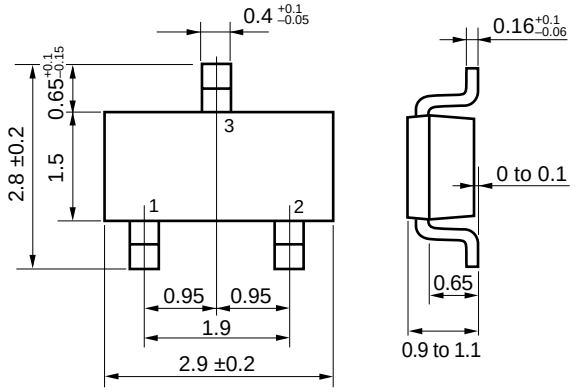
The 2SK3576 is a switching device which can be driven directly by a 2.5 V power source.

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

- 2.5V drive available
- Low on-state resistance
  $R_{DS(on)1}$ = 50 mΩ MAX. (V_{GS} = 4.5 V, I_D = 2.0 A)
  $R_{DS(on)2}$ = 53 mΩ MAX. (V_{GS} = 4.0 V, I_D = 2.0 A)
  $R_{DS(on)3}$ = 75 mΩ MAX. (V_{GS} = 2.5 V, I_D = 2.0 A)

PACKAGE DRAWING (Unit: mm)



1 : Gate
2 : Source
3 : Drain

ORDERING INFORMATION

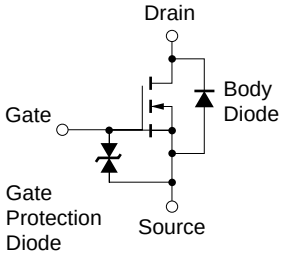
PART NUMBER	PACKAGE
2SK3576	SC-96 (Mini Mold Thin Type)

Marking: XK

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (V_{GS} = 0 V)	V_{DSS}	20	V
Gate to Source Voltage (V_{DS} = 0 V)	V_{GSS}	±12	V
Drain Current (DC) (T_A = 25°C)	$I_{D(DC)}$	±4.0	A
Drain Current (pulse) **Note1**	$I_{D(pulse)}$	±16	A
Total Power Dissipation (T_A = 25°C)	P_{T1}	0.2	W
Total Power Dissipation (T_A = 25°C) **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, 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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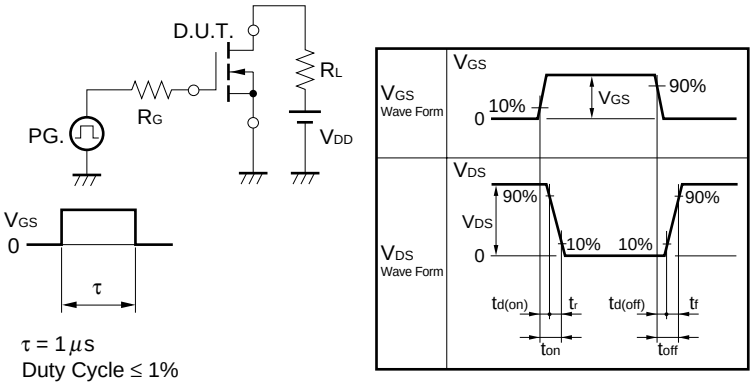
Document No. D15939EJ1V0DS00 (1st edition)
Date Published May 2002 NS CP(K)
Printed in Japan

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ELECTRICAL CHARACTERISTICS (T_A = 25°C)

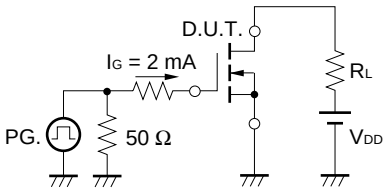
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20 V, V_{GS} = 0 V			10	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±12 V, V_{DS} = 0 V			±10	μA
Gate Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 1.0 mA	0.5		1.5	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = 10 V, I_D = 2.0 A	1.0			S
Drain to Source On-state Resistance	$R_{DS(on)1}$	V_{GS} = 4.5 V, I_D = 2.0 A		40	50	mΩ
	$R_{DS(on)2}$	V_{GS} = 4.0 V, I_D = 2.0 A		42	53	mΩ
	$R_{DS(on)3}$	V_{GS} = 2.5 V, I_D = 2.0 A		56	75	mΩ
Input Capacitance	C_{iss}	V_{DS} = 10 V		250		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		80		pF
Reverse Transfer Capacitance	C_{rss}	f = 1.0 MHz		60		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 10 V, I_D = 2.0 A		28		ns
Rise Time	t_r	V_{GS} = 4.0 V		140		ns
Turn-off Delay Time	$t_{d(off)}$	R_G = 10 Ω		110		ns
Fall Time	t_f			180		ns
Total Gate Charge	Q_G	V_{DD} = 16 V		3.3		nC
Gate to Source Charge	Q_{GS}	V_{GS} = 4.0 V		0.7		nC
Gate to Drain Charge	Q_{GD}	I_D = 4.0 A		1.5		nC
Body Diode Forward Voltage	$V_{F(S-D)}$	I_F = 4.0 A, V_{GS} = 0 V		0.89		V

TEST CIRCUIT 1 SWITCHING TIME



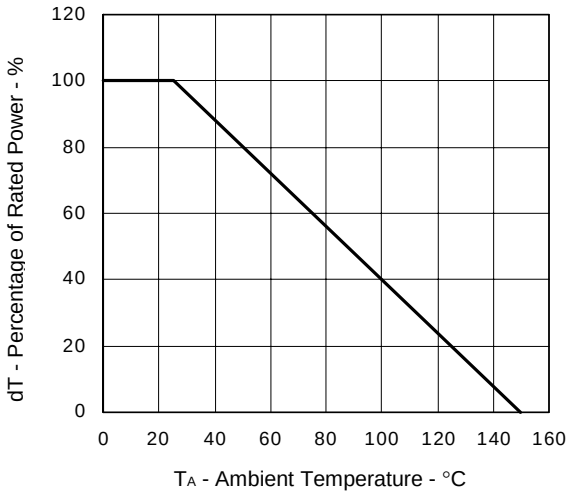
τ = 1 μs
Duty Cycle ≤ 1%

TEST CIRCUIT 2 GATE CHARGE

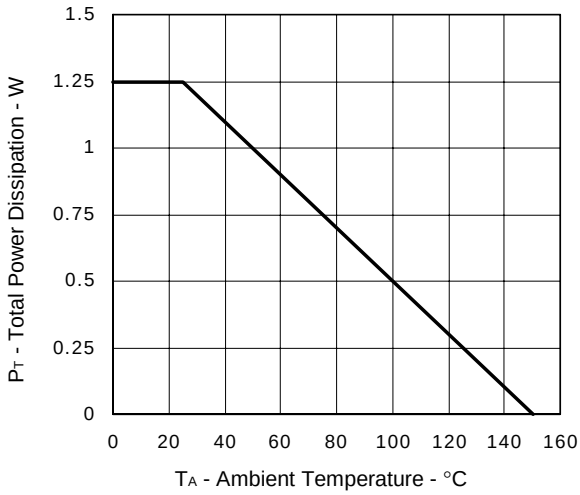


TYPICAL CHARACTERISTICS (TA = 25°C)

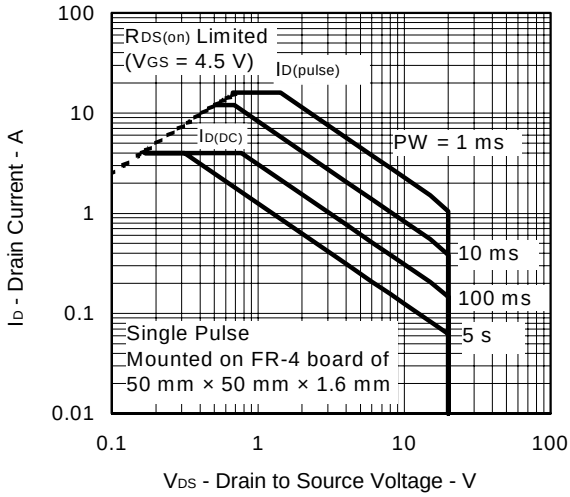
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



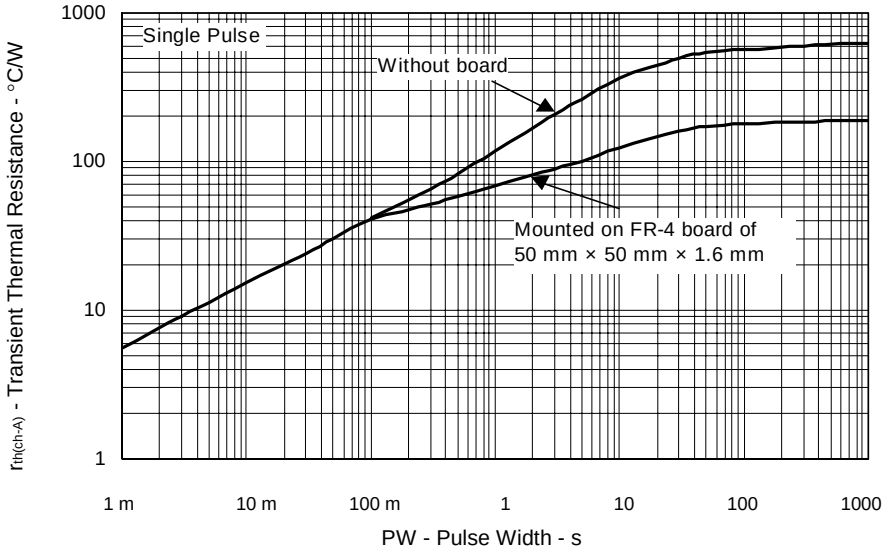
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



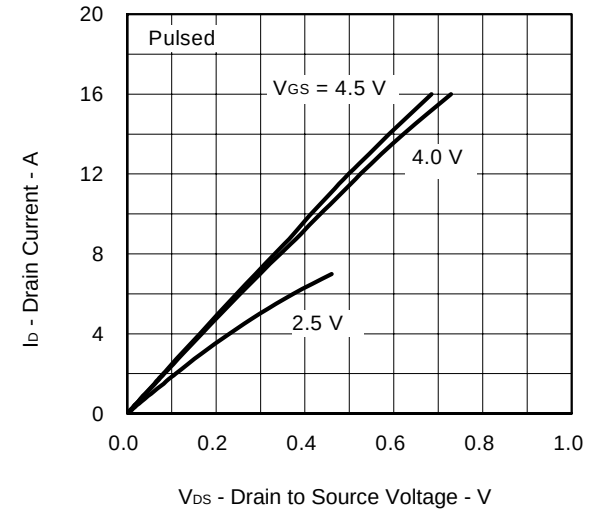
FORWARD BIAS SAFE OPERATING AREA



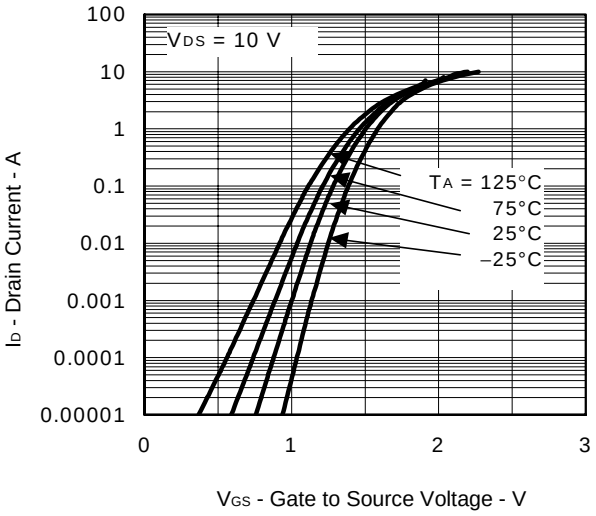
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



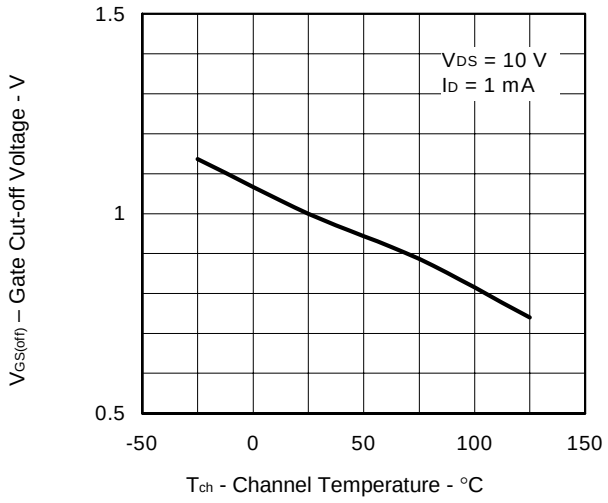
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



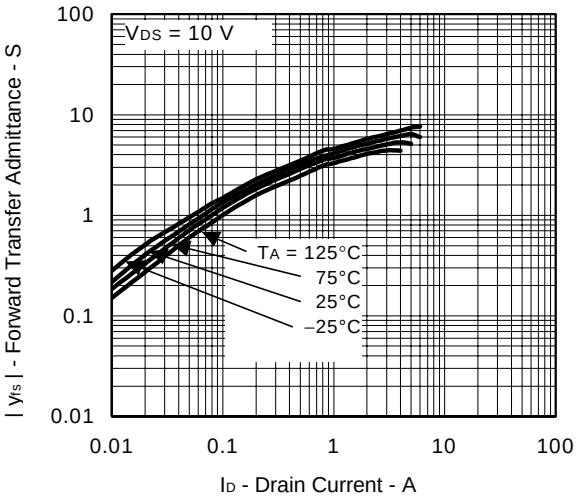
FORWARD TRANSFER CHARACTERISTICS



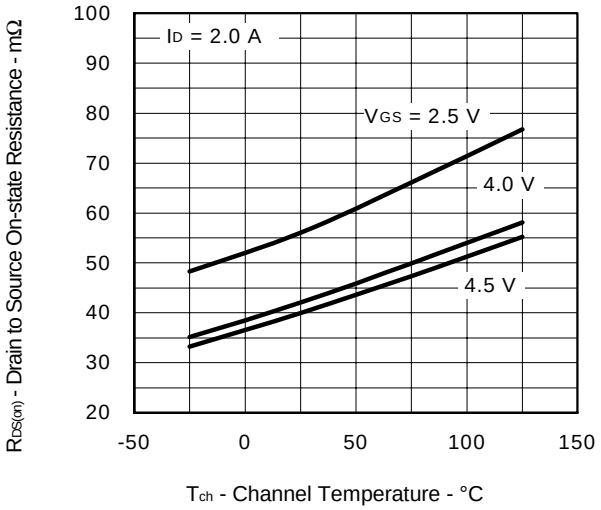
GATE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



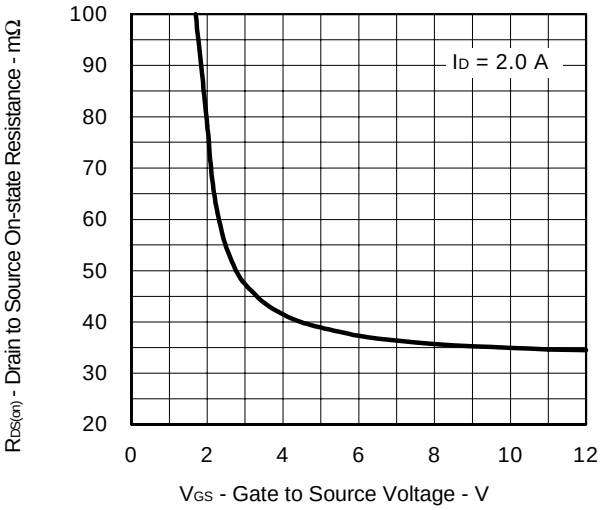
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



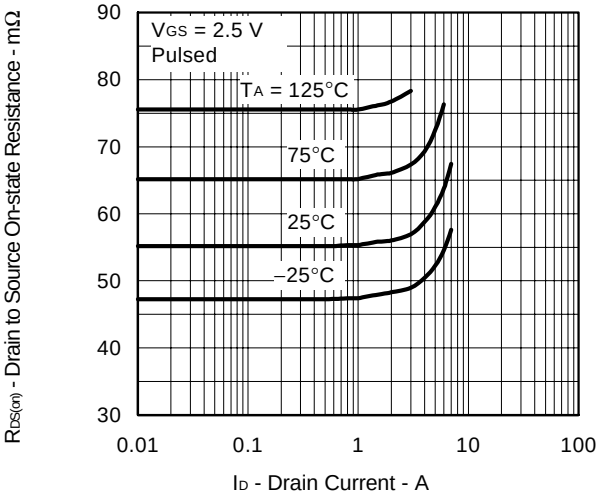
DRAIN TO SOURCE ON-STATERESISTANCE vs.
CHANNEL TEMPERATURE



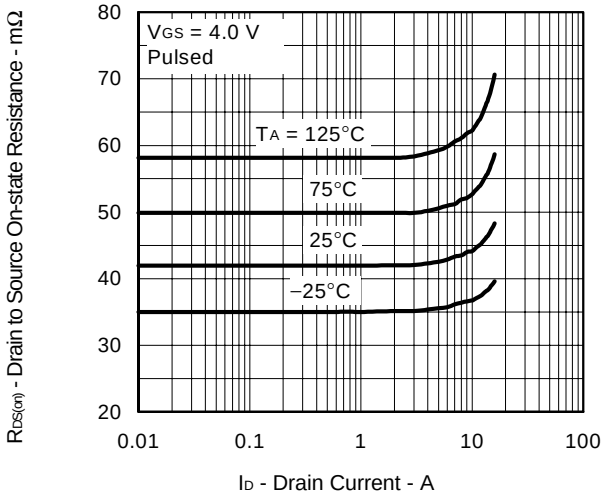
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



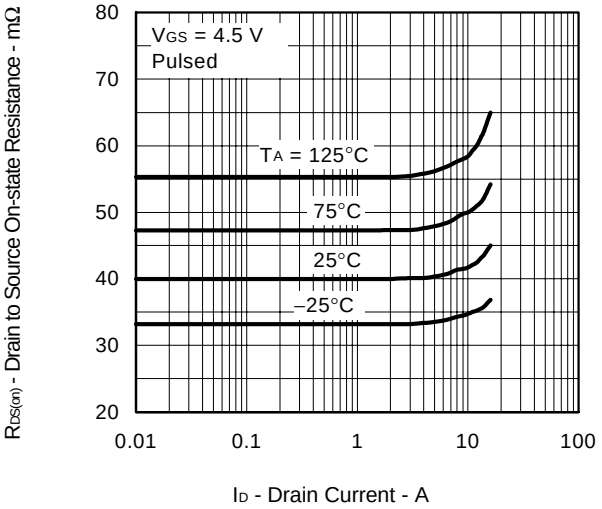
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



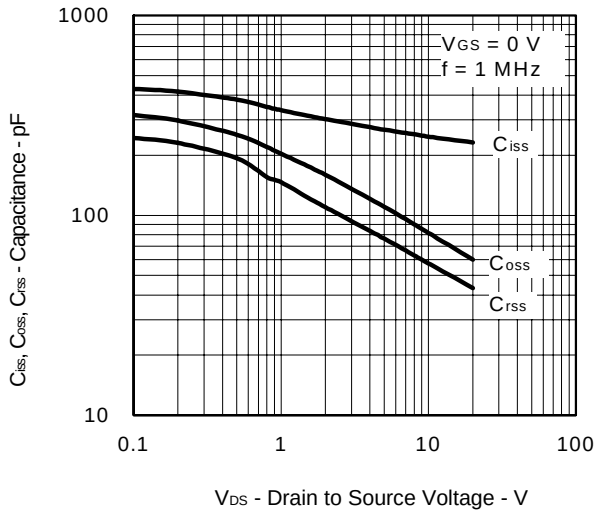
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



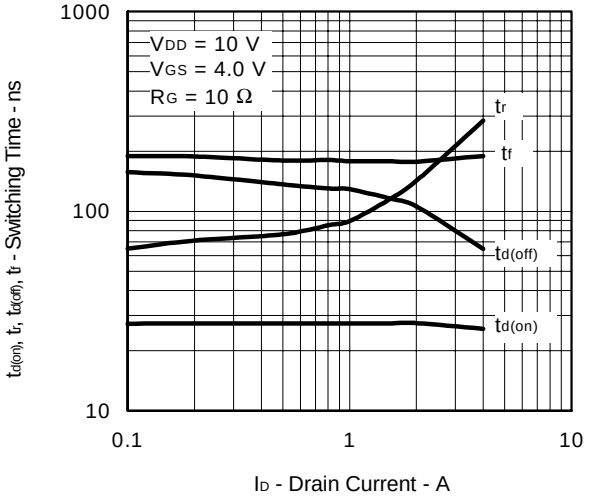
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



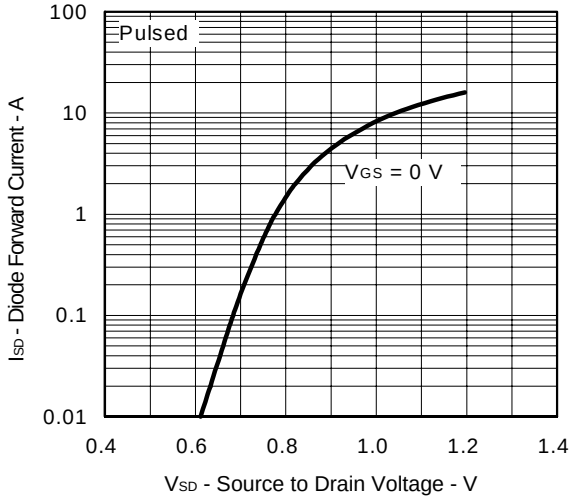
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



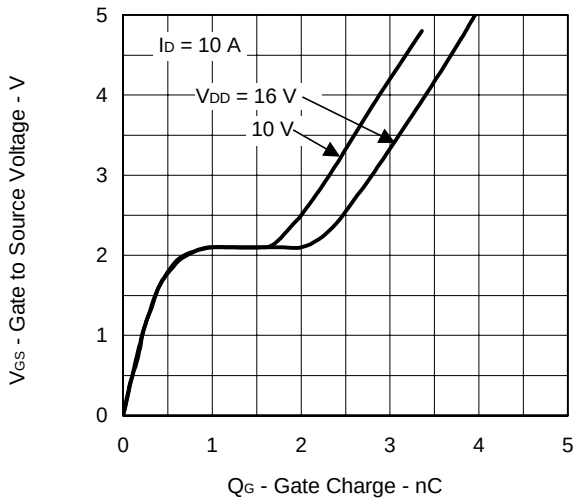
SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



[MEMO]

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