

MOS FIELD EFFECT TRANSISTOR  
**2SK3577**

**N-CHANNEL MOS FIELD EFFECT TRANSISTOR  
 FOR SWITCHING**

**DESCRIPTION**

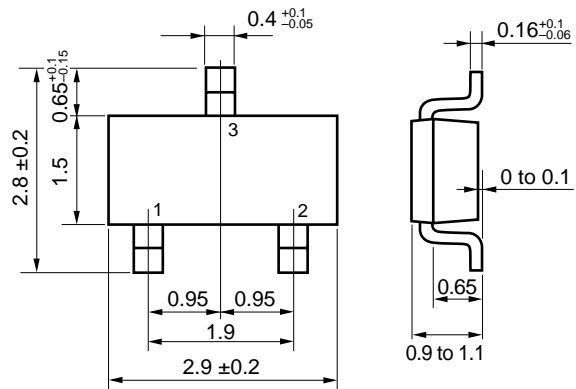
The 2SK3577 is a switching device which can be driven directly by a 2.5 V power source.

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**

- 2.5 V drive available
- Low on-state resistance  
 $R_{DS(on)1} = 63 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 2.0 \text{ A)}$   
 $R_{DS(on)2} = 65 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.0 \text{ V, } I_D = 2.0 \text{ A)}$   
 $R_{DS(on)3} = 91 \text{ m}\Omega \text{ MAX. (} V_{GS} = 2.5 \text{ V, } I_D = 2.0 \text{ A)}$

**PACKAGE DRAWING (Unit: mm)**



1 : Gate  
 2 : Source  
 3 : Drain

**ORDERING INFORMATION**

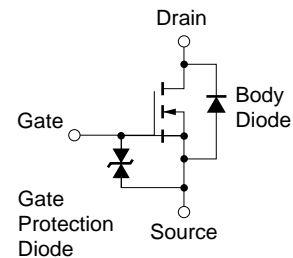
PART NUMBER	PACKAGE
2SK3577	SC-96 (Mini Mold Thin Type)

Marking: XL

**ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C)**

Drain to Source Voltage (V <sub>GS</sub> = 0 V)	V <sub>DSS</sub>	30	V
Gate to Source Voltage (V <sub>DS</sub> = 0 V)	V <sub>GSS</sub>	±12	V
Drain Current (DC) (T <sub>A</sub> = 25°C)	I <sub>D(DC)</sub>	±3.5	A
Drain Current (pulse) <sup>Note1</sup>	I <sub>D(pulse)</sub>	±14	A
Total Power Dissipation (T <sub>A</sub> = 25°C)	P <sub>T1</sub>	0.2	W
Total Power Dissipation (T <sub>A</sub> = 25°C) <sup>Note2</sup>	P <sub>T2</sub>	1.25	W
Channel Temperature	T <sub>ch</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-55 to +150	°C

**EQUIVALENT CIRCUIT**



- Notes** 1. PW ≤ 10 μs, Duty Cycle ≤ 1%  
 2. Mounted on FR-4 board, t ≤ 5 sec.

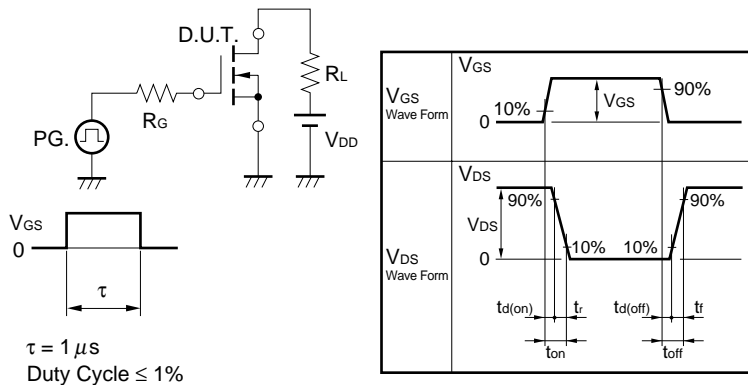
**Remark** The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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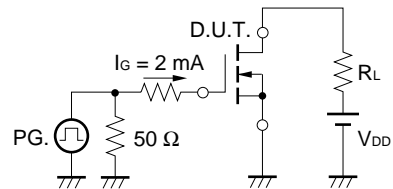
**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)**

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V			10	μA
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±12 V, V <sub>DS</sub> = 0 V			±10	μA
Gate Cut-off Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1.0 mA	0.5	1.0	1.5	V
Forward Transfer Admittance	y <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 2.0 A	1.0	4.9		S
Drain to Source On-state Resistance	R <sub>DS(on)1</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 2.0 A		50	63	mΩ
	R <sub>DS(on)2</sub>	V <sub>GS</sub> = 4.0 V, I <sub>D</sub> = 2.0 A		52	65	mΩ
	R <sub>DS(on)3</sub>	V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 2.0 A		68	91	mΩ
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 10 V		260		pF
Output Capacitance	C <sub>oss</sub>	V <sub>GS</sub> = 0 V		60		pF
Reverse Transfer Capacitance	C <sub>rss</sub>	f = 1.0 MHz		35		pF
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 10 V, I <sub>D</sub> = 2.0 A		28		ns
Rise Time	t <sub>r</sub>	V <sub>GS</sub> = 4.0 V		200		ns
Turn-off Delay Time	t <sub>d(off)</sub>	R <sub>G</sub> = 10 Ω		80		ns
Fall Time	t <sub>f</sub>			120		ns
Total Gate Charge	Q <sub>G</sub>	V <sub>DD</sub> = 24 V		3.0		nC
Gate to Source Charge	Q <sub>GS</sub>	V <sub>GS</sub> = 4.0 V		0.8		nC
Gate to Drain Charge	Q <sub>GD</sub>	I <sub>D</sub> = 3.5 A		1.2		nC
Body Diode Forward Voltage	V <sub>F(S-D)</sub>	I <sub>F</sub> = 3.5 A, V <sub>GS</sub> = 0 V		0.89		V

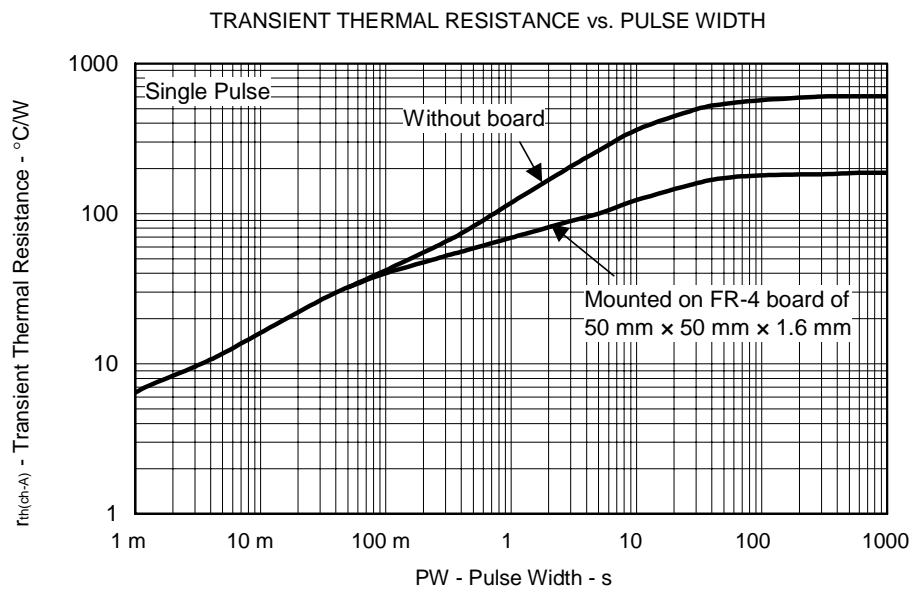
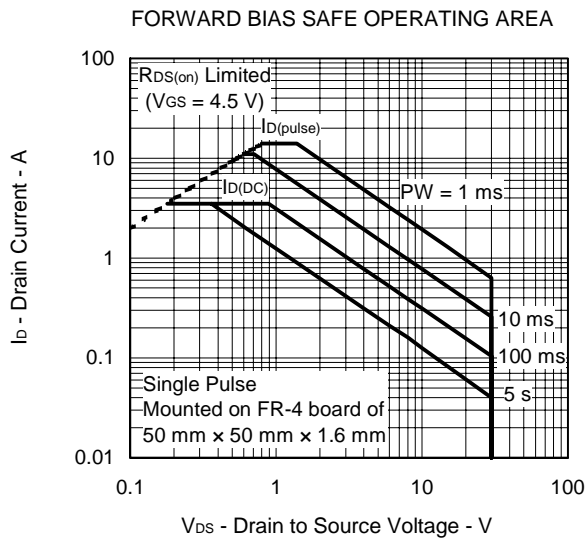
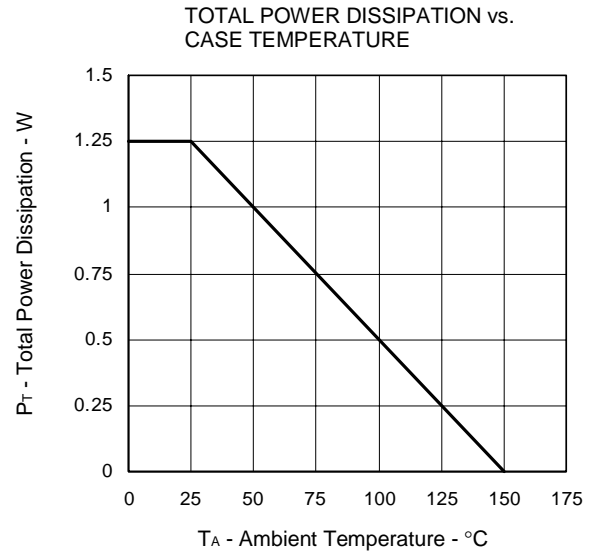
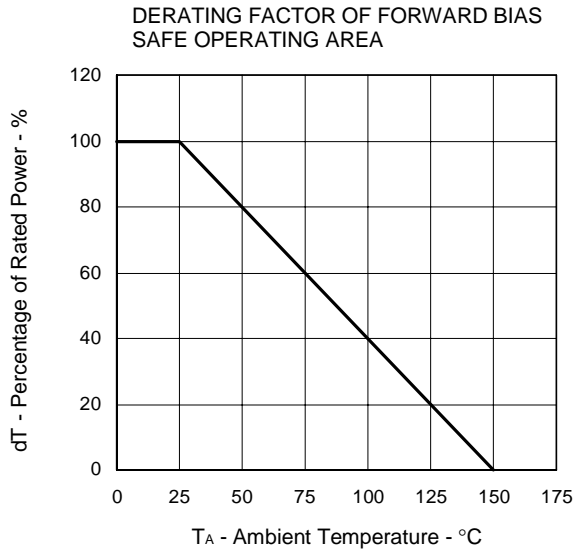
**TEST CIRCUIT 1 SWITCHING TIME**



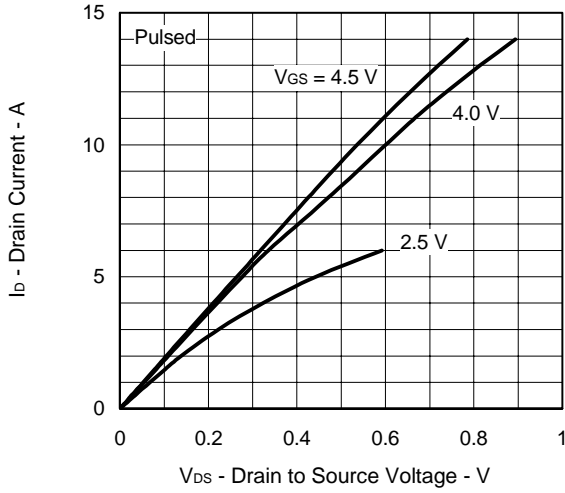
**TEST CIRCUIT 2 GATE CHARGE**



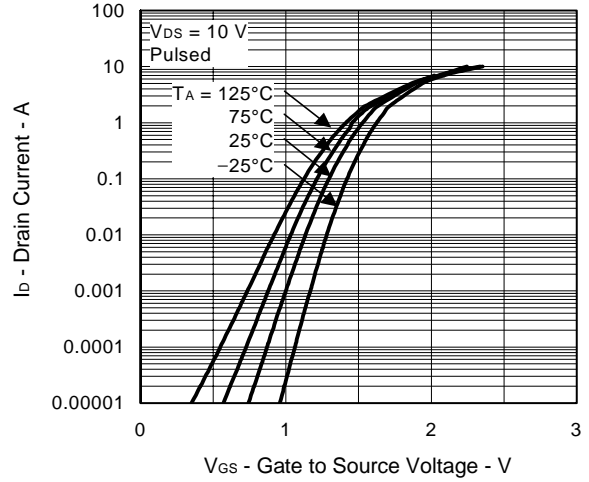
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



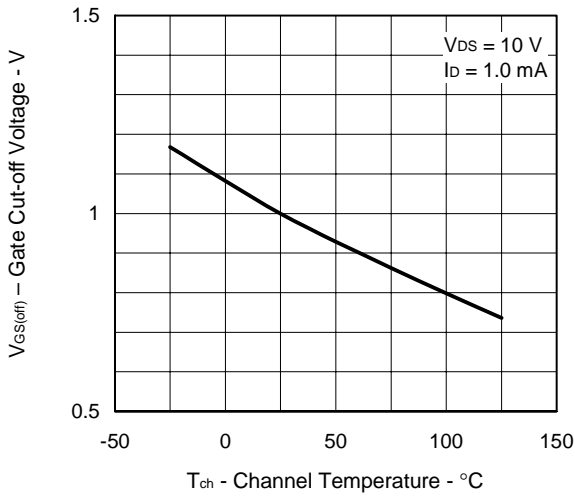
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



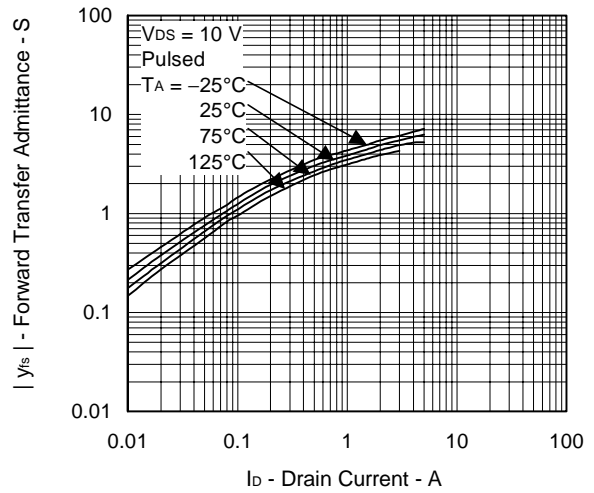
FORWARD TRANSFER CHARACTERISTICS



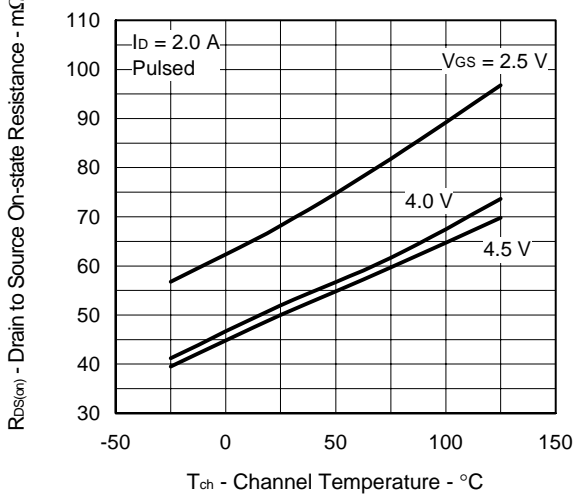
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



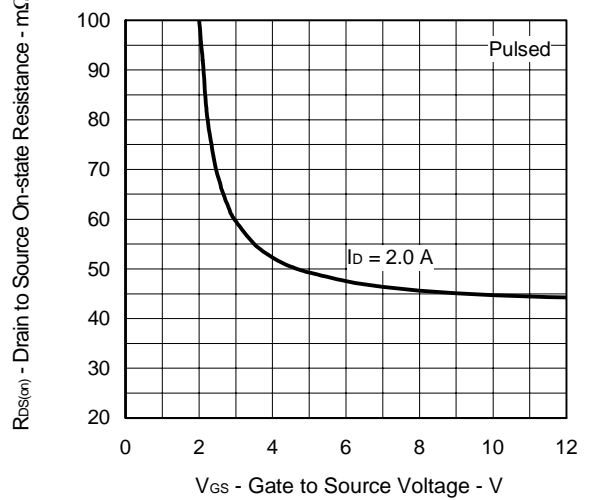
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT

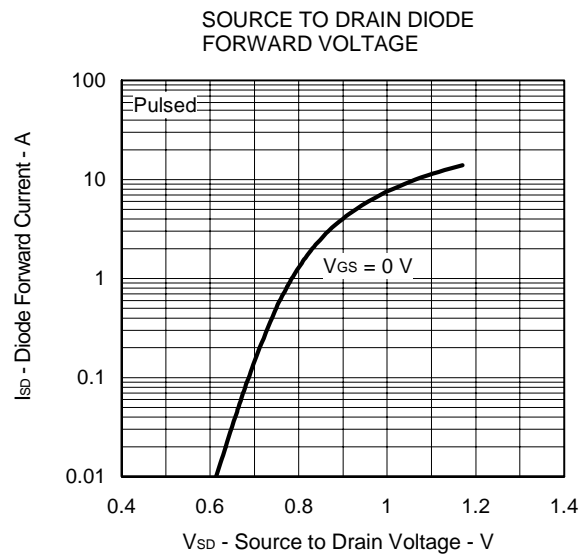
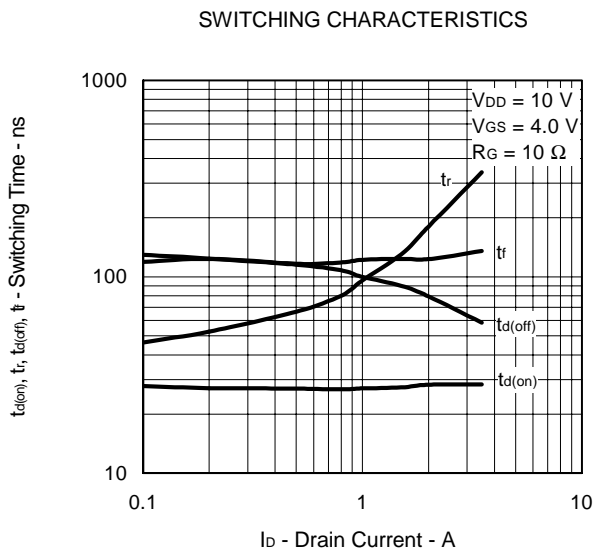
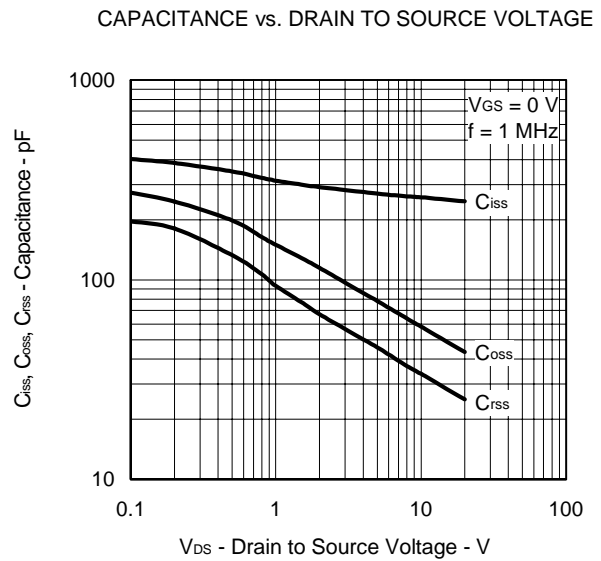
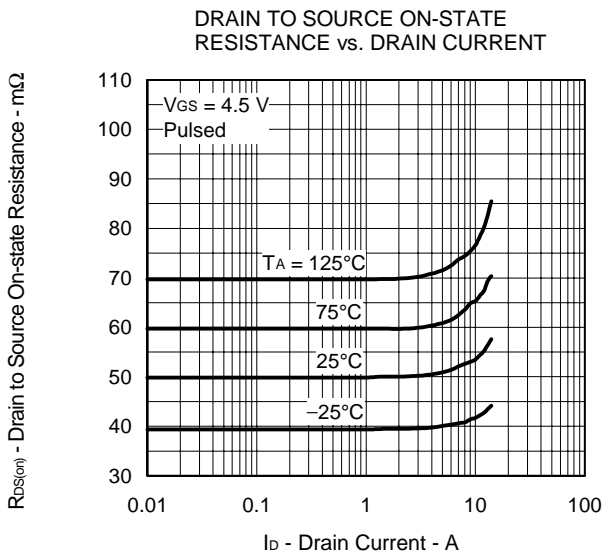
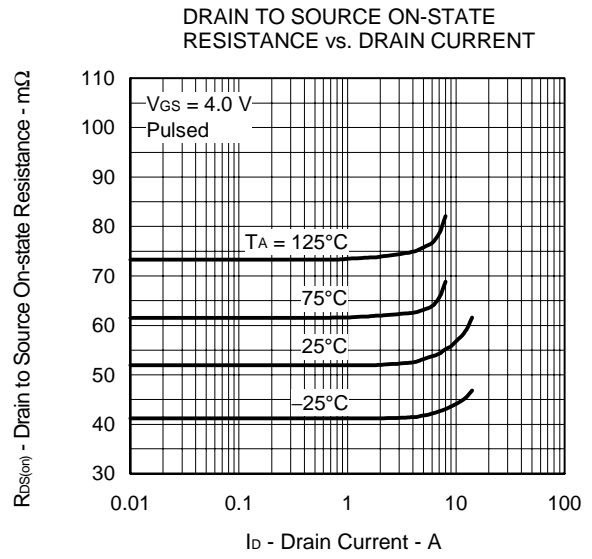
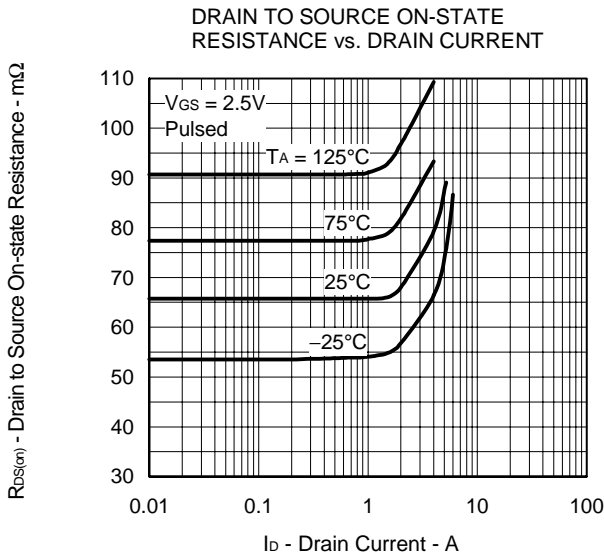


DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE

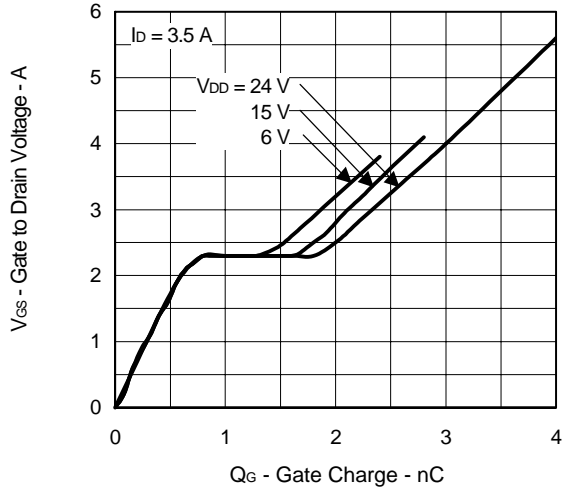


DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE





DYNAMIC INPUT/OUTPUT CHARACTERISTICS



[MEMO]

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