

2SK1581C

R07DS1287EJ0200

Rev.2.00

Jul 24, 2015

N-CHANNEL MOSFET FOR SWITCHING

Description

The 2SK1581C, N-channel vertical type MOSFET designed for general-purpose switch, is a device which can be driven directly by a 2.5 V power source.

Features

- Directly driven by a 2.5 V power source.
- Low on-state resistance
 - $R_{DS(on)1} = 0.57 \Omega$ MAX. ($V_{GS} = 4.5$ V, $I_D = 0.3$ A)
 - $R_{DS(on)2} = 0.60 \Omega$ MAX. ($V_{GS} = 4.0$ V, $I_D = 0.3$ A)
 - $R_{DS(on)3} = 0.88 \Omega$ MAX. ($V_{GS} = 2.5$ V, $I_D = 0.15$ A)

Ordering Information

Part Number	Lead Plating	Packing	Package
2SK1581C-T1B-A/AT	-A:Sn-Bi , -AT:Pure Sn	3000p/Reel	SC-59 (3pMM)

Remark "-A/AT" indicates Pb-free. This product does not contain Pb in external electrode and other parts.

Marking XL

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$)

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)	$I_{D(DC)}$	± 500	mA
Drain Current (pulse) ^{Note}	$I_{D(pulse)}$	± 2	A
Total Power Dissipation	P_T	200	mW
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

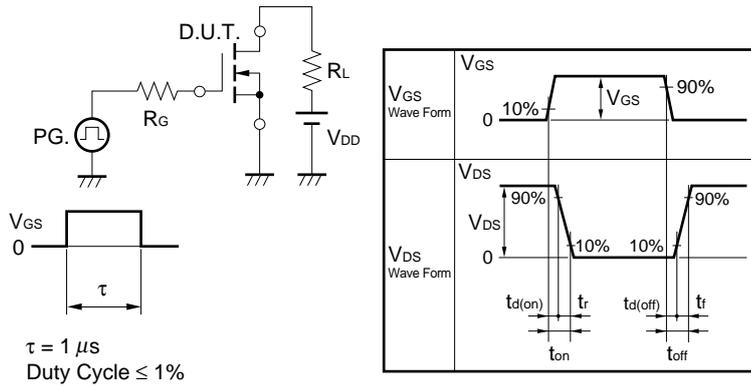
Note $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1\%$

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			1	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±12 V, V _{DS} = 0 V			±10	μA
Gate to Source Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	0.5	1.0	1.5	V
Forward Transfer Admittance Note	y _{fs}	V _{DS} = 10 V, I _D = 0.3 A	0.25	0.75		S
Drain to Source On-state Resistance Note	R _{DS(on)1}	V _{GS} = 4.5 V, I _D = 0.3 A		0.38	0.57	Ω
	R _{DS(on)2}	V _{GS} = 4.0 V, I _D = 0.3 A		0.41	0.6	Ω
	R _{DS(on)2}	V _{GS} = 2.5 V, I _D = 0.15 A		0.6	0.88	Ω
Input Capacitance	C _{iss}	V _{DS} = 10 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 V,		20		ns
Rise Time	t _r	I _D = 0.3 A,		51		ns
Turn-off Delay Time	t _{d(off)}	V _{GS} = 4 V,		94		ns
Fall Time	t _f	R _G = 10 Ω		87		ns
Body Diode Forward Voltage Note	V _{F(S-D)}	I _F = 0.5 A, V _{GS} = 0 V		0.87		V

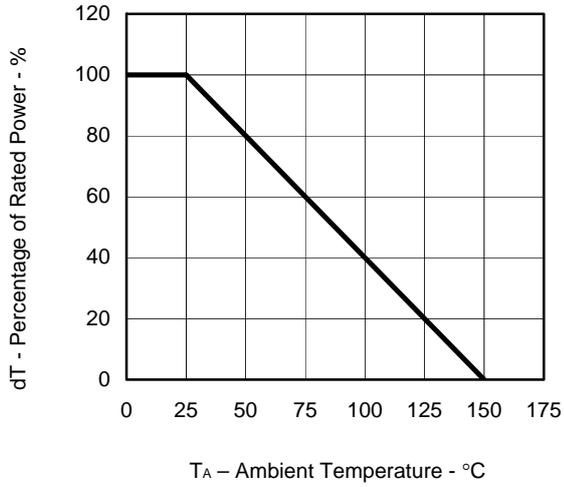
Note Pulsed

Test Circuit Switching Time

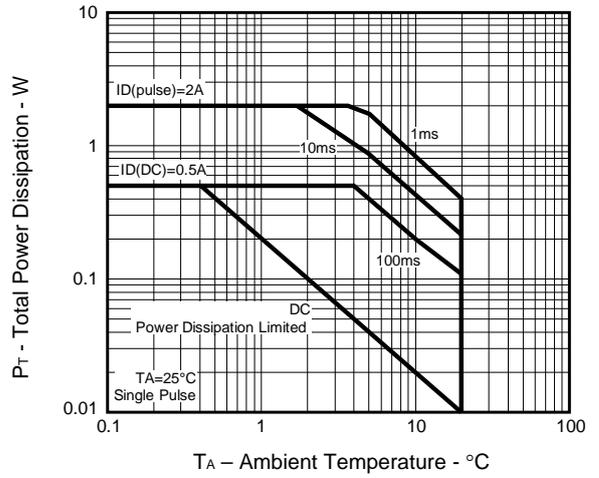


Typical Characteristics (TA = 25°C)

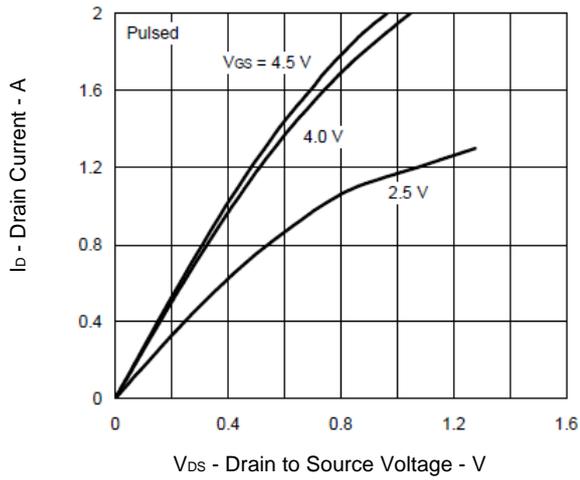
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



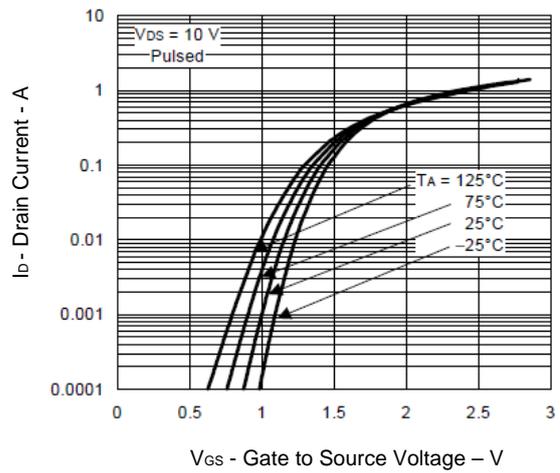
FORWARD BIAS SAFE OPERATING AREA



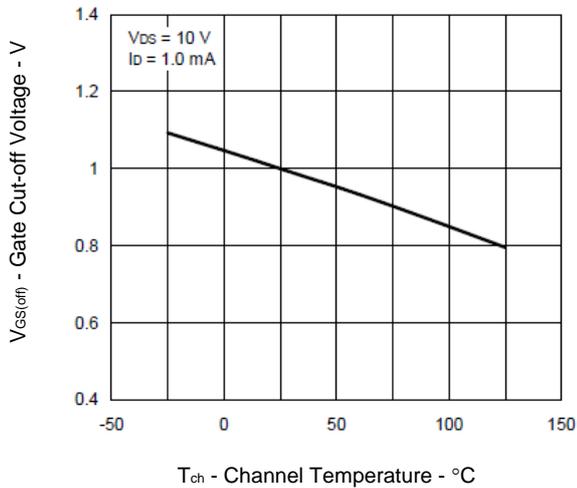
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



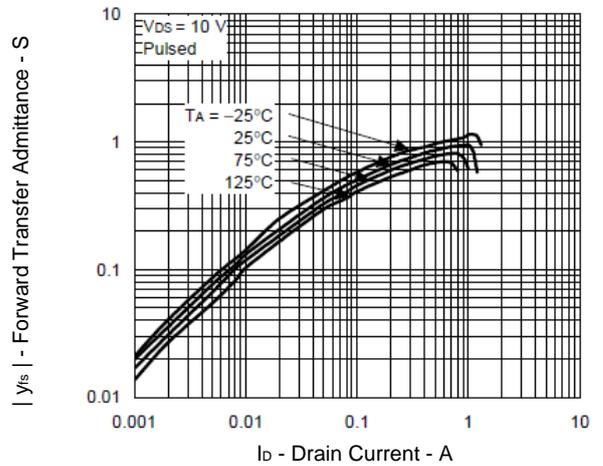
FORWARD TRANSFER CHARACTERISTICS



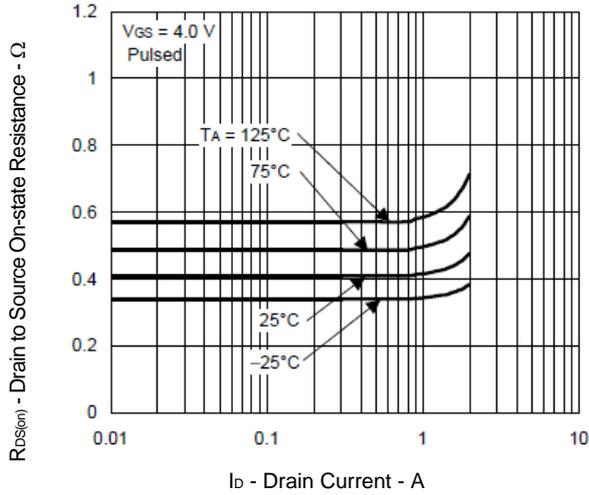
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



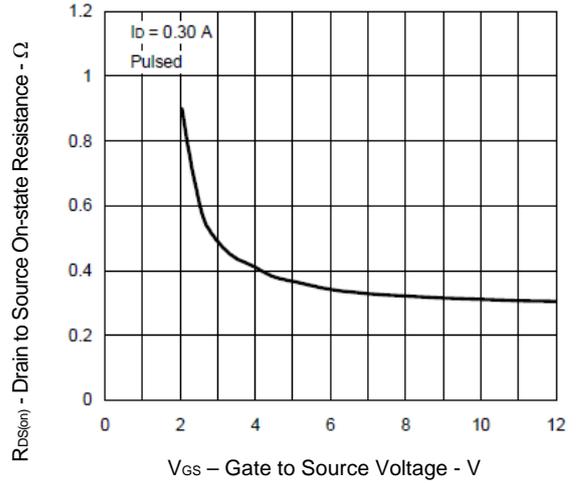
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



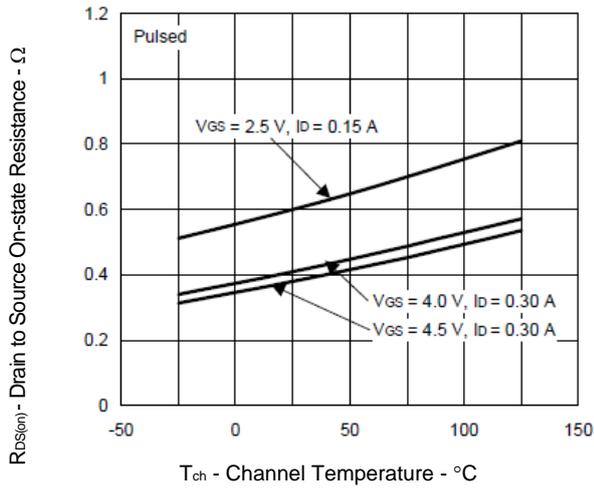
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



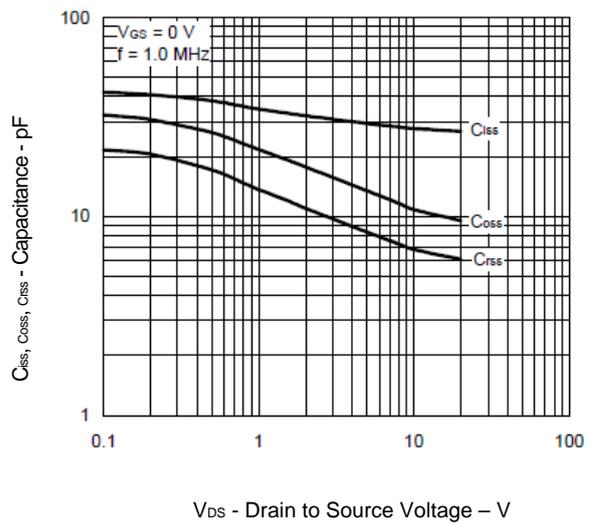
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



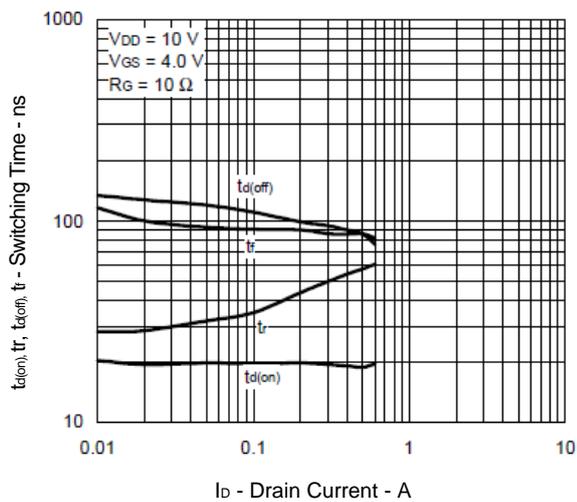
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



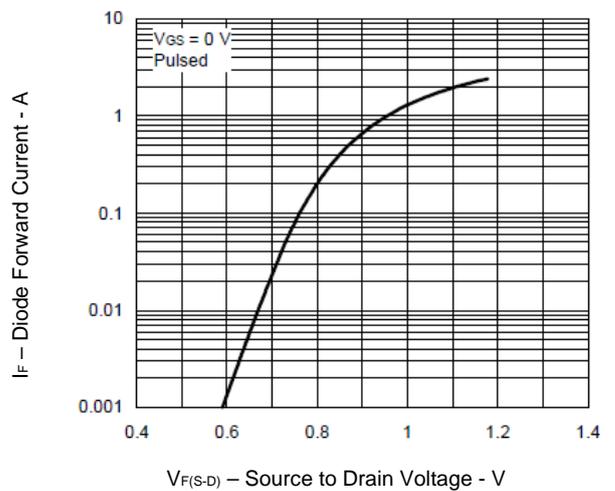
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS

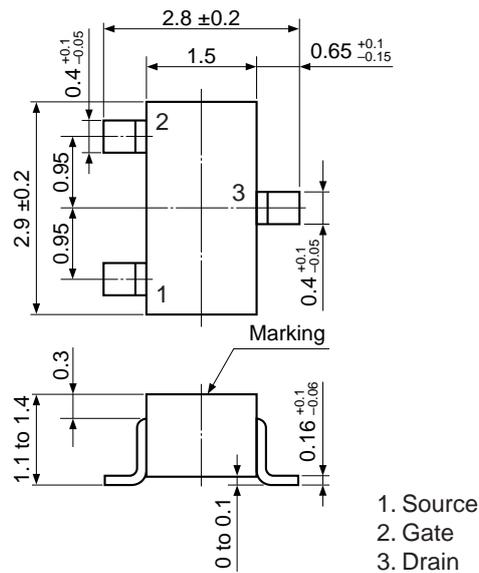


SOURCE TO DRAIN DIODE FORWARD VOLTAGE

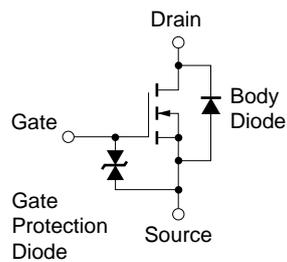


Package Drawings (Unit: mm)

SC-59 (Mini Mold)



Equivalent Circuit



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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Rev.	Date	Description	
		Page	Summary
1.00	Sep , 2013	-	First Edition Issued
2.00	Jul, 2015	3	Changed FORWARD BIAS SAFE OPERATING AREA

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