2SK1581C

N-CHANNEL MOSFET FOR SWITCHING

R07DS1287EJ0200
Rev.2.00
Jul 24, 2015

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 Ω MAX. (V_{GS} = 4.5 V, I_D = 0.3 A)
  $R_{DS(on)2}$ = 0.60 Ω MAX. (V_{GS} = 4.0 V, I_D = 0.3 A)
  $R_{DS(on)3}$ = 0.88 Ω 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°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	°C
Storage Temperature	T_{stg}	−55 to +150	°C

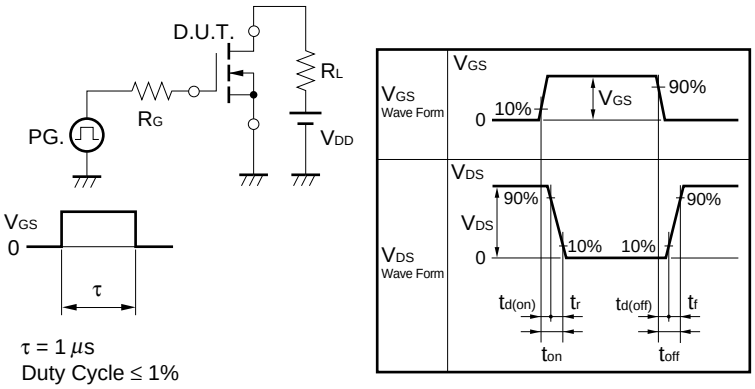
Note PW ≤ 10 μs, Duty Cycle ≤ 1%

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

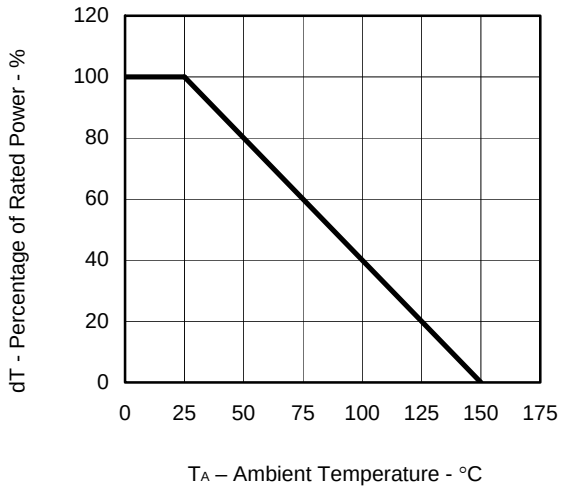
Test Circuit Switching Time



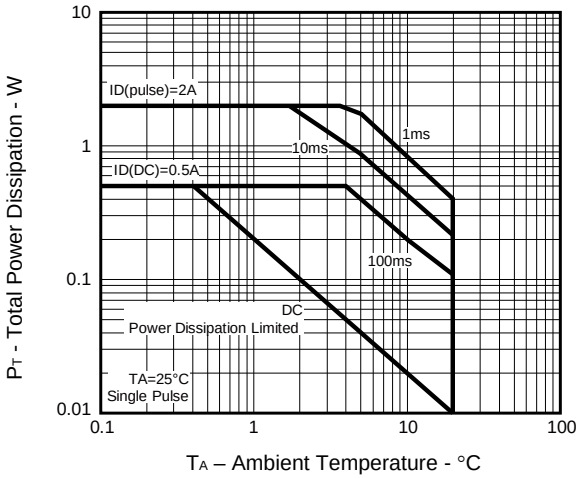
τ = 1 μs
Duty Cycle ≤ 1%

Typical Characteristics (T_A = 25°C)

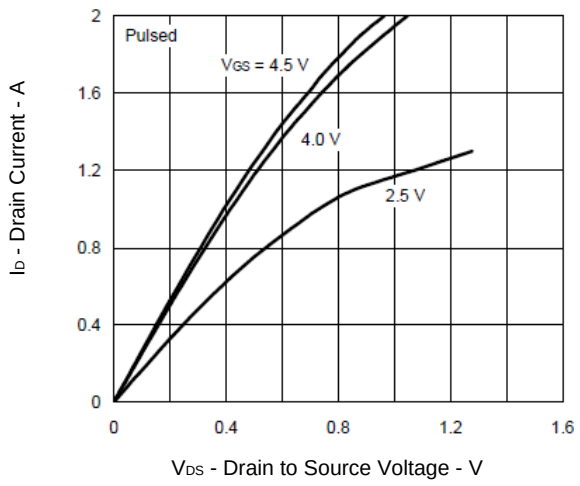
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



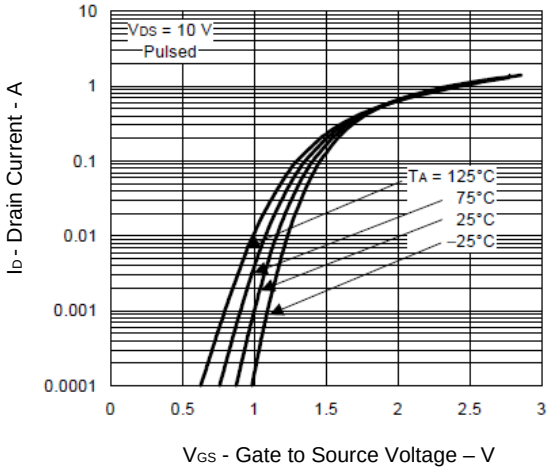
FORWARD BIAS SAFE OPERATING AREA



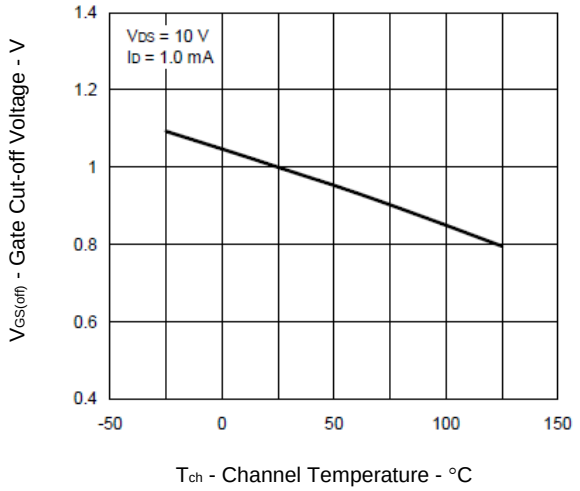
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



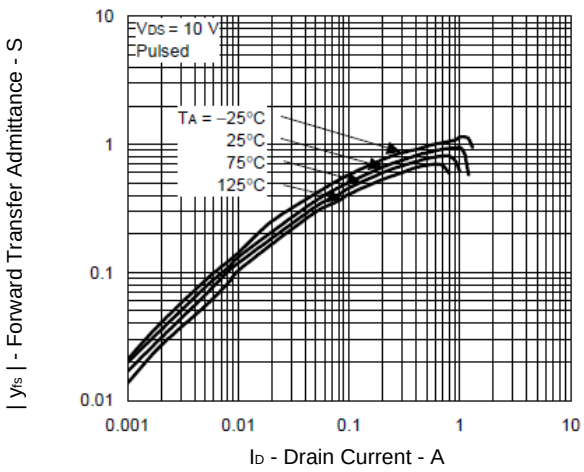
FORWARD TRANSFER CHARACTERISTICS



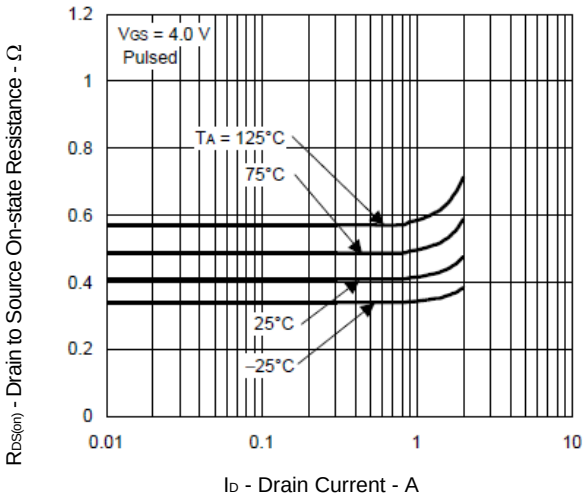
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



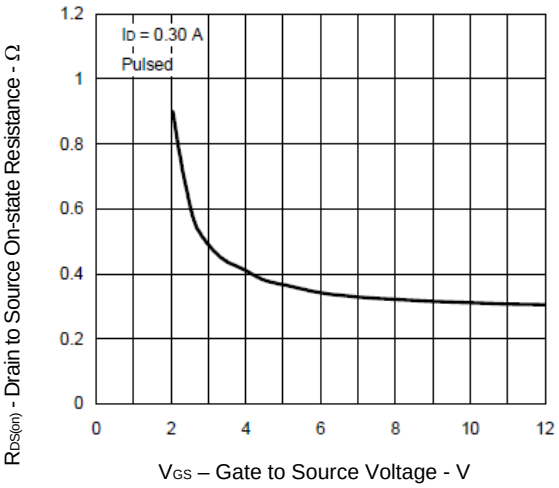
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



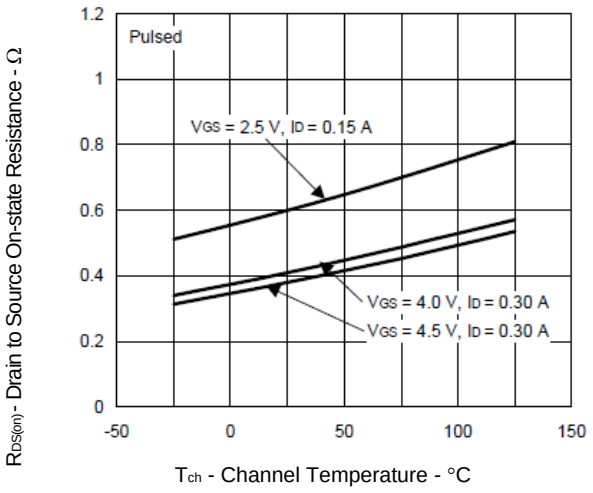
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
DRAIN CURRENT



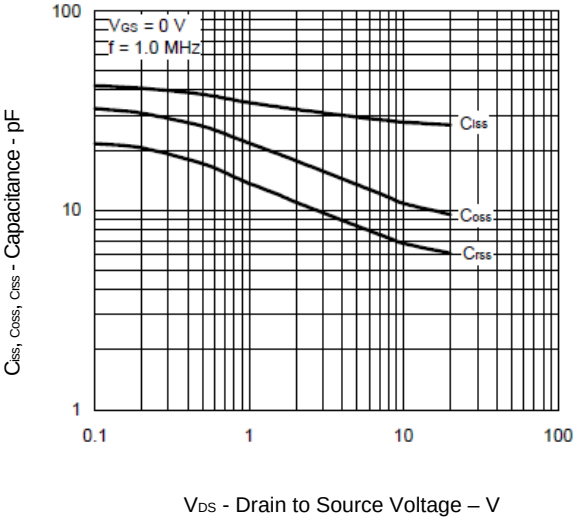
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



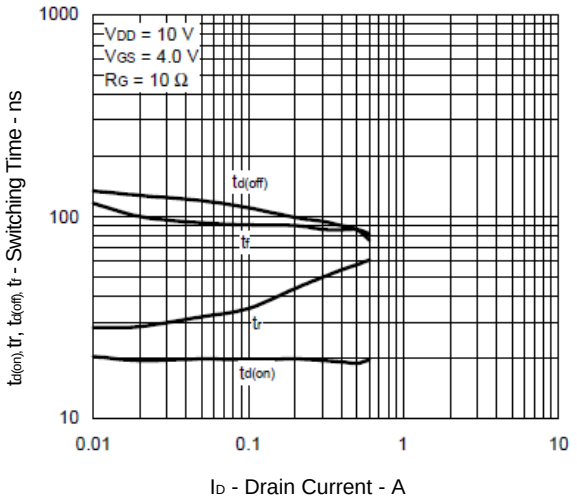
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
CHANNEL TEMPERATURE



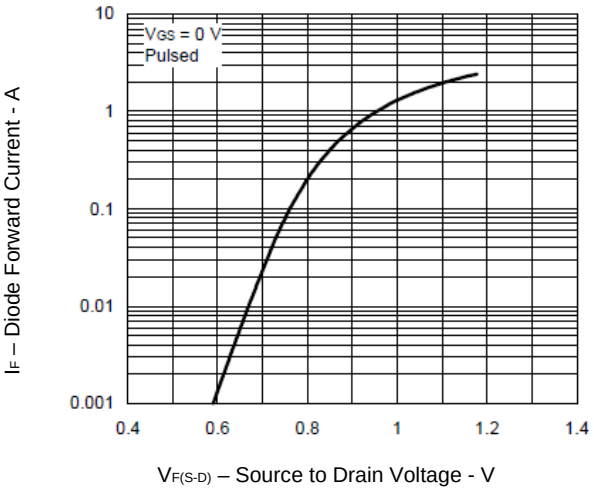
CAPACITANCE vs.
DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS

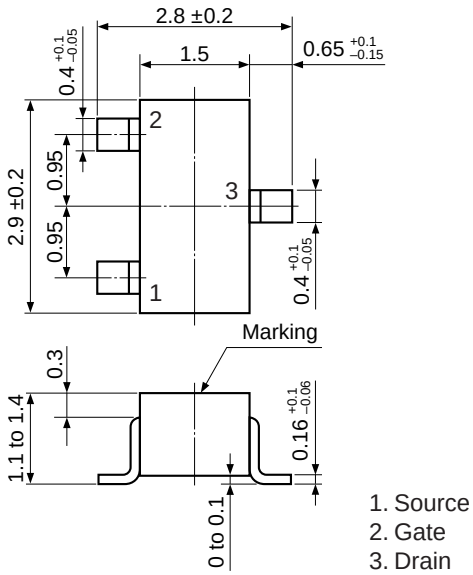


SOURCE TO DRAIN DIODE FORWARD VOLTAGE

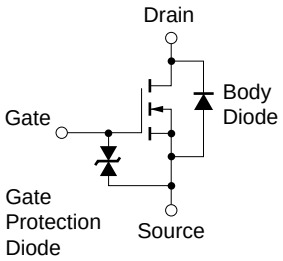


Package Drawings (Unit: mm)

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.

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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