

# 2SK2054C

R07DS1265EJ0200

Rev.2.00

Jun 12, 2015

## N-CHANNEL MOSFET FOR SWITCHING

### Description

The 2SK2054C, N-channel vertical type MOSFET designed for general-purpose switch, is a device which can be driven directly by a 4.0 V power source.

### Features

- Directly driven by a 4.0 V power source.
- Low on-state resistance
  - $R_{DS(on)1} = 105 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 2.0 \text{ A)}$
  - $R_{DS(on)2} = 150 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.0 \text{ V, } I_D = 2.0 \text{ A)}$

### Ordering Information

Part Number	Lead Plating	Packing	Package
2SK2054C-T1-AZ/AY	-AZ : Sn-Bi , -AY : Pure Sn	1000p/Reel	SC-84 (MP-2)

**Remark** "-AZ/AY" indicates Pb-free. This product does not contain Pb in external electrode and other parts.

### Marking XS1

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

Drain to Source Voltage ( $V_{GS} = 0 \text{ V}$ )	$V_{DSS}$	60	V
Gate to Source Voltage ( $V_{DS} = 0 \text{ V}$ )	$V_{GSS}$	$\pm 20$	V
Drain Current (DC)	$I_{D(DC)}$	$\pm 4.0$	A
Drain Current (pulse) <sup>Note</sup>	$I_{D(pulse)}$	$\pm 16$	A
Total Power Dissipation	$P_T$	2.0	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

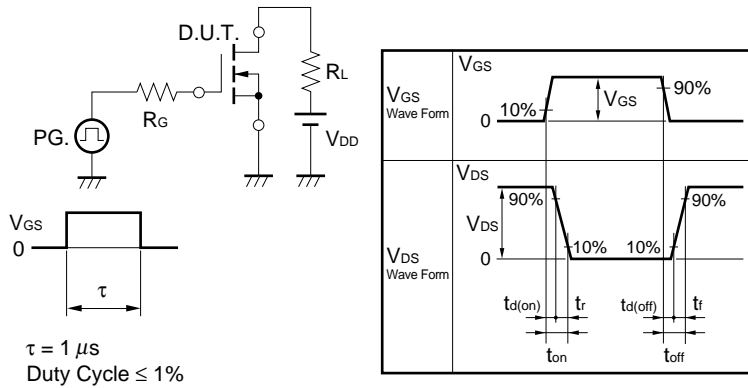
**Note**  $PW \leq 10 \mu\text{s}$ , Duty Cycle  $\leq 1\%$

Electrical Characteristics (T<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> = 60 V, V <sub>GS</sub> = 0 V			10	μA
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±18 V, V <sub>DS</sub> = 0 V			±10	μA
Gate to Source Cut-off Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1 mA	1.5	2.0	2.5	V
Forward Transfer Admittance <b>Note</b>	y <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 2.0 A	2.0			S
Drain to Source On-state Resistance <b>Note</b>	R <sub>DS(on)1</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 2.0 A		85	105	mΩ
	R <sub>DS(on)2</sub>	V <sub>GS</sub> = 4.0 V, I <sub>D</sub> = 2.0 A		106	150	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,		65		pF
Reverse Transfer Capacitance	C <sub>rss</sub>	f = 1.0 MHz		20		pF
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 30 V,		14		ns
Rise Time	t <sub>r</sub>	I <sub>D</sub> = 2 A,		5		ns
Turn-off Delay Time	t <sub>d(off)</sub>	V <sub>GS</sub> = 10 V,		80		ns
Fall Time	t <sub>f</sub>	R <sub>G</sub> = 10 Ω		30		ns
Total Gate Charge	Q <sub>G</sub>	I <sub>D</sub> = 4.0 A, V <sub>DD</sub> = 48 V, V <sub>GS</sub> = 10 V		6		nC
Body Diode Forward Voltage <b>Note</b>	V <sub>F(S-D)</sub>	I <sub>F</sub> = 4.0 A, V <sub>GS</sub> = 0 V		0.9		V

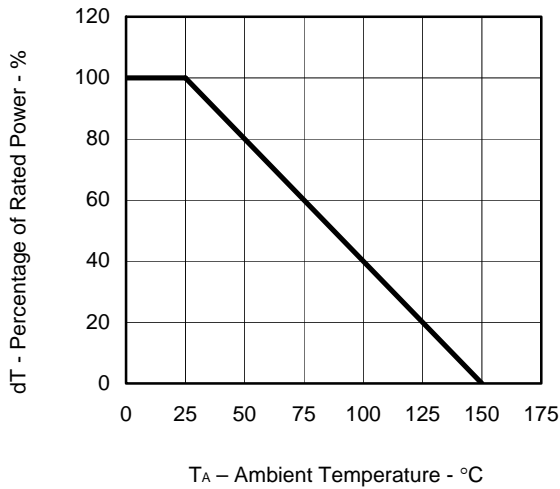
**Note** Pulsed

Test Circuit Switching Time

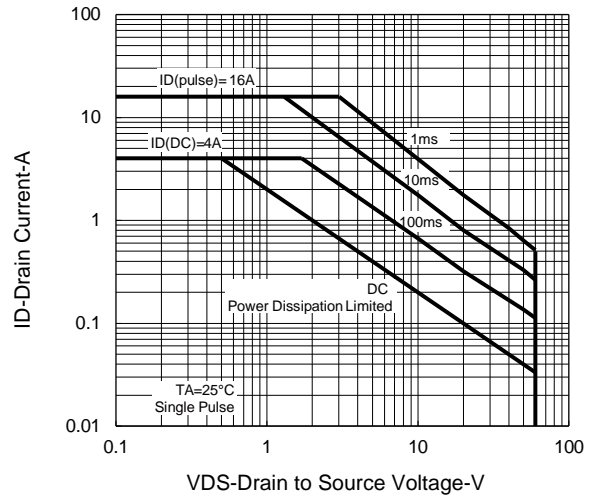


Typical Characteristics (T<sub>A</sub> = 25°C)

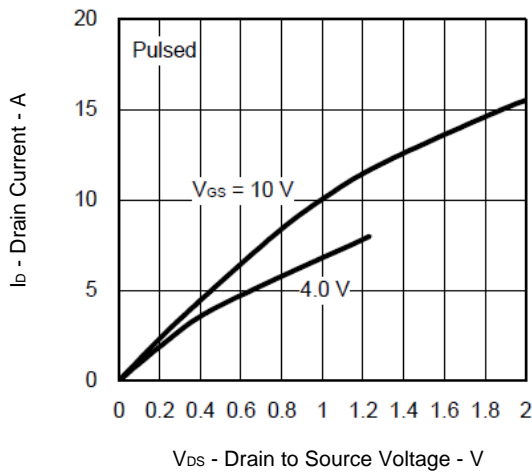
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



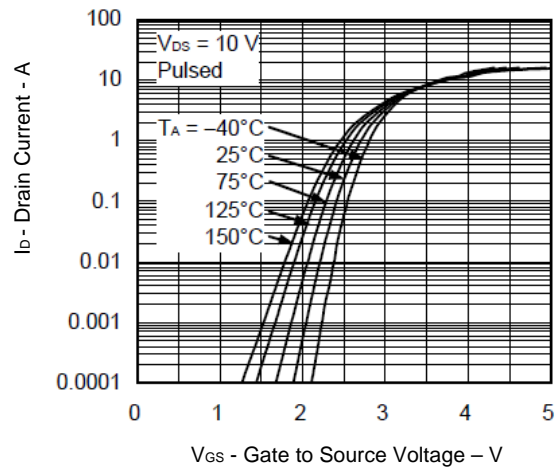
FORWARD BIAS SAFE OPERATING AREA



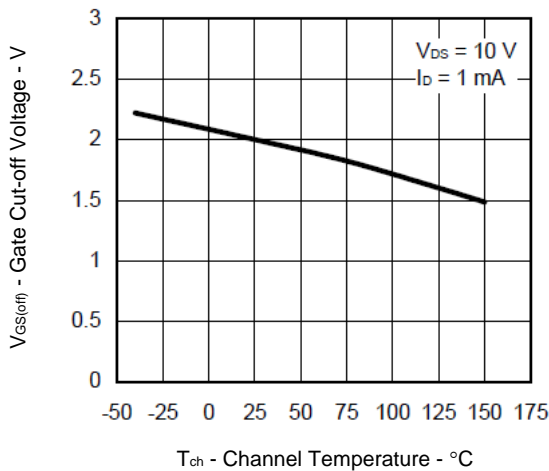
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



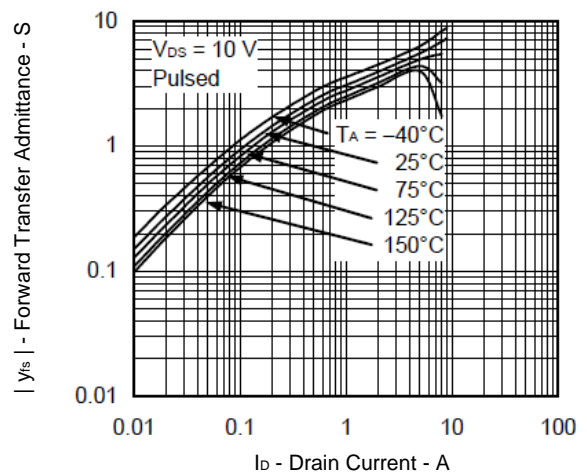
FORWARD TRANSFER CHARACTERISTICS



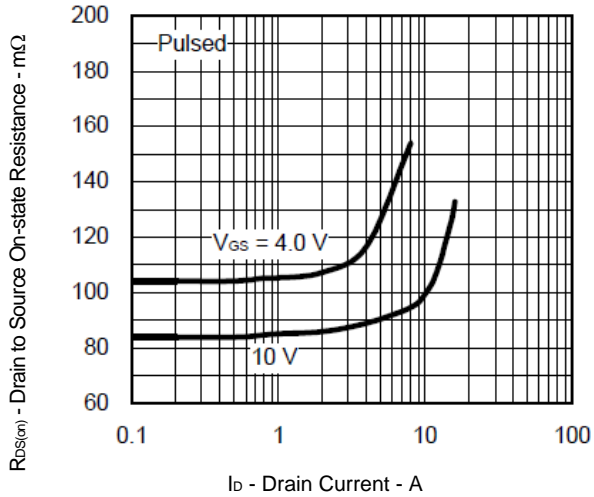
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



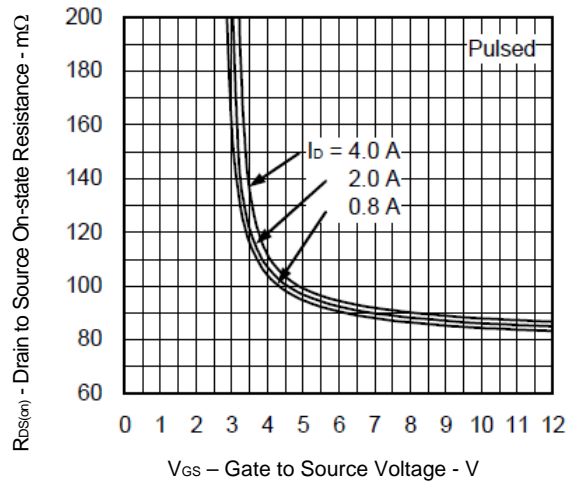
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



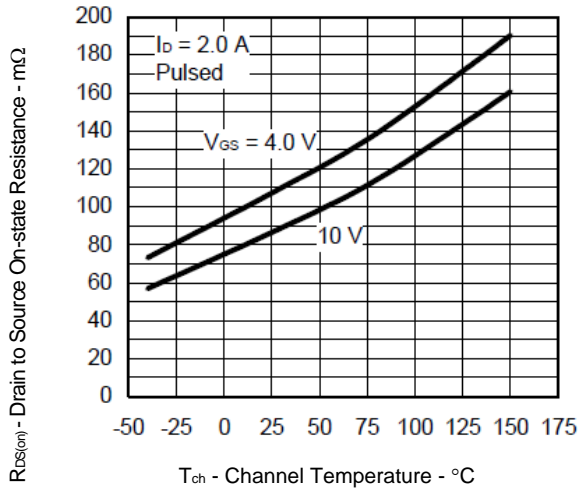
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



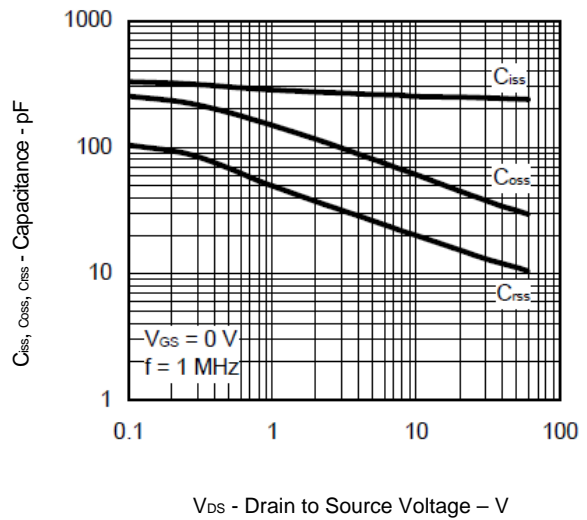
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



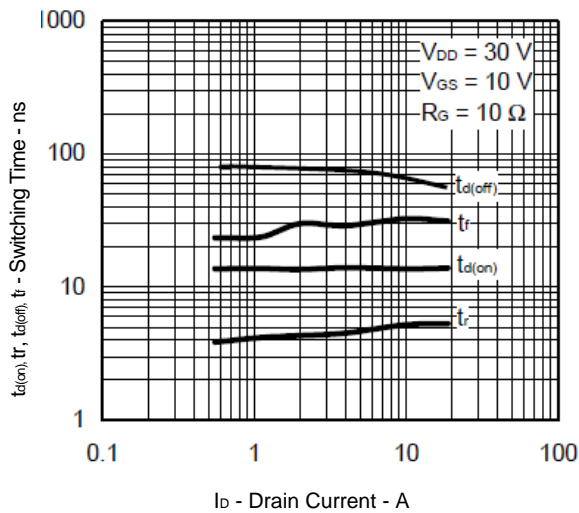
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



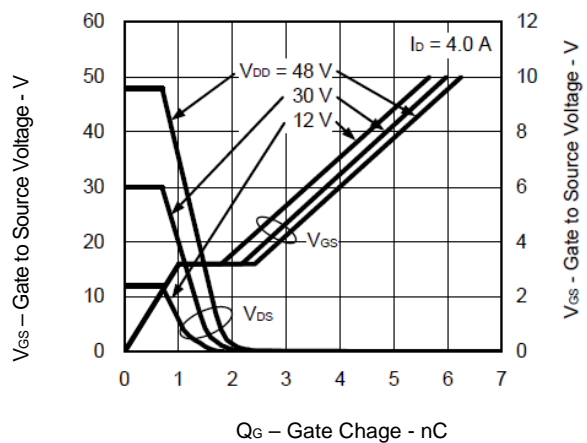
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE

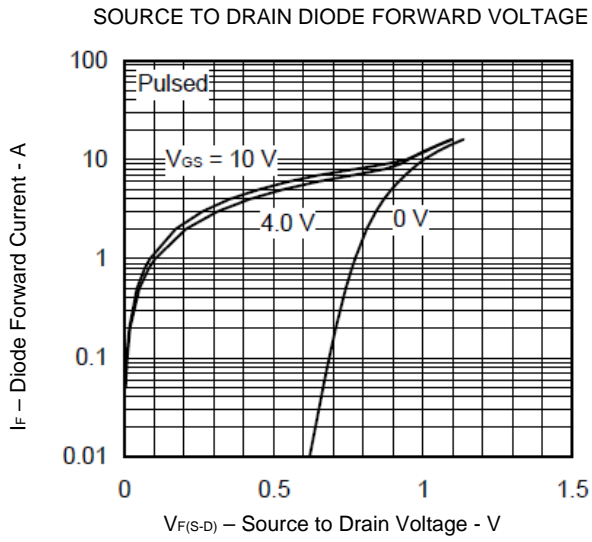


SWITCHING CHARACTERISTICS



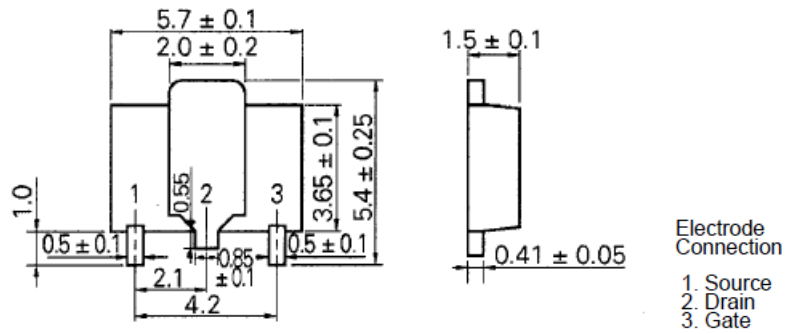
DYNAMIC INPUT CHARACTERISTICS



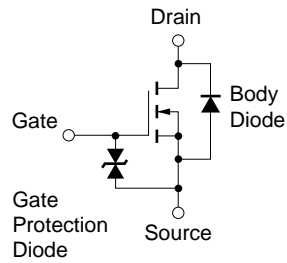


Package Drawings (Unit: mm)

SC-84 (MP-2)



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.

	<b>2SK2054C</b>
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Rev.	Date	Description	
		Page	Summary
1.00	Sep , 2013	-	First Edition Issued
2.00	Jun , 2015	3	Added FORWARD BIAS SAFE OPERATING AREA

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