

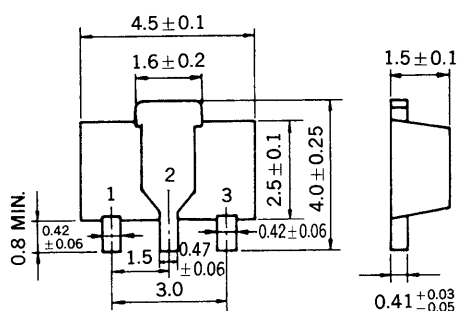
# MOS FIELD EFFECT TRANSISTOR

# 2SK680A

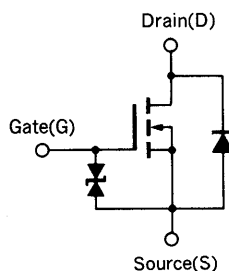
## N-CHANNEL MOS FET

## FOR HIGH SPEED SWITCHING

### PACKAGE DIMENSIONS (Unit : mm)



1. Source  
2. Drain  
3. Gate  
MARK : YB



(Diode in the figure is the parasitic diode.)

The 2SK680A, N-channel vertical type MOS FET, is a switching device which can be driven directly by the output of ICs having a 5 V power source.

The MOS FET has excellent switching characteristics and is suitable for use as a high-speed switching device in digital circuits.

### FEATURES

- Directly driven by ICs having a 5 V power source.
- Not necessary to consider driving current because of its high input impedance.
- Possible to reduce the number of parts by omitting the bias resistor.
- Has low on-state resistance

$$R_{DS(on)} = 1.0 \, \Omega \text{ MAX. @ } V_{GS} = 4.0 \text{ V, } I_D = 0.5 \text{ A}$$

$$R_{DS(on)} = 0.7 \, \Omega \text{ MAX. @ } V_{GS} = 10 \text{ V, } I_D = 0.5 \text{ A}$$

### QUALITY GRADE

Standard

Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

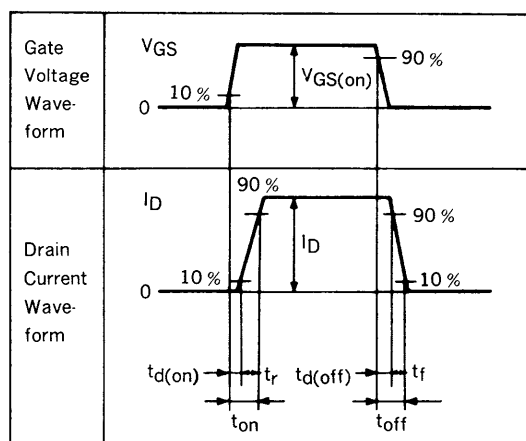
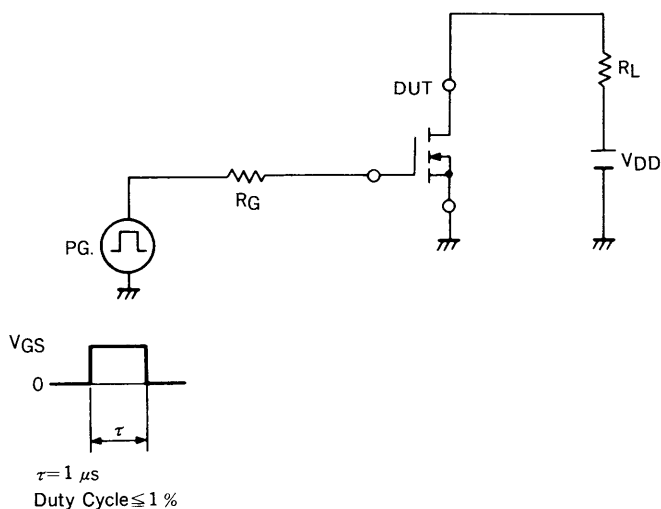
### ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

PARAMETER	SYMBOL	RATINGS	UNIT	TEST CONDITIONS
Drain to Source Voltage	$V_{DSS}$	30	V	$V_{GS} = 0$
Gate to Source Voltage	$V_{GSS}$	$\pm 20$	V	$V_{DS} = 0$
Drain Current	$I_D(\text{DC})$	$\pm 1.0$	A	
Drain Current	$I_D(\text{pulse})$	$\pm 2.0$	A	$PW \leq 10 \text{ ms, Duty Cycle} \leq 50 \%$
Total Power Dissipation	$P_T$	2.0	W	when using ceramic board of $16 \text{ cm}^2 \times 0.7 \text{ mm}$
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$	
Storage Temperature	$T_{stg}$	$-55 \text{ to } +150$	$^\circ\text{C}$	

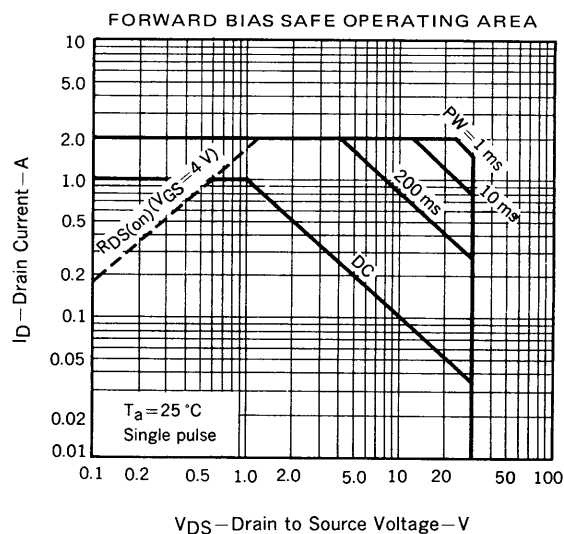
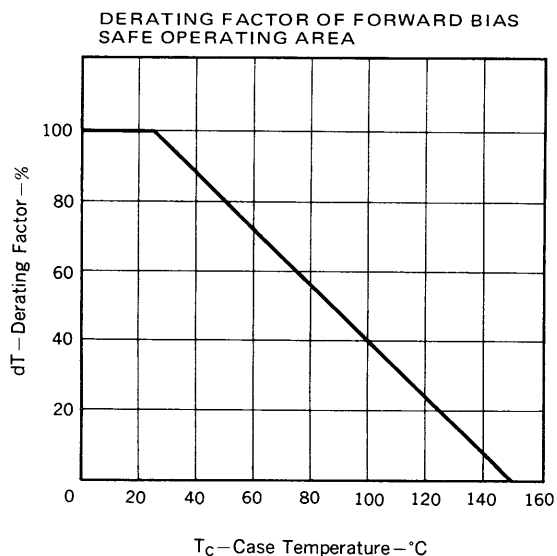
ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

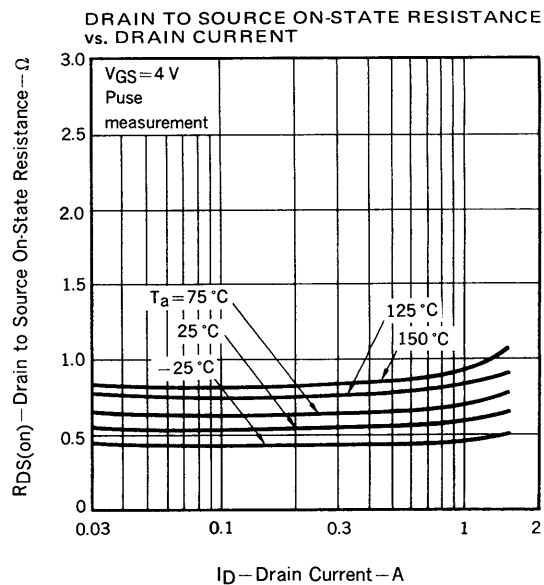
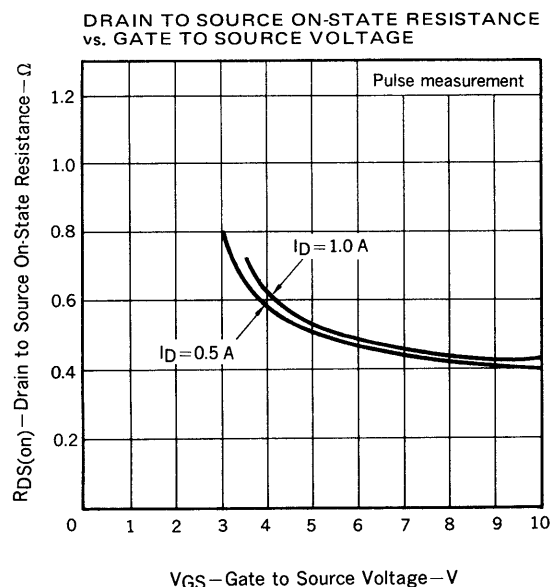
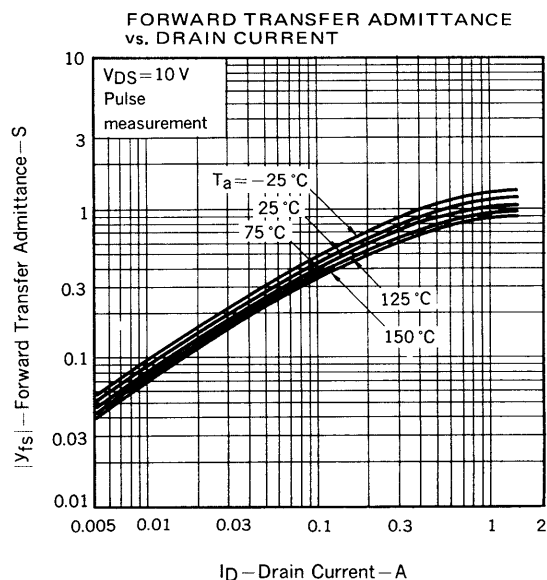
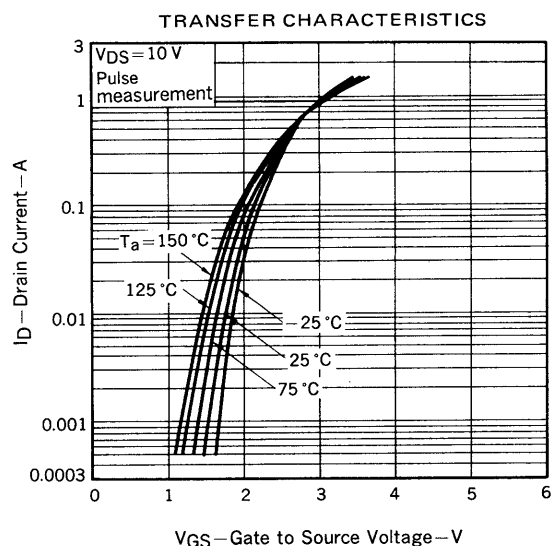
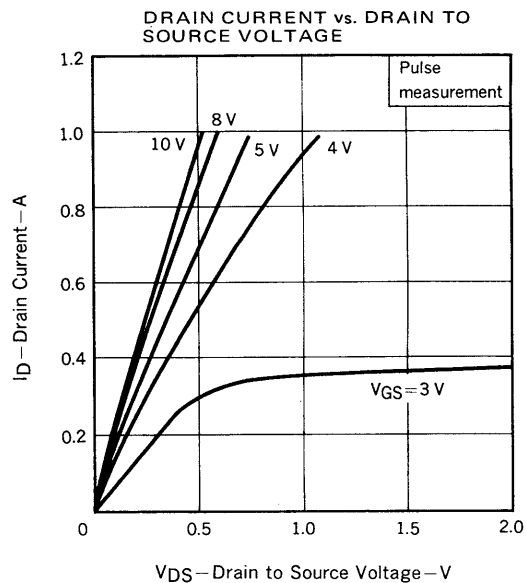
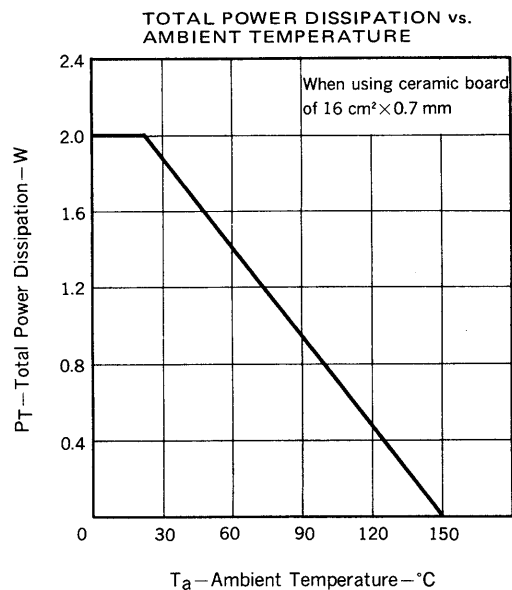
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
Drain Cut-off Current	$I_{DSS}$			10	$\mu\text{A}$	$V_{DS} = 30\text{ V}, V_{GS} = 0$
Gate Leakage Current	$I_{GSS}$			$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0$
Gate Cut-off Voltage	$V_{GS(off)}$	1.0	1.6	2.5	V	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$
Forward Transfer Admittance	$ Y_{fs} $	0.4			S	$V_{DS} = 10\text{ V}, I_D = 0.5\text{ A}$
Drain to Source On-State Resistance	$R_{DS(on)1}$		0.6	1.0	$\Omega$	$V_{GS} = 4.0\text{ V}, I_D = 0.5\text{ A}$
Drain to Source On-State Resistance	$R_{DS(on)2}$		0.4	0.7	$\Omega$	$V_{GS} = 10\text{ V}, I_D = 0.5\text{ A}$
Input Capacitance	$C_{iss}$		130		pF	$V_{DS} = 5.0\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$
Output Capacitance	$C_{oss}$		70		pF	
Feedback Capacitance	$C_{rss}$		30		pF	
Turn-On Delay Time	$t_{d(on)}$		12		ns	$V_{GS(on)} = 10\text{ V}, R_G = 10\ \Omega$ $V_{DD} = 25\text{ V}, I_D = 0.5\text{ A}$ $R_L = 50\ \Omega$
Rise Time	$t_r$		44		ns	
Turn-Off Delay Time	$t_{d(off)}$		310		ns	
Fall Time	$t_f$		160		ns	

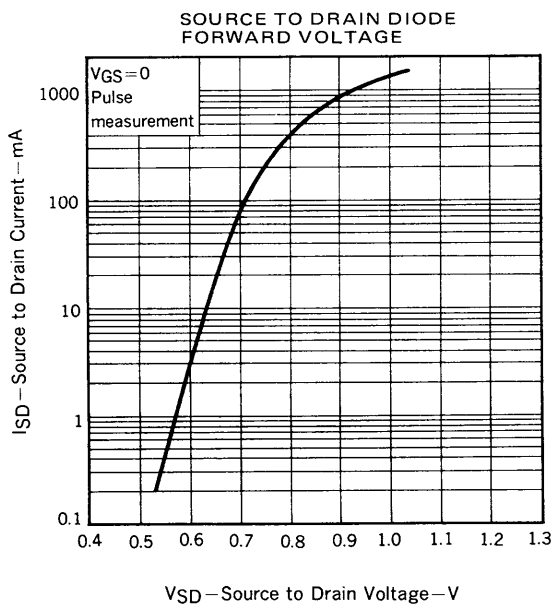
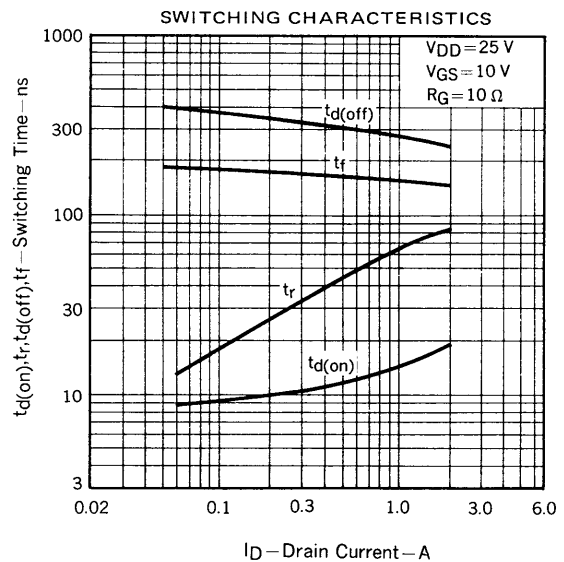
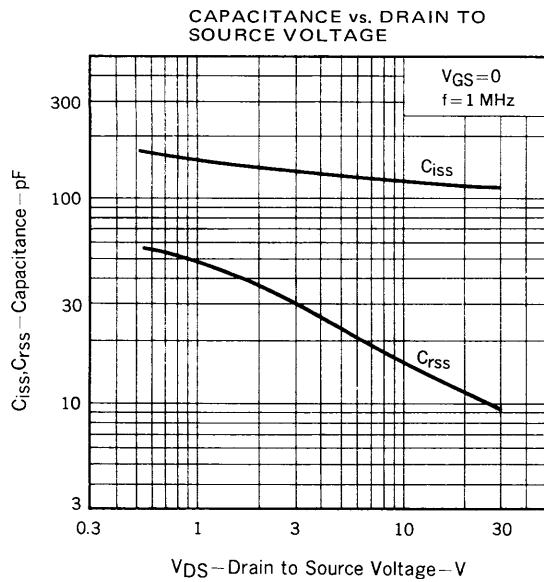
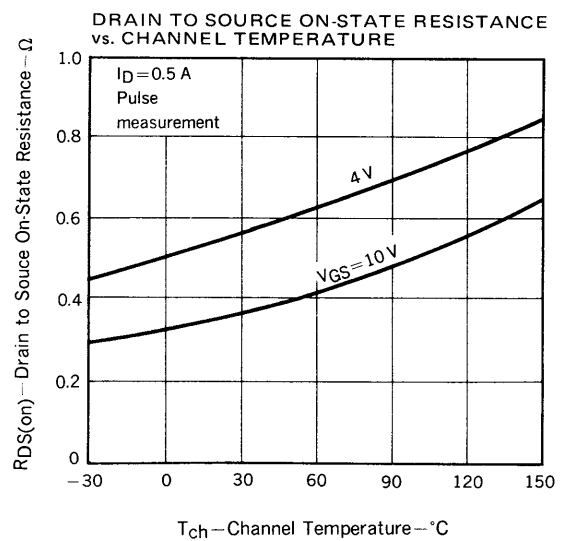
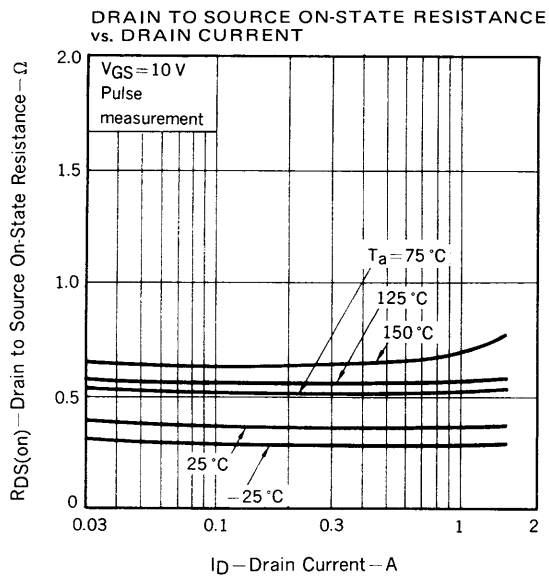
SWITCHING TIME MEASUREMENT CIRCUIT AND CONDITIONS



TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )







## RECOMMENDED SOLDERING CONDITIONS

Mounting of this product by soldering should be done under the following conditions.

Please consult our representatives about soldering methods and conditions other than these.

## SURFACE MOUNT TYPE

For details of the recommended soldering conditions, see the information document.

“Device Mounting Manual for Surface Mounting (IEI-1207).”

Soldering Method	Soldering Conditions	Symbol for Recommended Conditions
Infrared Reflow	Package peak temp.: 230 °C Soldering time: within 30 sec (above 210 °C) Soldering times: 1, Days limitation: none*	IR30-00
Vapor Phase Soldering	Package peak temp.: 215 °C Soldering time: within 40 sec (above 200 °C) Soldering times: 1, Days limitation: none*	VP15-00
Wave Soldering	Soldering bath temp.: below 260 °C Soldering time: within 10 sec Soldering times: 1, Days limitation: none*	WS60-00

\*: Stored days under storage conditions at 25 °C and below 65 % R.H. after the dry-pack has been opened.

**Note 1** Combination of soldering methods should be avoided.

## REFERENCE

Document Name	Document No.
NEC semiconductor device reliability/quality control system.	TEI-1202
Quality grade on NEC semiconductor devices.	IEI-1209
Semiconductor device mounting technology manual.	IEI-1207
Semiconductor device package manual.	IEI-1213
Guide to quality assurance for semiconductor devices.	MEI-1202
Semiconductor selection guide.	MF-1134

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Standard: Computer, Office equipment, Communication equipment, Test and Measurement equipment, Machine tools, Industrial robots, Audio and Visual equipment, Other consumer products, etc.

Special: Automotive and Transportation equipment, Traffic control systems, Antidisaster systems, Anticrime systems, etc.