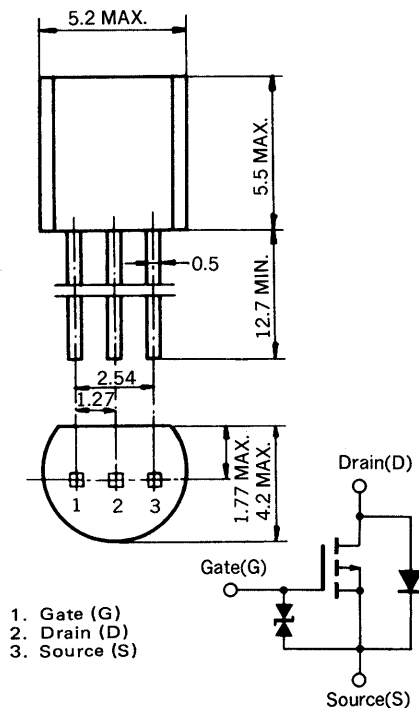


# MOS FIELD-EFFECT TRANSISTOR

## 2SJ196

### P-CHANNEL MOS FET FOR SWITCHING

#### OUTLINE DIMENSIONS (Unit : mm)



(Diode in the above figure is a parasitic diode.)

The 2SJ196 is a p-channel vertical type MOS FET switching device which can be directly driven from an IC operating with a 5 V single power supply. The device featuring low ON-state resistance is of the voltage drive type and thus is ideal for driving actuators such as motors, solenoids, and relays.

#### FEATURES

- Low ON-state resistance  
 $R_{DS(on)} = 1.5 \Omega$  MAX. at  $V_{GS} = -4$  V,  $I_D = -0.5$  A  
 $R_{DS(on)} = 1.0 \Omega$  MAX. at  $V_{GS} = -10$  V,  $I_D = -0.5$  A
- Voltage drive at logic level ( $V_{GS} = -4$  V) is possible.
- Bidirectional zener diode for protection is incorporated in between the gate and the source.
- Complementary to 2SK1482

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

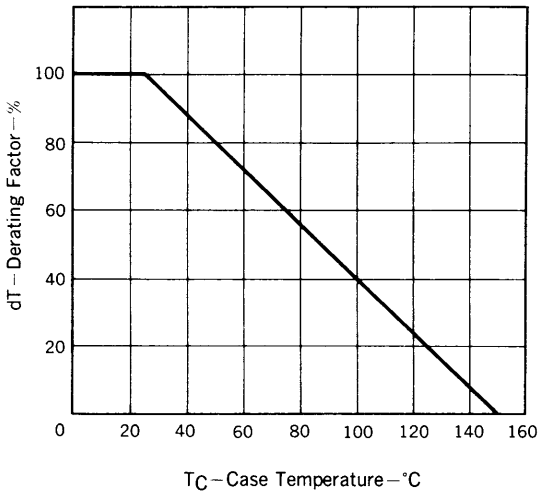
CHARACTERISTIC	SYMBOL	RATINGS	UNIT	TEST CONDITIONS
Drain to Source Voltage	$V_{DSS}$	-60	V	$V_{GS} = 0$
Gate to Source Voltage	$V_{GSS}$	$\pm 20$	V	$V_{DS} = 0$
Drain Current (DC)	$I_D(\text{DC})$	$\pm 1.0$	A	
Drain Current (pulse)	$I_D(\text{pulse})$	$\pm 2.0$	A	$PW \leq 10$ ms, Duty Cycle $\leq 50$ %
Total Power Dissipation	$P_T$	750	mW	
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$	
Storage Temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$	

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

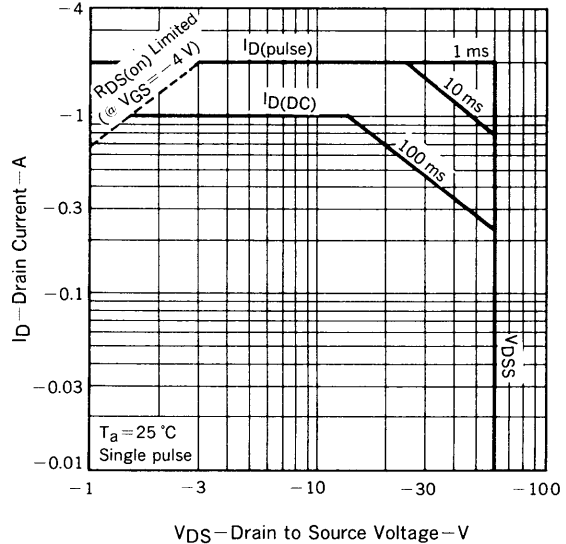
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
Drain Cut-off Current	I <sub>DSS</sub>			-10	μA	V <sub>DS</sub> = -60 V, V <sub>GS</sub> = 0
Gate Leakage Current	I <sub>GSS</sub>			±10	μA	V <sub>GS</sub> = ±20 V, V <sub>DS</sub> = 0
Gate Cut-off Voltage	V <sub>GS(off)</sub>	-1.0	-2.1	-3.0	V	V <sub>DS</sub> = -10 V, I <sub>D</sub> = -1 mA
Forward Transfer Admittance	y <sub>fs</sub>	0.4	1.0		S	V <sub>DS</sub> = -10 V, I <sub>D</sub> = -0.5 A
Drain to Source On-State Resistance	R <sub>DS(on)1</sub>		0.9	1.5	Ω	V <sub>GS</sub> = -4.0 V, I <sub>D</sub> = -0.5 A
Drain to Source On-State Resistance	R <sub>DS(on)2</sub>		0.5	1.0	Ω	V <sub>GS</sub> = -10 V, I <sub>D</sub> = -0.5 A
Input Capacitance	C <sub>iss</sub>		220		pF	V <sub>DS</sub> = -10 V, V <sub>GS</sub> = 0, f = 1 MHz
Output Capacitance	C <sub>oss</sub>		125		pF	
Feedback Capacitance	C <sub>rss</sub>		17		pF	
Turn-On Delay Time	t <sub>d(on)</sub>		45		ns	V <sub>GS(on)</sub> = -10 V, R <sub>G</sub> = 10 Ω, V <sub>DD</sub> = -25 V, I <sub>D</sub> = -0.5 A, R <sub>L</sub> = 50 Ω
Rise Time	t <sub>r</sub>		70		ns	
Turn-Off Delay Time	t <sub>d(off)</sub>		380		ns	
Fall Time	t <sub>f</sub>		170		ns	

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

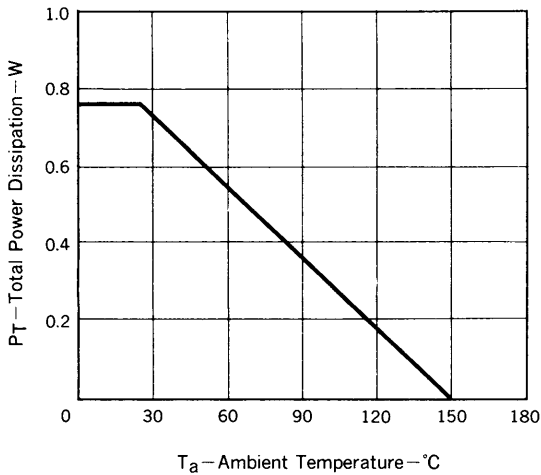
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



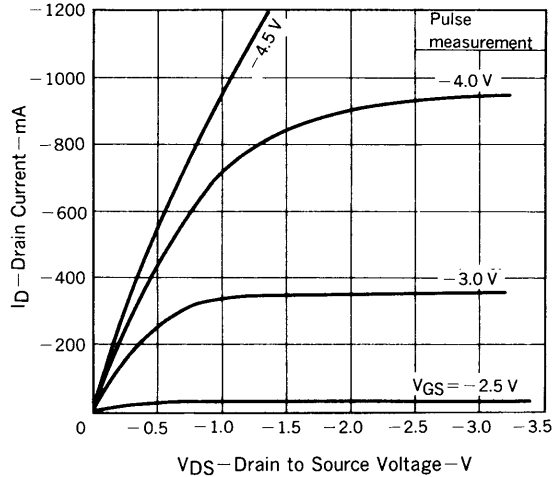
FORWARD BIAS SAFE OPERATING AREA



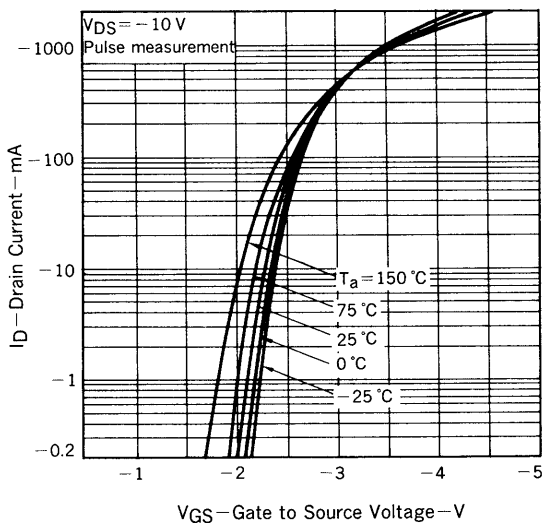
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



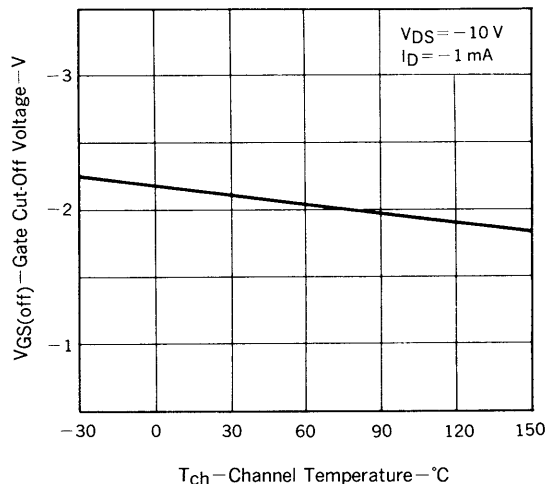
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



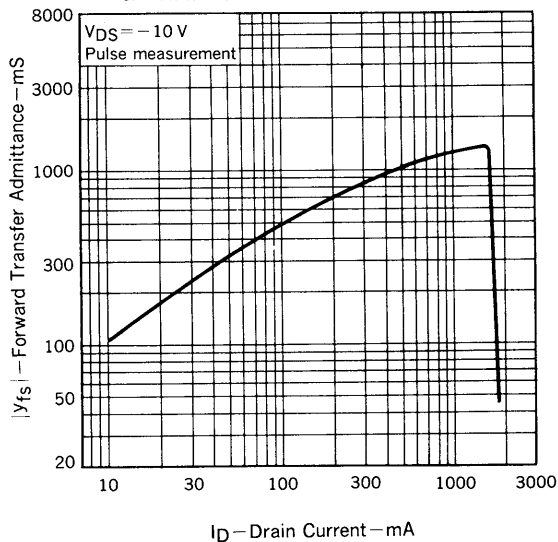
TRANSFER CHARACTERISTICS



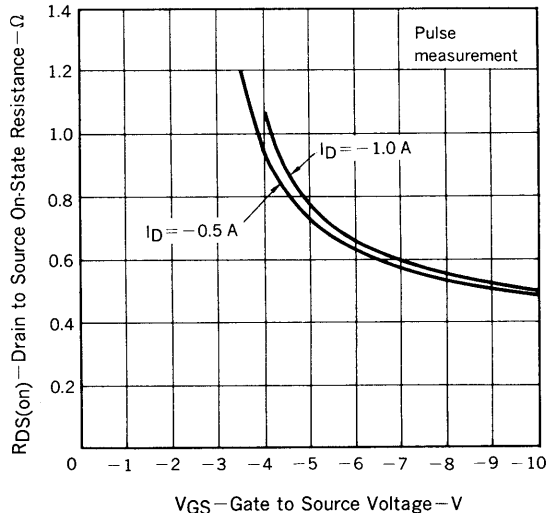
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE



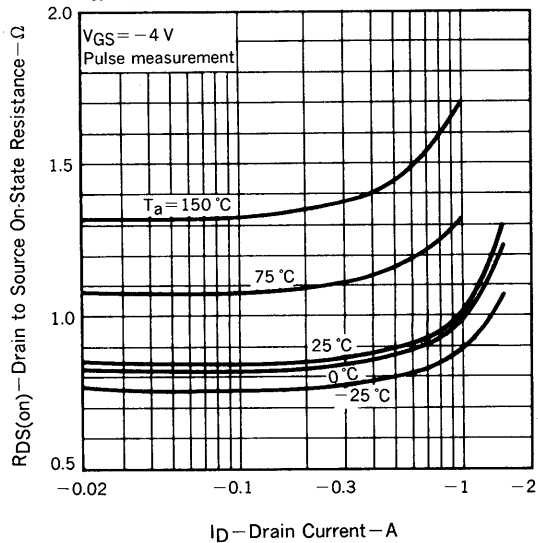
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



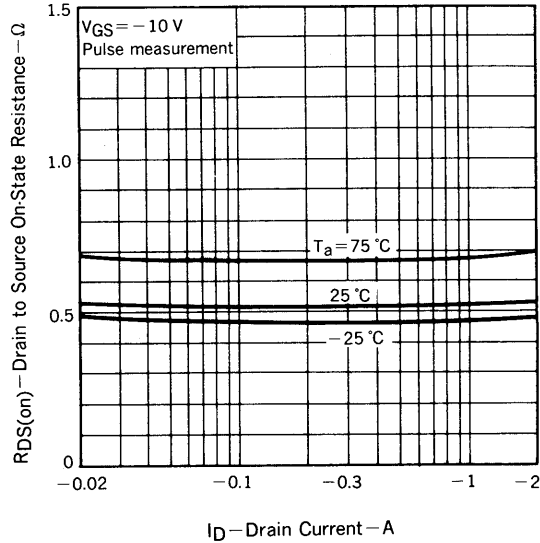
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE

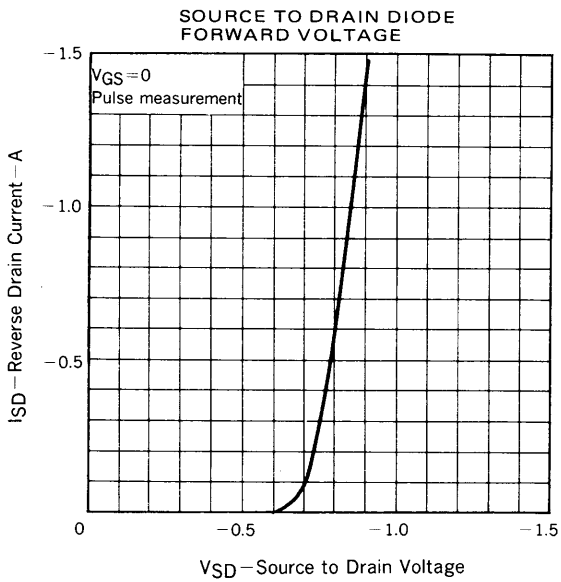
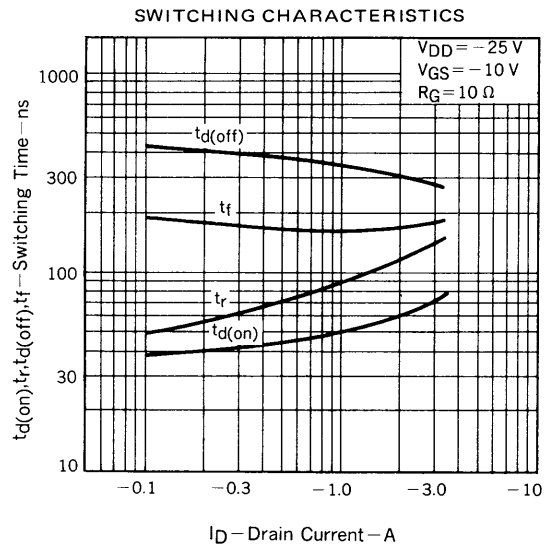
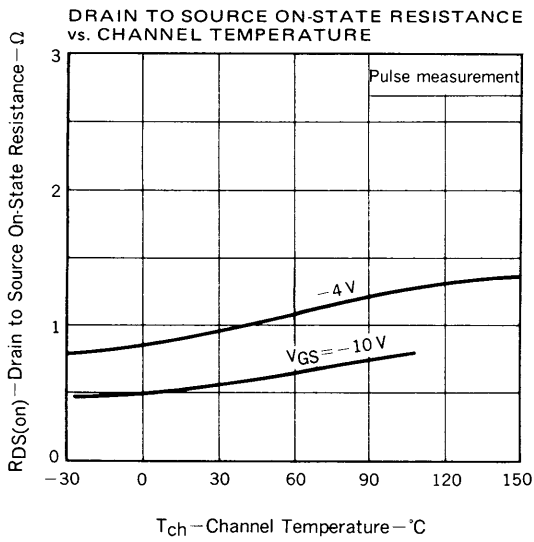


DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT

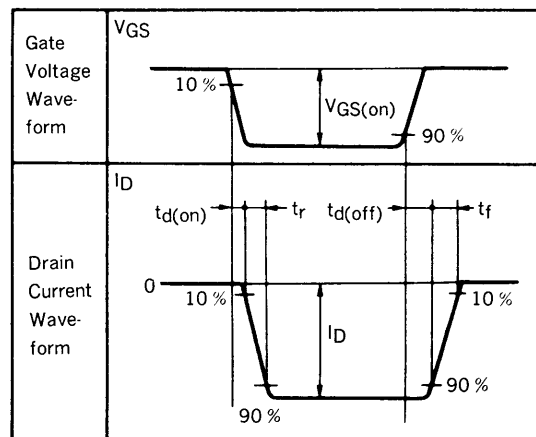
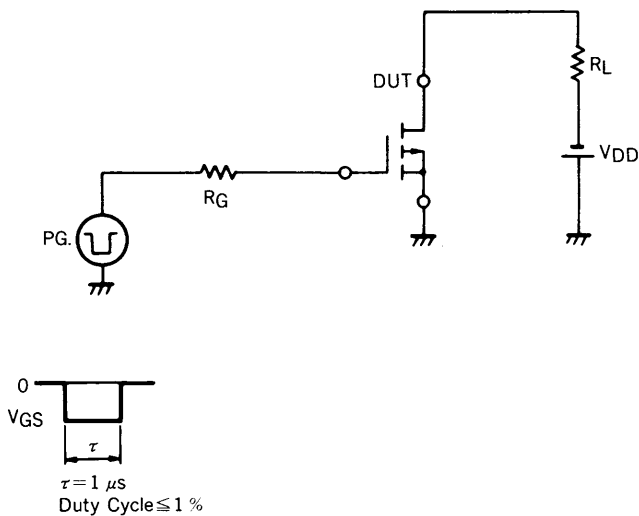


DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT





**SWITCHING TIME MEASUREMENT CIRCUIT AND CONDITIONS**



**RECOMMENDED SOLDERING CONDITIONS**

Solder this product under the following recommended conditions.

For soldering methods or soldering conditions other than those recommended in the table, please consult our NEC salespeople.

**Insert type**

Soldering method	Soldering conditions	Recommended condition code
Wave soldering	Solder bath temperature: 260 °C max. Soldering time: 10 sec max.	

[MEMO]

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Application examples recommended by NEC Corporation

Standard: Data processing and office equipment, Communication equipment (terminal, mobile), Test and Measurement equipment, Audio and Video equipment, Other consumer products, etc.

Special: Automotive and Transportation equipment, Communication equipment (trunk line), Train and Traffic control devices, industrial robots, Burning control systems, antidisaster systems, anticrime systems etc.