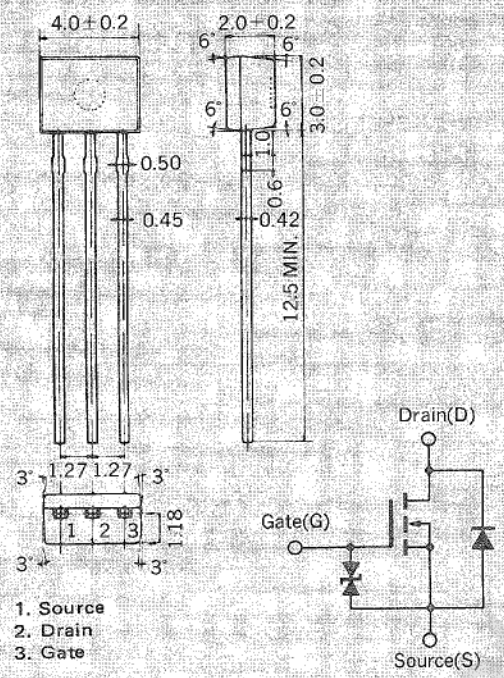
NEC
ELECTRON DEVICE

MOS FIELD EFFECT TRANSISTOR
2SK1656

N-CHANNEL MOS FET
FOR SWITCHING

PACKAGE DIMENSIONS (Unit : mm)



(Diode in the figure is the parasitic diode.)

The 2SK1656 is an N-channel vertical type MOS FET which can be driven by 2.5 V power supply.

As the MOS FET is low Gate Leakage Current, it is suitable for appliances including Filter Circuit.

FEATURES

- Directly driven by ICs having a 3 V power supply.
- Has low Gate Leakage Current
  I_{GSS} = ±5 nA MAX. @ V_{GS} = ±3.0 V

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 °C)

PARAMETER	SYMBOL	RATINGS	UNIT	TEST CONDITIONS
Drain to Source Voltage	V_{DSS}	30	V	V_{GS} = 0
Gate to Source Voltage	V_{GSS}	±7	V	V_{DS} = 0
Drain Current	$I_{D(DC)}$	±100	mA	
Drain Current	$I_{D(pulse)}$	±200	mA	PW ≦ 10 ms, Duty Cycle ≦ 50 %
Total Power Dissipation	P_T	250	mW	
Channel Temperature	T_{ch}	150	°C	
Operating Temperature	T_{opt}	−55 to +80	°C	
Storage Temperature	T_{stg}	−55 to +150	°C	

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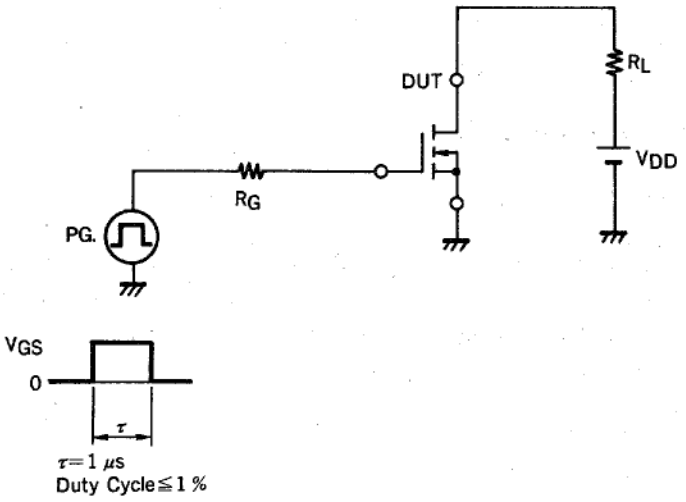
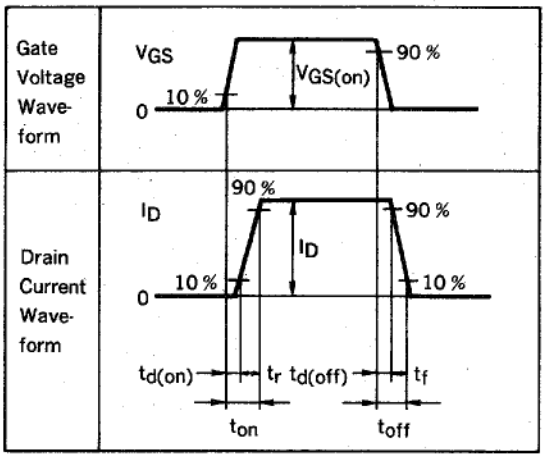
ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain Cut-off Current	I_{DSS}			10	μA	V_{DS} = 30 V, V_{GS} = 0
Gate Leakage Current	I_{GSS}			±5.0	nA	V_{GS} = ±3.0 V, V_{DS} = 0
Gate Cut-off Voltage	$V_{GS(off)}$	0.9	1.2	1.5	V	V_{DS} = 3.0 V, I_D = 1 mA
Forward Transfer Admittance	$\|y_{fs}\|$	20	40		mS	V_{DS} = 3.0 V, I_D = 0.3 A
Drain to Source On-State Resistance	$R_{DS(on)1}$		25	45	Ω	V_{GS} = 2.5 V, I_D = 0.3 A
Drain to Source On-State Resistance	$R_{DS(on)2}$		18	25	Ω	V_{GS} = 4.0 V, I_D = 0.3 A
Input Capacitance	C_{iss}		15		pF	V_{DS} = 3.0 V, V_{GS} = 0, f = 1 MHz
Output Capacitance	C_{oss}		10		pF	
Feedback Capacitance	C_{rss}		1.5		pF	
Turn-On Delay Time	$t_{d(on)}$		50		ns	V_{DD} = 3.0 V, I_D = 10 mA, $V_{GS(on)}$ = 3 V, R_G = 10 Ω, R_L = 300 Ω
Rise Time	t_r		23		ns	
Turn-Off Delay Time	$t_{d(off)}$		34		ns	
Fall Time	t_f		43		ns	

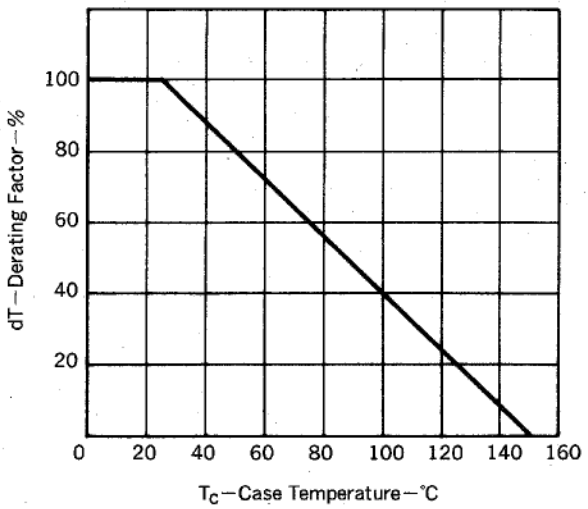
SWITCHING TIME MEASUREMENT CIRCUIT AND CONDITIONS



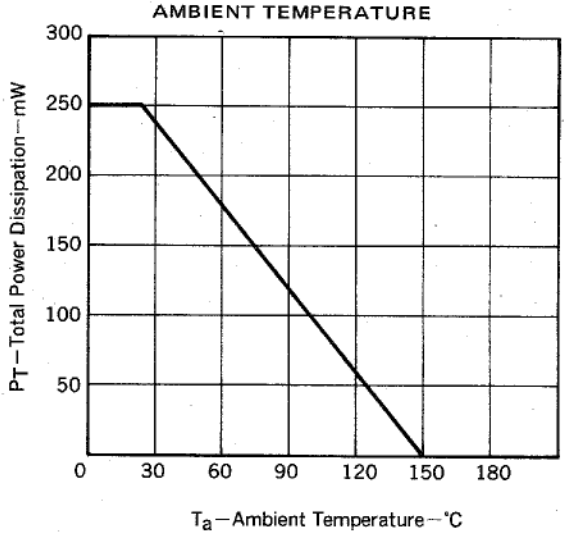


TYPICAL CHARACTERISTICS (T_a = 25 °C)

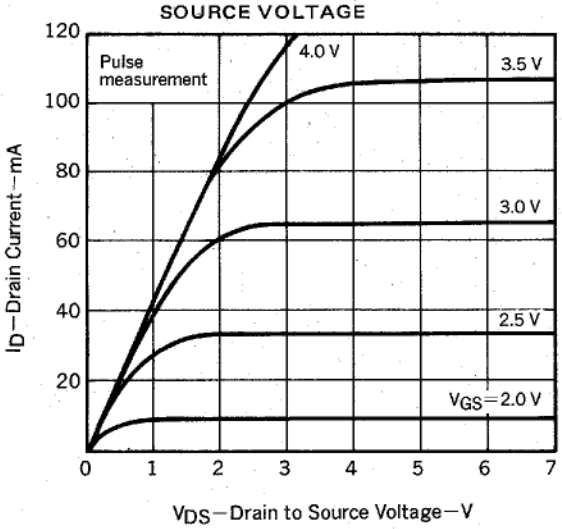
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



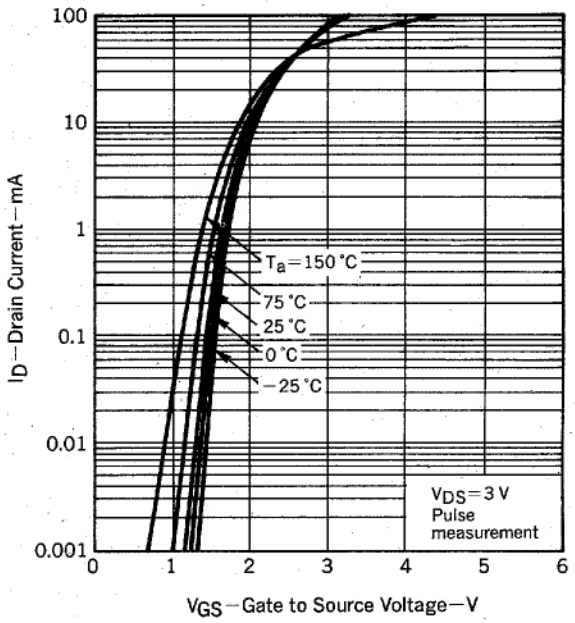
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



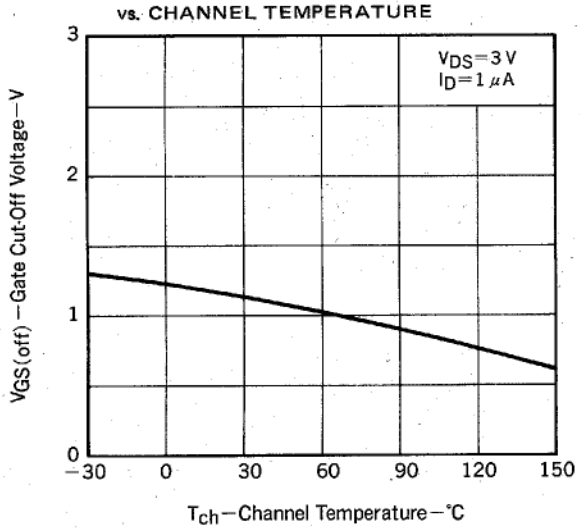
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



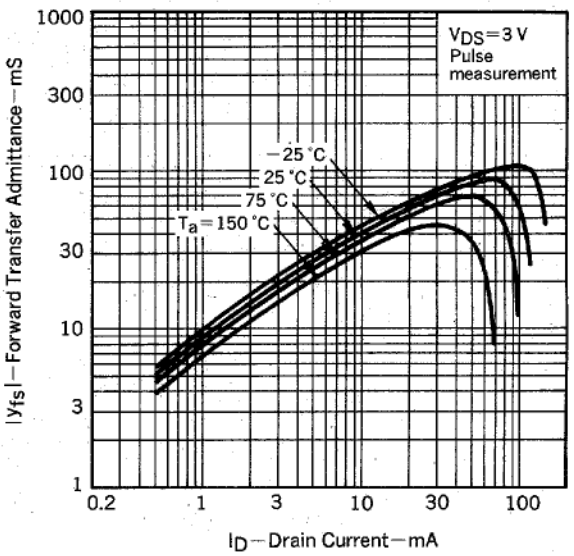
TRANSFER CHARACTERISTICS



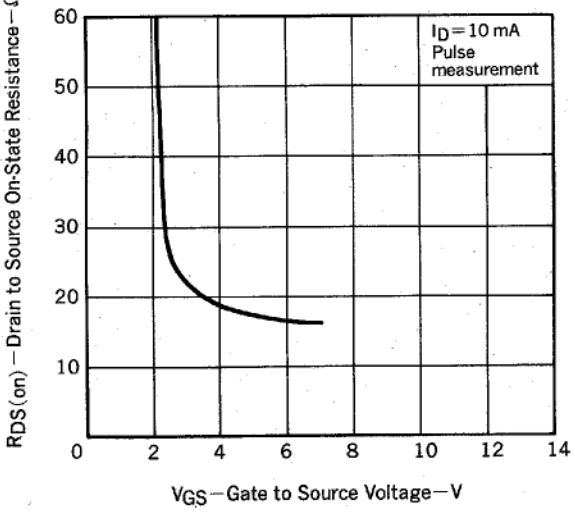
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE



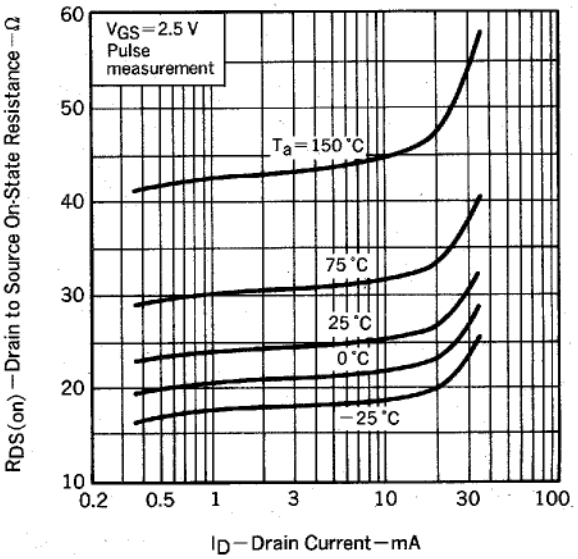
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



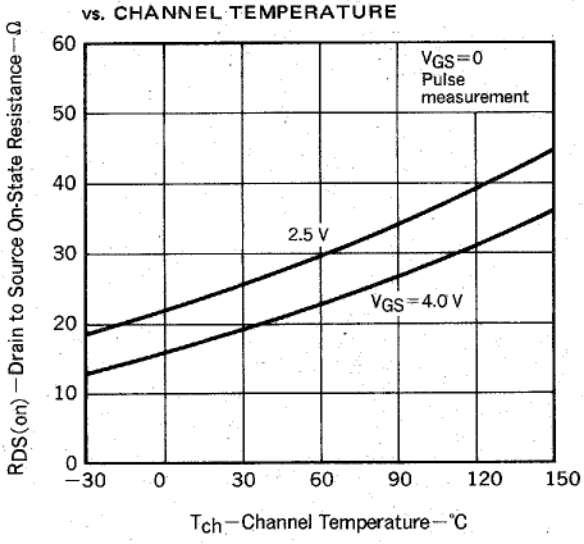
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



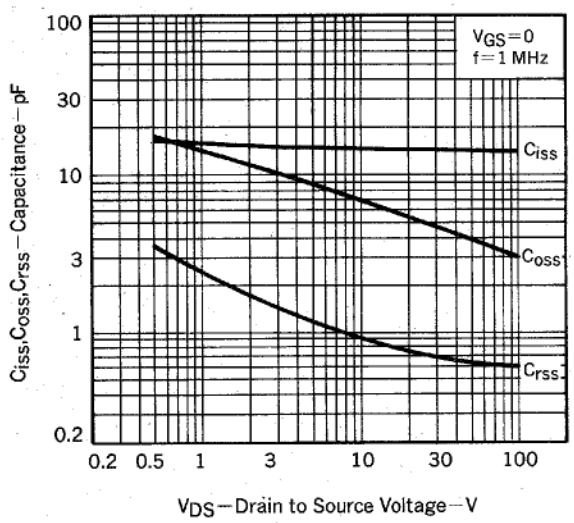
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



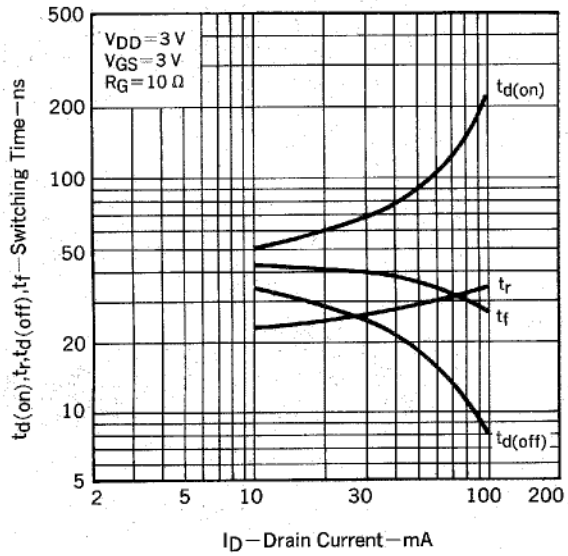
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



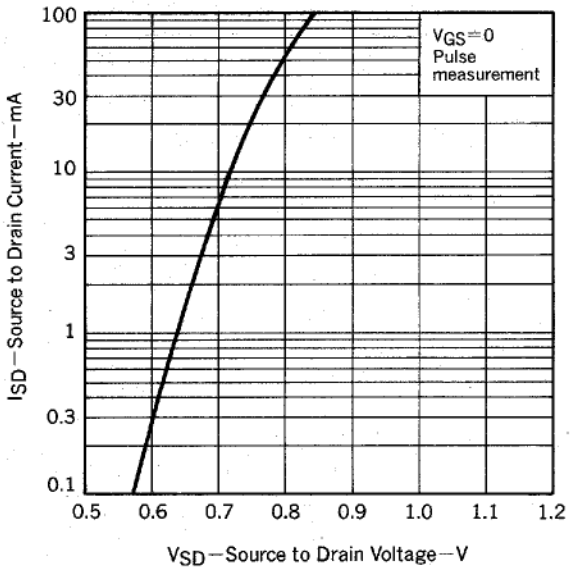
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



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 "SMT MANUAL" (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.

(MEMO)