DATA SHEET

NEC

MOS FIELD EFFECT POWER TRANSISTORS

2SJ133, 2SJ133-Z

P-CHANNEL POWER MOS FET FOR SWITCHING

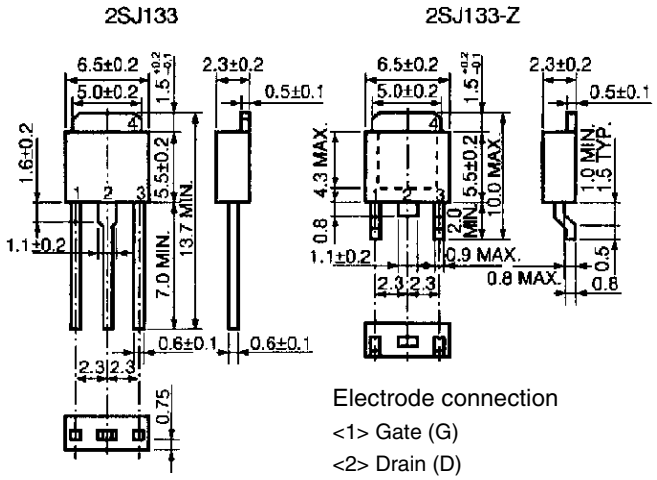
FEATURES

- Gate drive available at logic level (V_{GS} = –4 V)
- High current control available in small dimension due to low $R_{DS(on)}$ (≅ 0.45 Ω)
- 2SJ133-Z is a lead process product and is deal for mounting a hybrid IC.

QUALITY GRADES

- Standard
  Please refer to "Quality Grades on NEC Semiconductor Devices" (Document No. C11531E) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

PACKAGE DRAWING (UNIT: mm)



Electrode connection
<1> Gate (G)
<2> Drain (D)
<3> Source (S)
<4> Fin (drain)

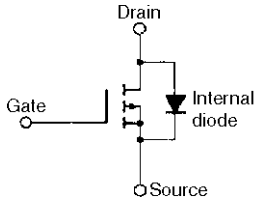
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Parameter	Symbol	Conditions	Ratings	Unit
Drain to source voltage	V_{DSS}	V_{GS} = 0	–60	V
Gate to source voltage	V_{GSS}	V_{DS} = 0	∓20	V
Drain current (DC)	$I_{D(DC)}$	T_C = 25°C	∓2.0	A
Drain current (pulse)	$I_{D(pulse)}$	PW ≤ 300 μs duty cycle ≤ 10 %	∓8.0	A
Total power dissipation	P_T	T_C = 25°C	20	W
Total power dissipation	P_T	T_a = 25°C	1.0*, 2.0**	W
Channel temperature	T_{ch}		150	°C
Storage temperature	T_{stg}		–55 to +150	°C

* Printing board mounted

** 7.5 cm^2 × 0.7 mm ceramic board mounted

INTERNAL EQUIVALENT CIRCUIT



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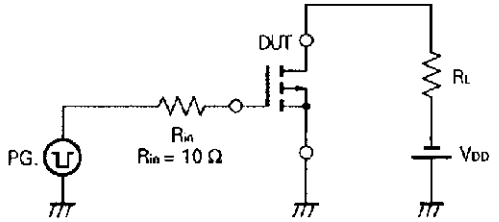
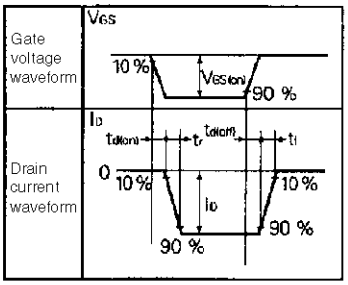
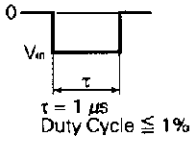
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Drain cutoff current	I_{DSS}	V_{DS} = –60 V, V_{GS} = 0			–10	μA
Gate cutoff current	I_{GSS}	V_{GS} = ∓20 V, V_{DS} = 0			∓100	nA
Gate cutoff voltage	$V_{GS(off)}$	V_{DS} = –10 V, I_D = –1.0 mA	–1.0	–2.0	–3.0	V
Forward transfer admittance	$\|y_{fs}\|$	V_{DS} = –10 V, I_D = –1.0 A	1.0	1.8		S
Drain to source on-state resistance	$R_{DS(on)1}$	V_{GS} = –10 V, I_D = –1.0 A		0.45	0.8	Ω
Drain to source on-state resistance	$R_{DS(on)2}$	V_{GS} = –4 V, I_D = –0.8 A		0.7	1.3	Ω
Input capacitance	C_{iss}	V_{DS} = –10 V, V_{GS} = 0 V f = 1 MHz		660		pF
Output capacitance	C_{oss}			250		pF
Reverse transfer capacitance	C_{rss}			50		pF
Turn-on delay time	$t_{d(on)}$	I_D = –1.0 A, $V_{GS(on)}$ = –10 V V_{DD} ≅ –30 V, R_L = 30 Ω, R_{in} = 10 Ω		30		ns
Rise time	t_r			30		ns
Turn-off delay time	$t_{d(off)}$			110		ns
Fall time	t_f			40		ns

SWITCHING TIME TEST CIRCUIT, TEST CONDITION (RESISTANCE LOAD)

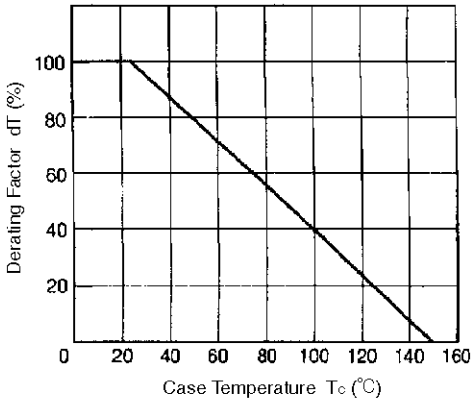




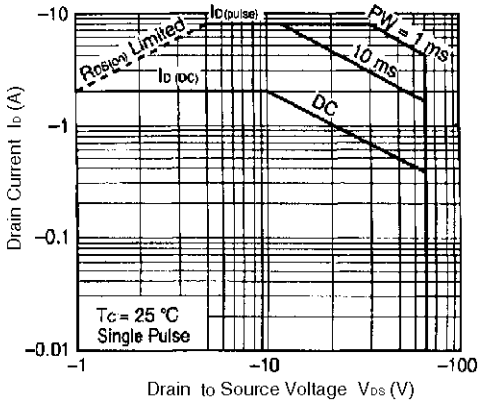


TYPICAL CHARACTERISTICS (Ta = 25°C)

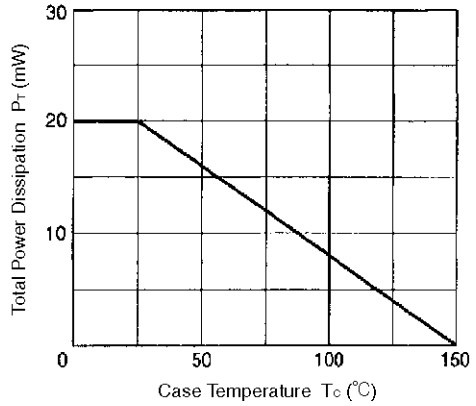
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



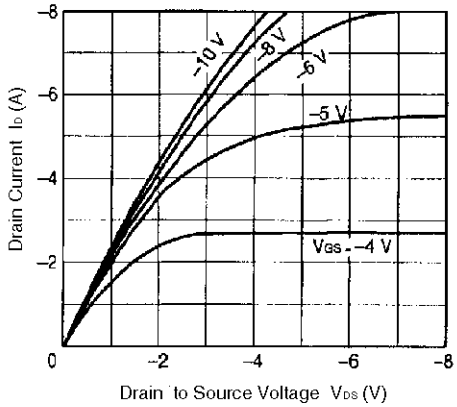
FORWARD BIAS SAFE OPERATING AREA



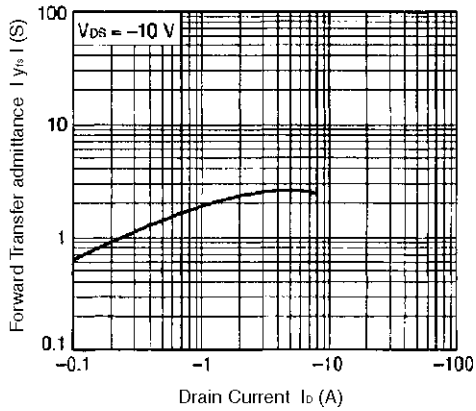
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



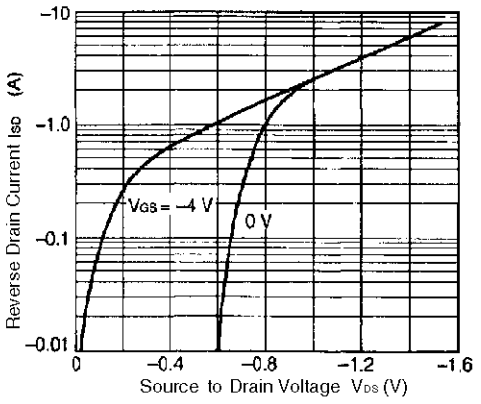
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



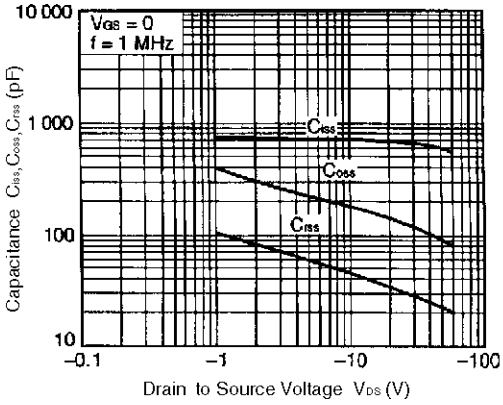
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



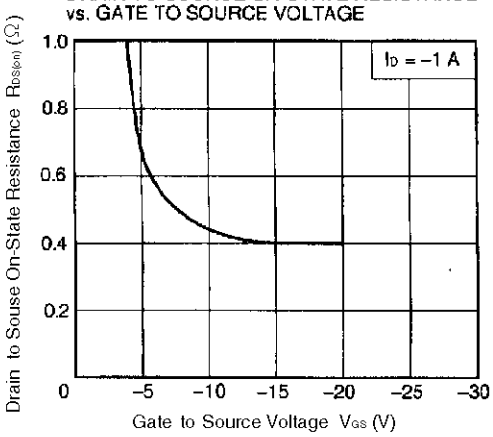
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



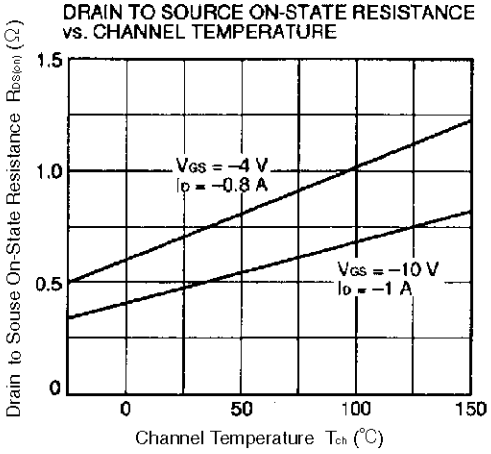
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



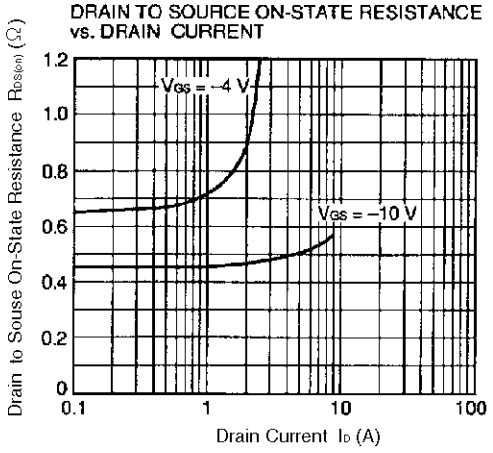
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



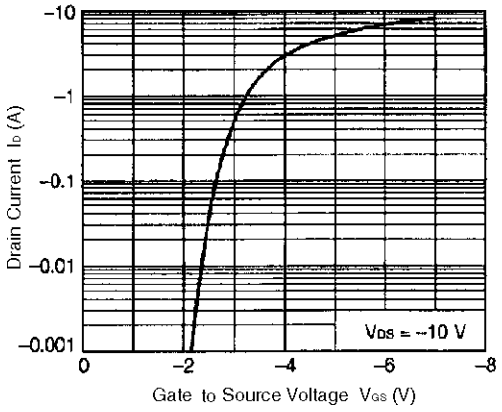
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



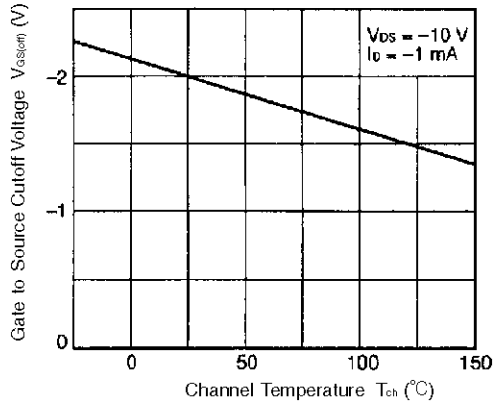
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



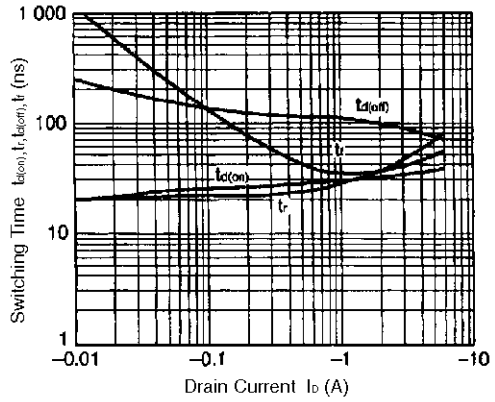
TRANSFER CHARACTERISTIC



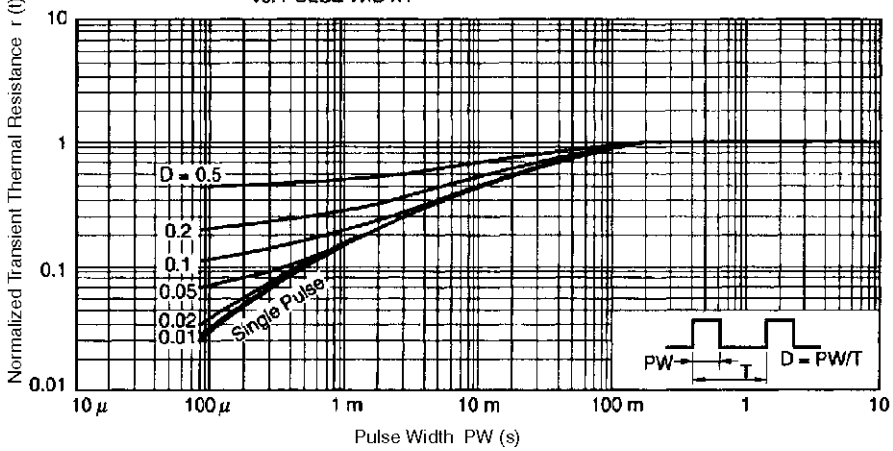
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE



SWITCHING TIME vs. DRAIN CURRENT



NORMALIZED TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



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