

# MOS FIELD EFFECT POWER TRANSISTORS 2SJ324, 2SJ324-Z

## SWITCHING P-CHANNEL POWER MOS FET INDUSTRIAL USE

### DESCRIPTION

The 2SJ324 is P-channel MOS Field Effect Transistor designed for solenoid, motor and lamp driver.

### FEATURES

- Low On-state Resistance  
 $R_{DS(on)} = 0.18 \Omega$  TYP. ( $V_{GS} = -10$  V,  $I_D = -1$  A)  
 $R_{DS(on)} = 0.36 \Omega$  TYP. ( $V_{GS} = -4$  V,  $I_D = -0.8$  A)
- Low  $C_{iss}$   $C_{iss} = 330$  pF TYP.
- Built-in G-S Gate Protection Diode

### 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.

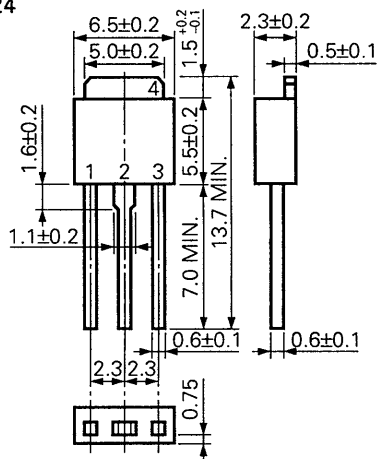
### ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

Drain to Source Voltage	$V_{DSS}$	-30	V
Gate to Source Voltage (AC)	$V_{GSS}$	$\pm 20$	V
Gate to Source Voltage (DC)	$V_{GSS}$	-20, +10	V
Drain Current (DC)	$I_{D(DC)}$	$\pm 2.0$	A
Drain Current (pulse)	$I_{D(pulse)^*}$	$\pm 8.0$	A
Total Power Dissipation ( $T_c = 25^\circ\text{C}$ )	$P_{T1}$	20	W
Total Power Dissipation ( $T_a = 25^\circ\text{C}$ )	$P_{T2}$	1.0	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

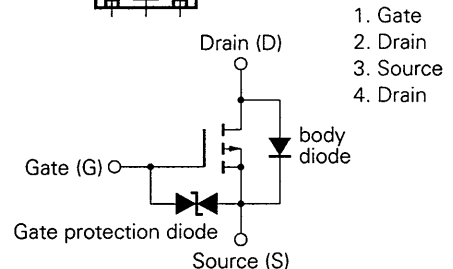
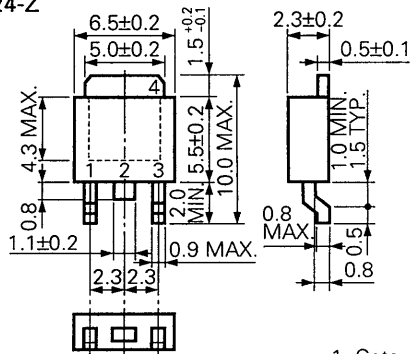
\*  $PW \leq 10 \mu\text{s}$ , Duty Cycle  $\leq 1\%$

### PACKAGE DIMENSIONS in millimeters

2SJ324



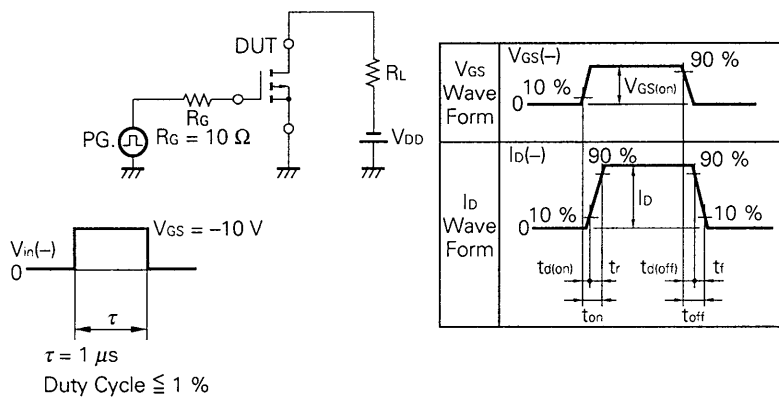
2SJ324-Z



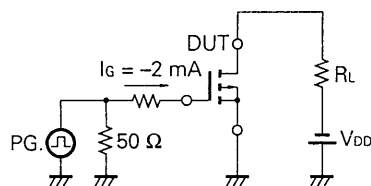
**ELECTRICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C)**

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source On-state Resistance	R <sub>DS(on)</sub>		0.18	0.25	Ω	V <sub>GS</sub> = -10 V, I <sub>D</sub> = -1.0 A
Drain to Source On-state Resistance	R <sub>DS(on)</sub>		0.36	0.52	Ω	V <sub>GS</sub> = -4 V, I <sub>D</sub> = -0.8 A
Gate to Source Cutoff Voltage	V <sub>GS(off)</sub>	-1.0	-1.5	-2.0	V	V <sub>DS</sub> = -10 V, I <sub>D</sub> = -1 mA
Forward Transfer Admittance	y <sub>fs</sub>	1.0	1.9		S	V <sub>DS</sub> = -10 V, I <sub>D</sub> = -1.0 A
Drain Leakage Current	I <sub>DSS</sub>			-10	μA	V <sub>DS</sub> = -30 V, V <sub>GS</sub> = 0
Gate to Source Leakage Current	I <sub>GSS</sub>			±10	μA	V <sub>GS</sub> = ±16 V, V <sub>DS</sub> = 0
Input Capacitance	C <sub>iss</sub>		330		pF	V <sub>DS</sub> = -10 V
Output Capacitance	C <sub>oss</sub>		290		pF	V <sub>GS</sub> = 0
Reverse Transfer Capacitance	C <sub>rss</sub>		105		pF	f = 1 MHz
Turn-On Delay Time	t <sub>d(on)</sub>		7		ns	V <sub>GS(on)</sub> = -10 V
Rise Time	t <sub>r</sub>		35		ns	V <sub>DD</sub> = -15 V
Turn-Off Delay Time	t <sub>d(off)</sub>		40		ns	I <sub>D</sub> = -1.0 A, R <sub>G</sub> = 10 Ω
Fall Time	t <sub>f</sub>		30		ns	R <sub>L</sub> = 15 Ω
Total Gate Charge	Q <sub>G</sub>		12		nC	V <sub>GS</sub> = -10 V
Gate to Source Charge	Q <sub>GS</sub>		1.5		nC	I <sub>D</sub> = -2.0 A
Gate to Drain Charge	Q <sub>GD</sub>		4.5		nC	V <sub>DD</sub> = -24 V
Body Diode Forward Voltage	V <sub>F</sub>		0.9		V	I <sub>F</sub> = 2.0 A, V <sub>GS</sub> = 0
Reverse Recovery Time	t <sub>rr</sub>		50		ns	I <sub>F</sub> = 2.0 A, V <sub>GS</sub> = 0
Reverse Recovery Charge	Q <sub>rr</sub>		40		nC	di/dt = 50 A/μs
ESD	V <sub>ESD</sub>		±130		V	C = 200 pF, R = 0, Single Pulse

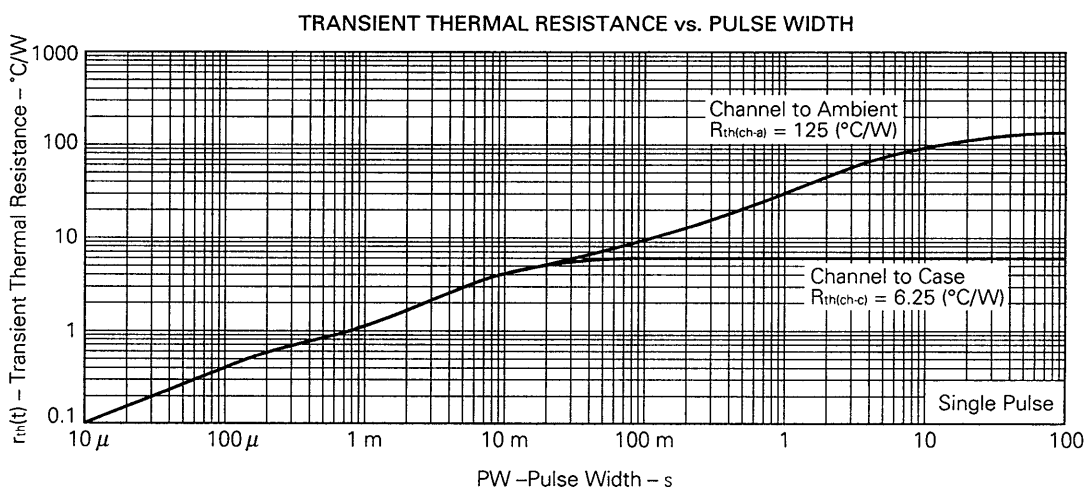
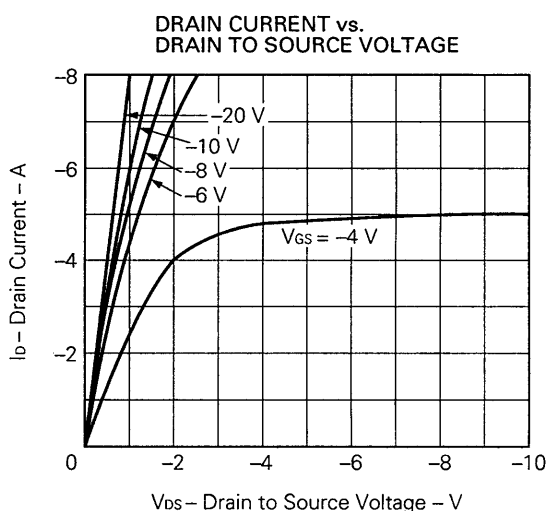
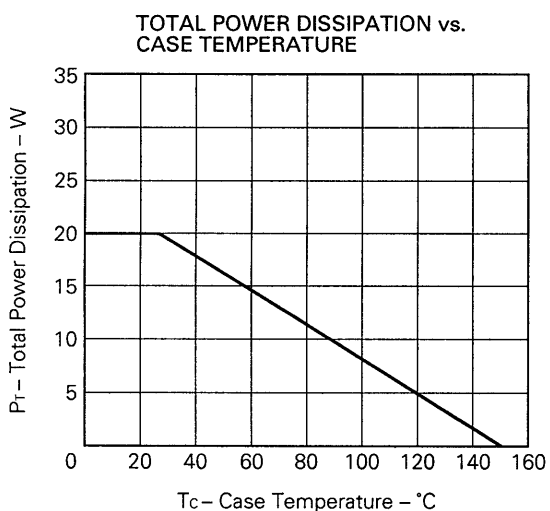
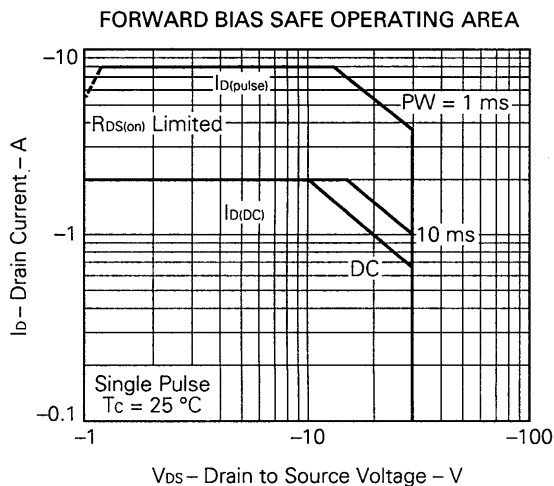
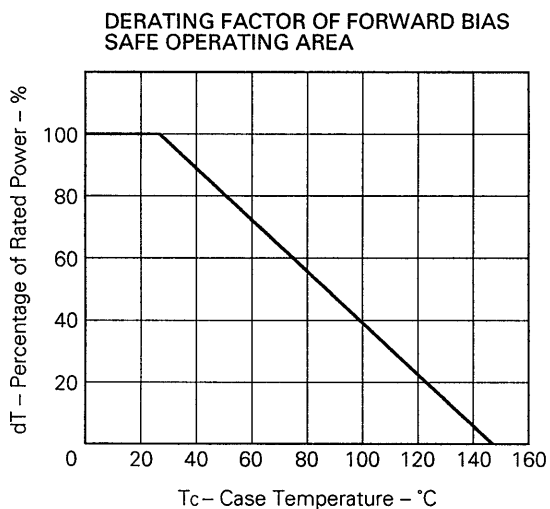
**Test Circuit 1: Switching Time**

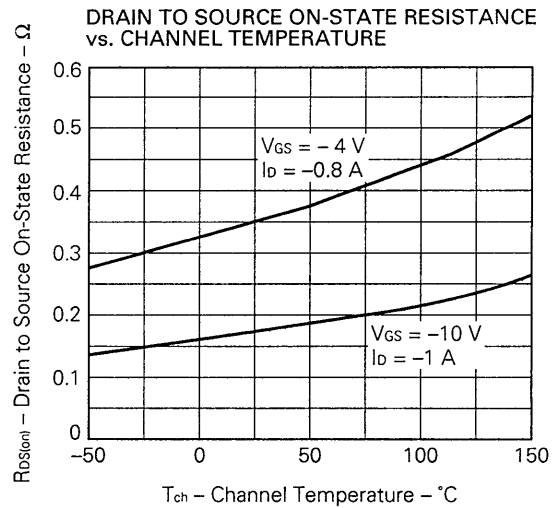
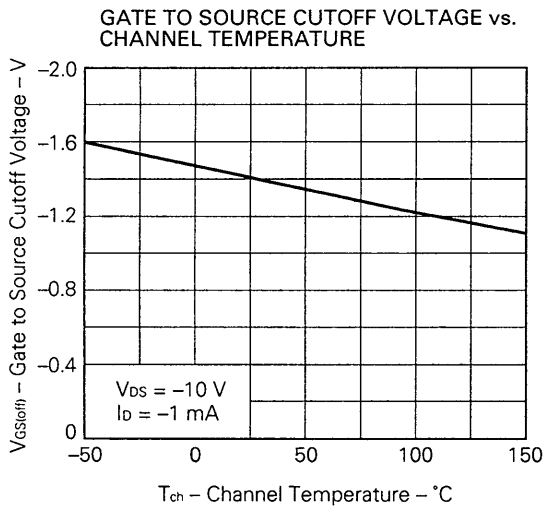
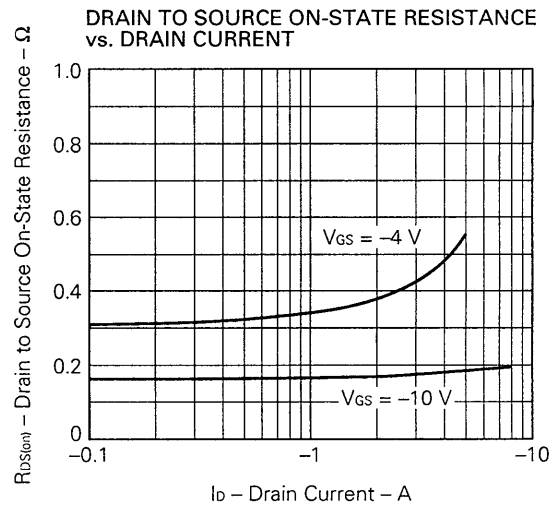
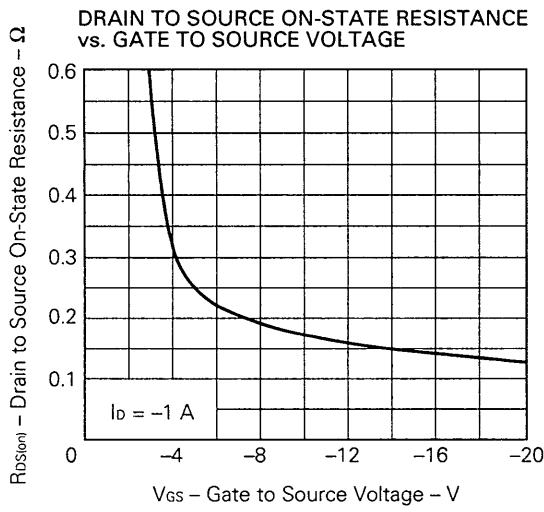
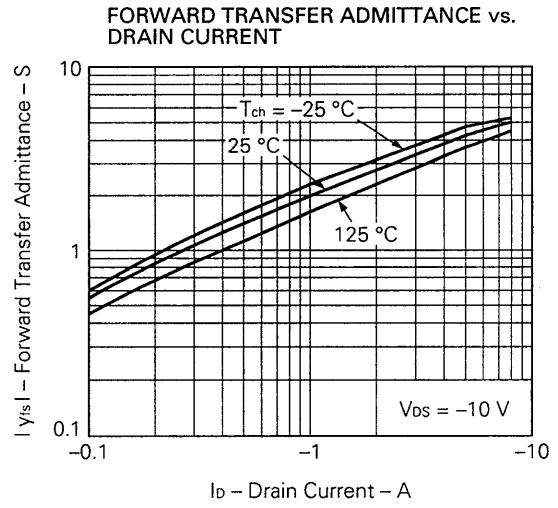
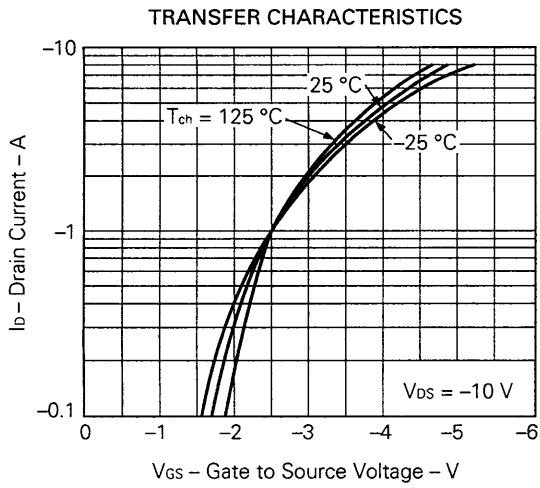


**Test Circuit 2: Gate Charge**

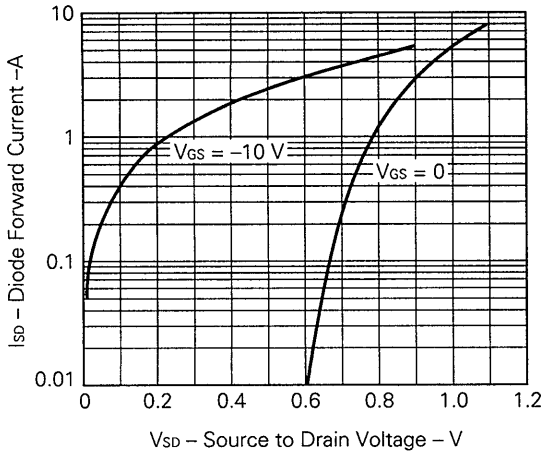


TYPICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C)

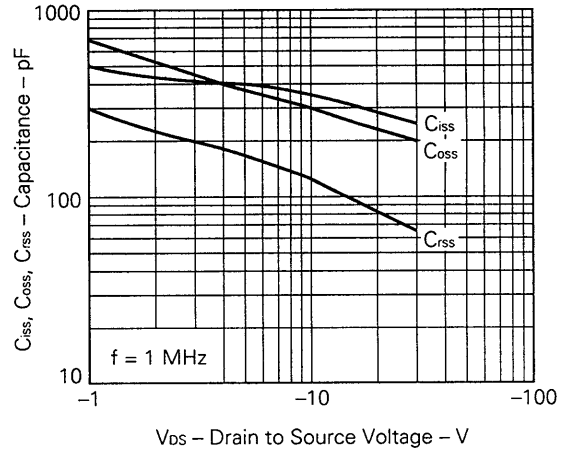




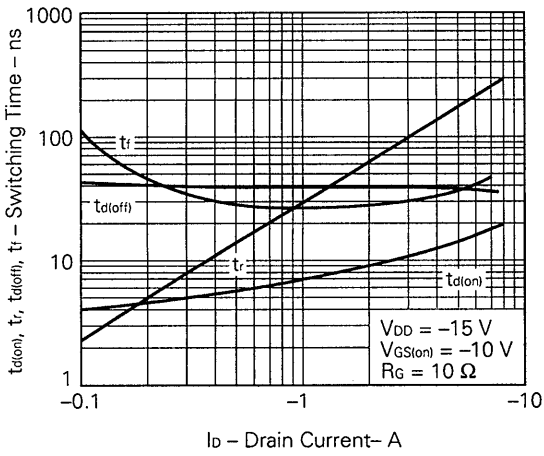
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



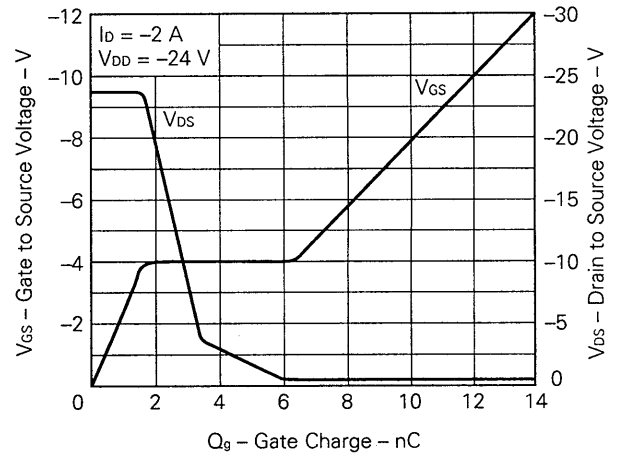
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



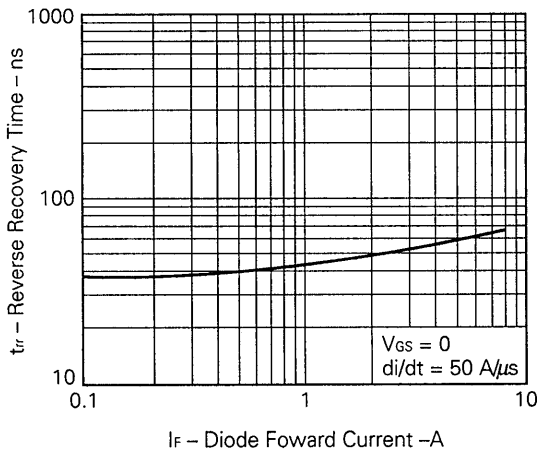
SWITCHING CHARACTERISTICS



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



REVERSE RECOVERY TIME vs. REVERSE DRAIN CURRENT



**Reference**

Application note name	No.
Safe operating area of Power MOS FET.	TEA-1034
Application circuit using Power MOS FET.	TEA-1035
Quality control of NEC semiconductors devices.	TEI-1202
Quality control guide of semiconductors devices.	MEI-1202
Assembly manual of semiconductors devices.	IEI-1207

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