

# MOS FIELD EFFECT TRANSISTOR

## 2SJ356

### P-CHANNEL MOS FET FOR HIGH-SPEED SWITCHING

The 2SJ356 is a P-channel MOS FET of a vertical type and is a switching element that can be directly driven by the output of an IC operating at 5 V.

This product has a low ON resistance and superb switching characteristics and is ideal for driving the actuators and DC/DC converters.

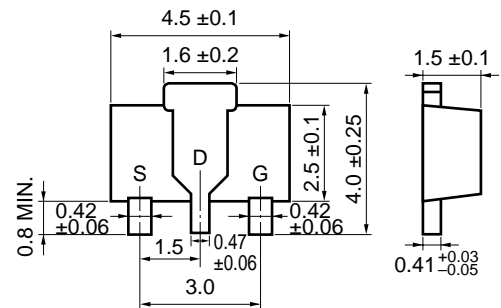
#### FEATURES

- Can be directly driven by 5-V IC
- Low ON resistance

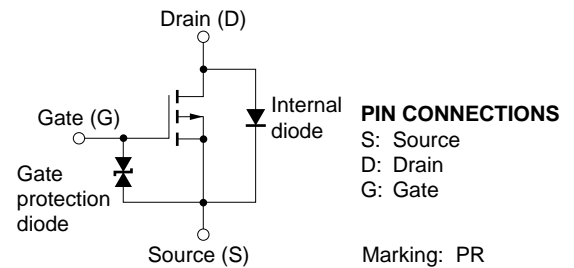
$R_{DS(on)} = 0.95 \, \Omega$  MAX. @  $V_{GS} = -4 \, V$ ,  $I_D = -1.0 \, A$

$R_{DS(on)} = 0.50 \, \Omega$  MAX. @  $V_{GS} = -10 \, V$ ,  $I_D = -1.0 \, A$

#### PACKAGE DIMENSIONS (in mm)



#### EQUIVALENT CIRCUIT



#### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25 \, ^\circ C$ )

PARAMETER	SYMBOL	TEST CONDITIONS	RATING	UNIT
Drain to Source Voltage	$V_{DS}$	$V_{GS} = 0$	-60	V
Gate to Source Voltage	$V_{GS}$	$V_{DS} = 0$	-20/+10	V
Drain Current (DC)	$I_{D(DC)}$		±2.0	A
Drain Current (Pulse)	$I_{D(pulse)}$	PW ≤ 10 ms Duty cycle ≤ 1 %	±4.0	A
Total Power Dissipation	$P_T$	16 cm <sup>2</sup> × 0.7 mm, ceramic substrate used	2.0	W
Channel Temperature	$T_{ch}$		150	°C
Storage Temperature	$T_{stg}$		-55 to +150	°C

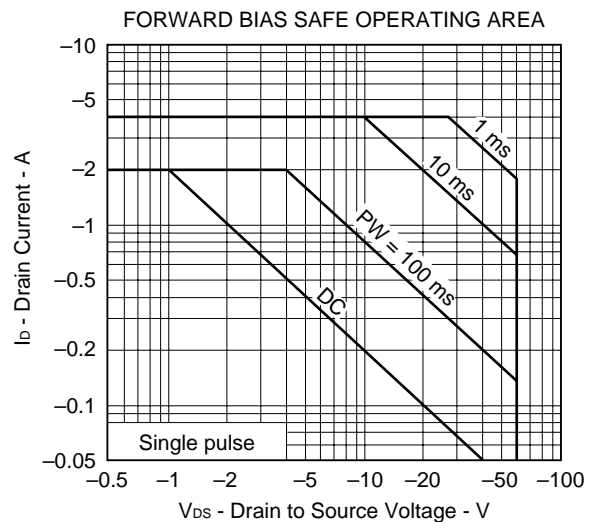
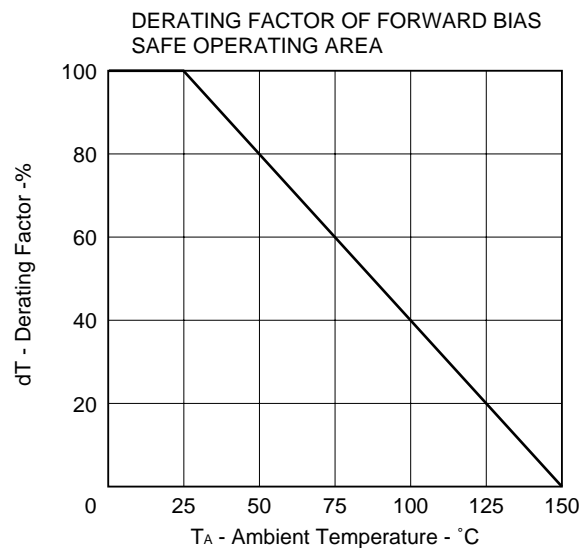
The internal diode connected between the gate and source of this product is to protect the product from static electricity. If the product is used in a circuit where the rated voltage of the product may be exceeded, connect a protection circuit.

Take adequate preventive measures against static electricity when handling this product.

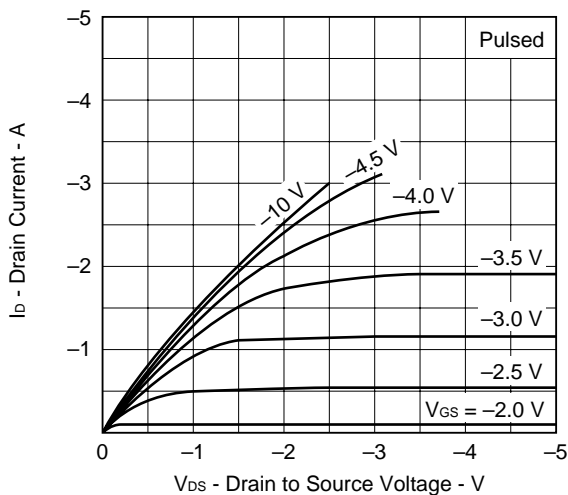
The information in this document is subject to change without notice.

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

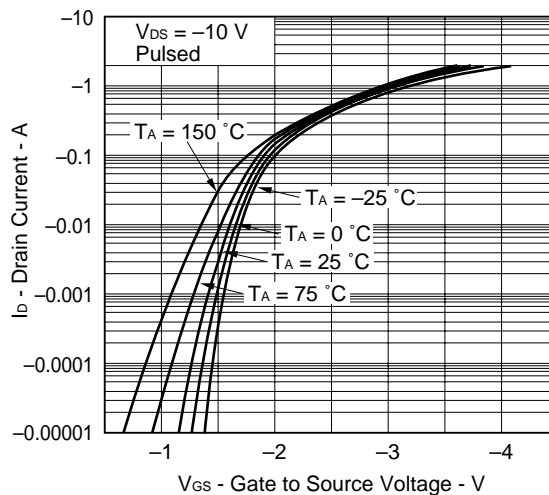
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-Off Current	$I_{DSS}$	$V_{DS} = -60\text{ V}$ , $V_{GS} = 0$			-10	$\mu\text{A}$
Gate Leakage Current	$I_{GSS}$	$V_{GS} = -16/+10\text{ V}$ , $V_{DS} = 0$			$\pm 10$	$\mu\text{A}$
Gate Cut-Off Voltage	$V_{GS(off)}$	$V_{DS} = -10\text{ V}$ , $I_D = -1\text{ mA}$	-1.0	-1.4	-2.0	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS} = -10\text{ V}$ , $I_D = -1.0\text{ A}$	1.0			S
Drain to Source On-State Resistance	$R_{DS(on)1}$	$V_{GS} = -4\text{ V}$ , $I_D = -1.0\text{ A}$		0.65	0.95	$\Omega$
Drain to Source On-State Resistance	$R_{DS(on)2}$	$V_{GS} = -10\text{ V}$ , $I_D = -1.0\text{ A}$		0.41	0.50	$\Omega$
Input Capacitance	$C_{iss}$	$V_{DS} = -10\text{ V}$ , $V_{GS} = 0$ , $f = 1.0\text{ MHz}$		270		pF
Output Capacitance	$C_{oss}$			145		pF
Reverse Transfer Capacitance	$C_{rss}$			55		pF
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -25\text{ V}$ , $I_D = -1.0\text{ A}$ $V_{GS(on)} = -10\text{ V}$ $R_G = 10\text{ }\Omega$ , $R_L = 25\text{ }\Omega$		4.3		ns
Rise Time	$t_r$			21		ns
Turn-Off Delay Time	$t_{d(off)}$			115		ns
Fall Time	$t_f$			75		ns
Gate Input Charge	$Q_G$	$V_{DS} = -48\text{ V}$ , $V_{GS} = -10\text{ V}$ , $I_D = -2.0\text{ A}$ , $I_G = -2\text{ mA}$		11.6		nC
Gate to Source Charge	$Q_{GS}$			1.0		nC
Gate to Drain Charge	$Q_{GD}$			3.8		nC
Internal Diode Reverse Recovery Time	$t_{rr}$	$I_F = 2.0\text{ A}$ , $di/dt = 50\text{ A}/\mu\text{s}$		82		ns
Internal Diode Reverse Recovery Charge	$Q_{rr}$			94		nC

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

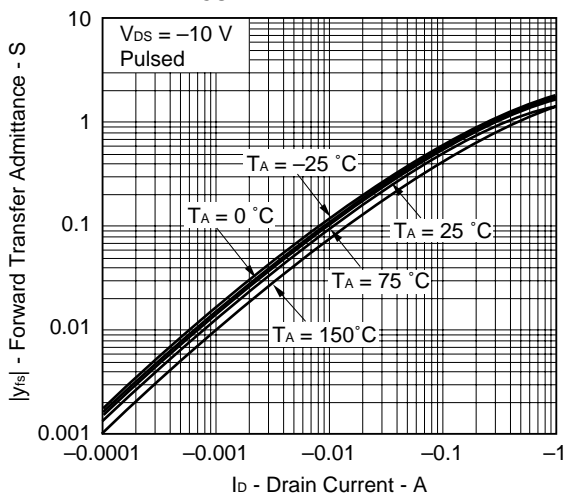
DRAIN CURRENT vs.  
DRAIN TO SOURCE VOLTAGE



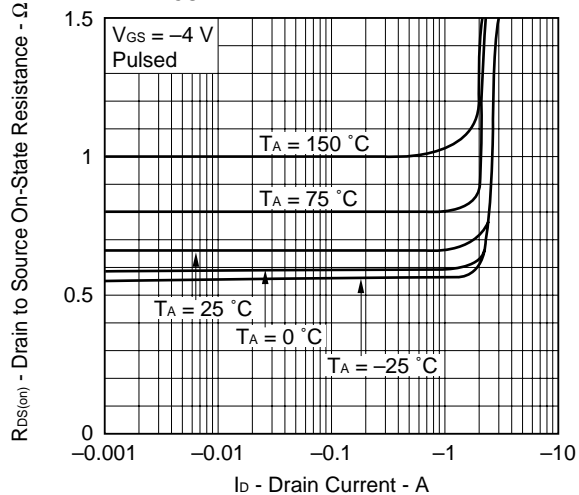
TRANSFER CHARACTERISTICS



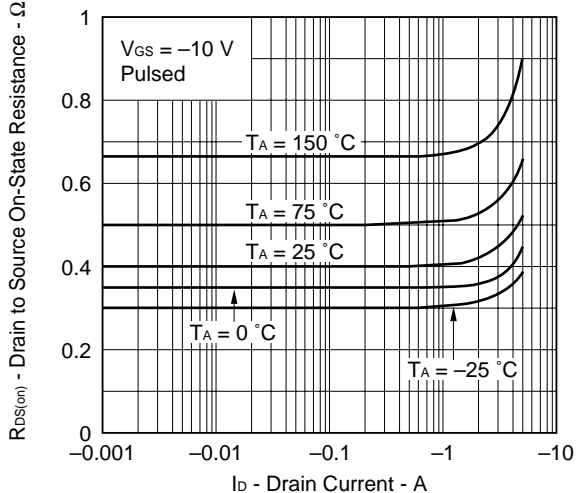
FORWARD TRANSFER ADMITTANCE vs.  
DRAIN CURRENT



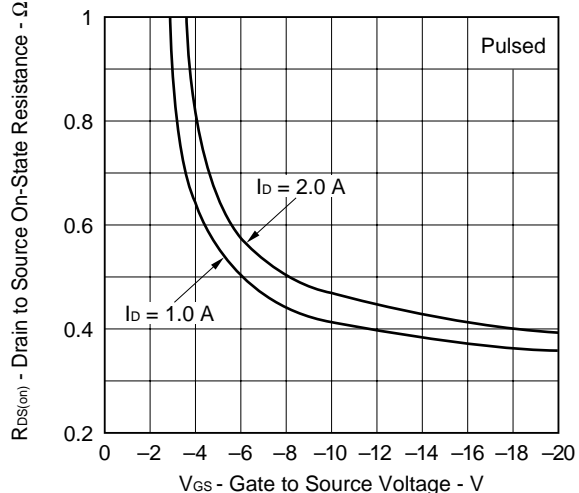
DRAIN TO SOURCE ON-STATE RESISTANCE vs.  
DRAIN CURRENT



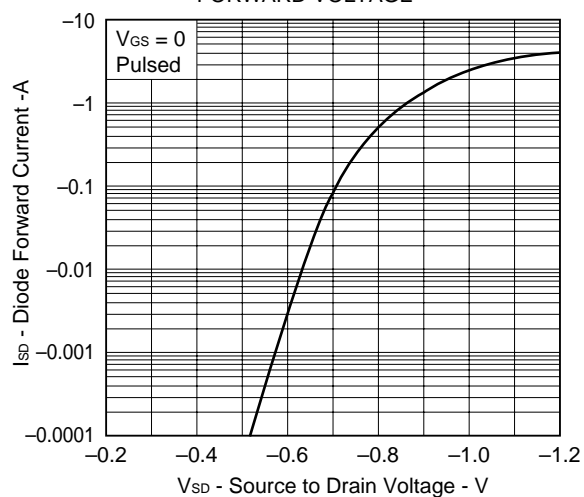
DRAIN TO SOURCE ON-STATE RESISTANCE vs.  
DRAIN CURRENT



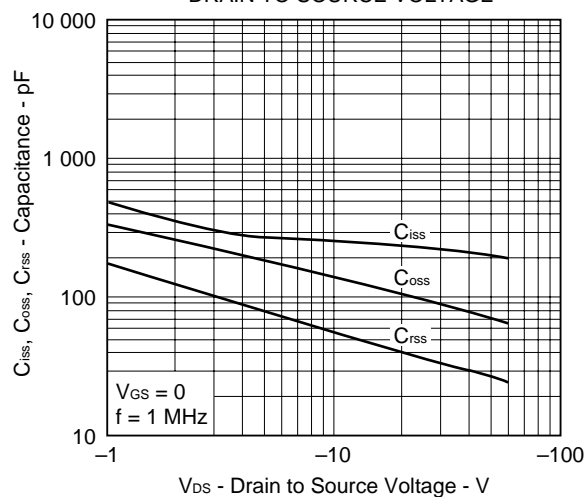
DRAIN TO SOURCE ON-STATE RESISTANCE vs.  
GATE TO SOURCE VOLTAGE



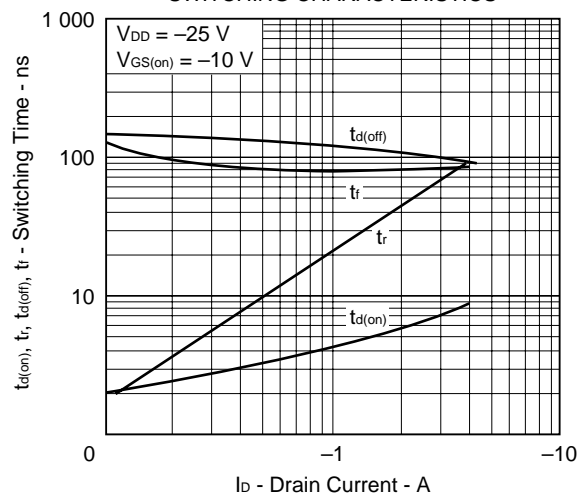
SOURCE TO DRAIN DIODE  
FORWARD VOLTAGE



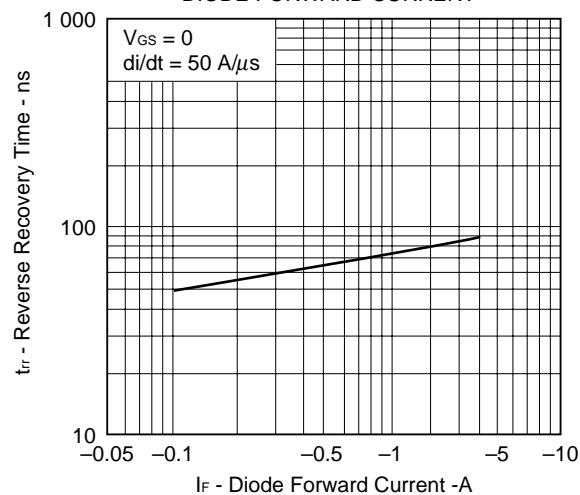
CAPACITANCE vs.  
DRAIN TO SOURCE VOLTAGE



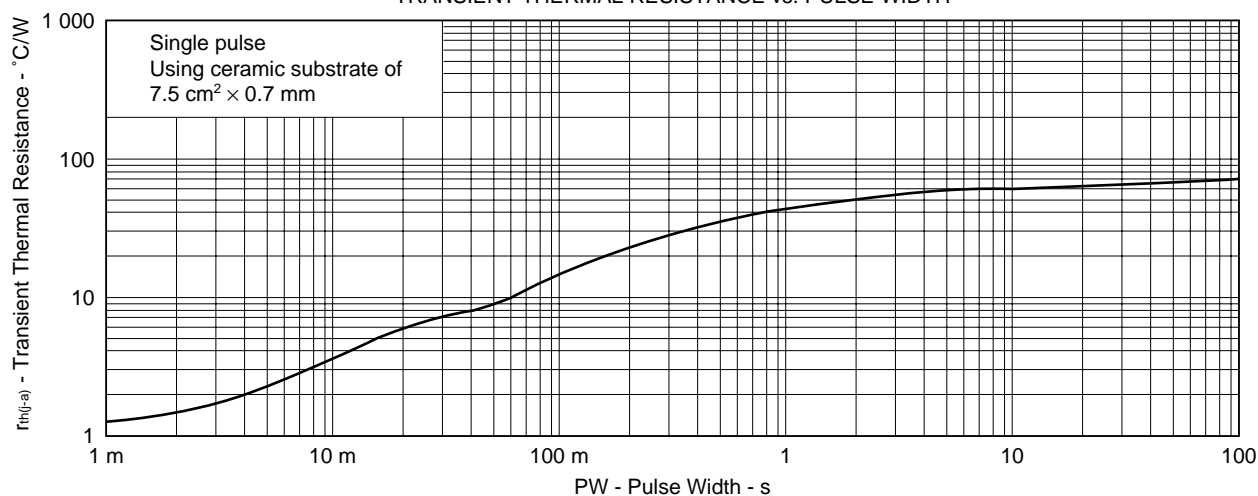
SWITCHING CHARACTERISTICS



REVERSE RECOVERY TIME vs.  
DIODE FORWARD CURRENT



TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



## 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	C10535E
Guide to quality assurance for semiconductor devices	MEI-1202
Semiconductor selection guide	X10679E

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Anti-radioactive design is not implemented in this product.