

P-CHANNEL MOS FET FOR HIGH-SPEED SWITCH

The 2SJ357 is a P-channel vertical MOS FET that can be used as a switching element. The 2SJ357 can be directly driven by an IC operating at 5 V.

The 2SJ357 features a low on-resistance and excellent switching characteristics, and is suitable for applications such as actuator driver and DC/DC converter.

FEATURES

- New-type compact package  
Has advantages of packages for small signals and for power transistors, and compensates those disadvantages
- Can be directly driven by an IC operating at 5 V.
- Low on-resistance  
 $R_{DS(ON)} = 0.35 \Omega \text{ MAX. @ } V_{GS} = -4 \text{ V, } I_D = -1.5 \text{ A}$   
 $R_{DS(ON)} = 0.20 \Omega \text{ MAX. @ } V_{GS} = -10 \text{ V, } I_D = -1.5 \text{ A}$

QUALITY GRADE

Standard

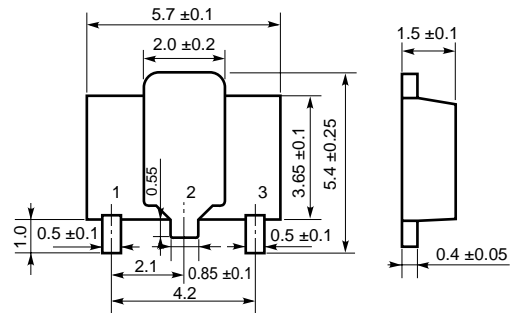
Please refer to "Quality Grades on NEC Semiconductor Devices" (Document No. C11531E) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = +25 °C)

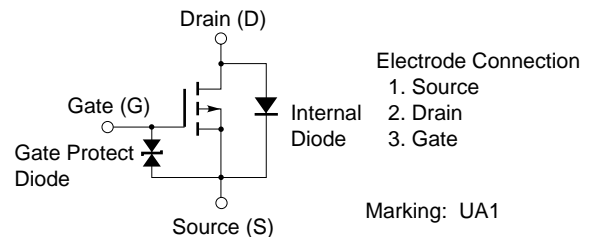
Parameter	Symbol	Conditions	Ratings	Unit
Drain-Source Voltage	V <sub>DSS</sub>	V <sub>GS</sub> = 0	-30	V
Gate-Source Voltage	V <sub>GSS</sub>	V <sub>DS</sub> = 0	-20/+10	V
Drain Current (DC)	I <sub>D(DC)</sub>		-/+3.0	A
Drain Current (Pulse)	I <sub>D(pulse)</sub>	PW ≤ 10 ms Duty Cycle ≤ 1 %	-/+6.0	A
Total Power Loss	P <sub>T</sub>	Mounted on ceramic board of 7.5 cm <sup>2</sup> × 0.7 mm	2.0	W
Channel Temperature	T <sub>ch</sub>		150	°C
Storage Temperature	T <sub>stg</sub>		-55 to +150	°C

The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device is actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

Package Drawings (unit: mm)



Equivalent Circuit

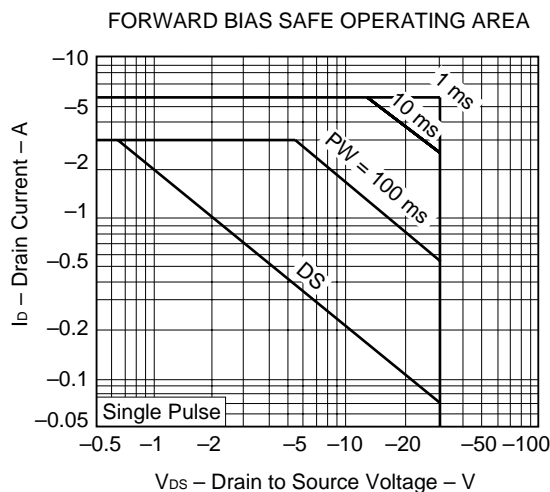
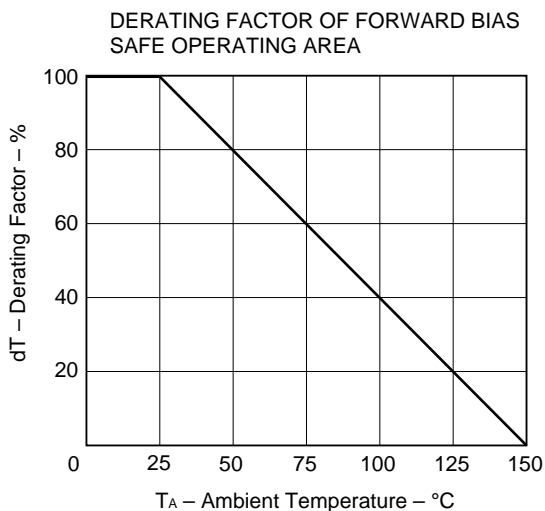


The information in this document is subject to change without notice.

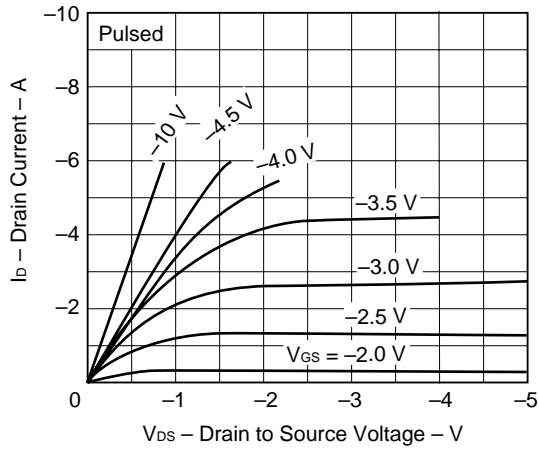
**ELECTRICAL SPECIFICATIONS (T<sub>A</sub> = +25 °C)**

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Drain Shut-down Current	I <sub>DSS</sub>	V <sub>DS</sub> = -30 V, V <sub>GS</sub> = 0			-10	μA
Gate Leak Current	I <sub>GSS</sub>	V <sub>GS</sub> = -16/+10 V, V <sub>DS</sub> = 0			-/+10	μA
Gate Cutoff Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = -10 V, I <sub>D</sub> = -1 mA	-1.0	-1.5	-2.0	V
Forward Transfer Admittance	y <sub>fs</sub>	V <sub>DS</sub> = -10 V, I <sub>D</sub> = -1.0 A	1.8			S
Drain-Source On-Resistance	R <sub>DS(on)1</sub>	V <sub>GS</sub> = -4 V, I <sub>D</sub> = -1.5 A		0.23	0.35	Ω
Drain-Source On-Resistance	R <sub>DS(on)2</sub>	V <sub>GS</sub> = -10 V, I <sub>D</sub> = -1.5 A		0.12	0.20	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -10 V, V <sub>GS</sub> = 0, f = 1.0 MHz		645		pF
Output Capacitance	C <sub>oss</sub>			500		pF
Feedback Capacitance	C <sub>rss</sub>			275		pF
On-Time Delay	t <sub>d(on)</sub>	V <sub>DD</sub> = -25 V, I <sub>D</sub> = -1.5 A V <sub>GS(on)</sub> = -10 V R <sub>G</sub> = 10 Ω, R <sub>L</sub> = 17 Ω		8		ns
Rise Time	t <sub>r</sub>			42		ns
Off-Time Delay	t <sub>d(off)</sub>			145		ns
Fall Time	t <sub>f</sub>			170		ns
Gate Input Charge	Q <sub>G</sub>	V <sub>DS</sub> = -24 V, V <sub>GS</sub> = -10 V, I <sub>D</sub> = -3.1 A, I <sub>G</sub> = -2 mA		25.1		nC
Gate-Source Charge	Q <sub>GS</sub>			2.0		nC
Gate-Drain Charge	Q <sub>GD</sub>			9.8		nC
Internal Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 3.0 A di/dt = 50 A/μs		112		ns
Internal Diode Reverse Recovery Charge	Q <sub>rr</sub>			106		nC

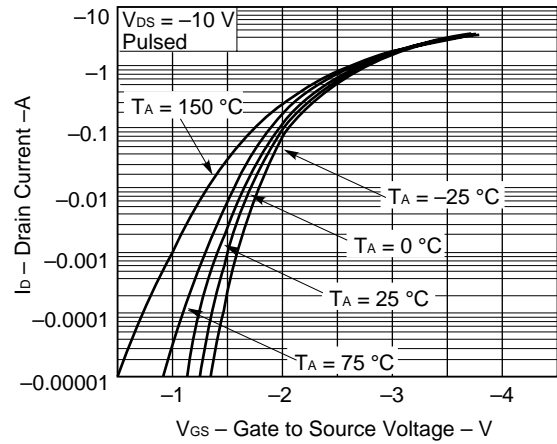
**CHARACTERISTICS CURVES (T<sub>A</sub> = +25 °C)**



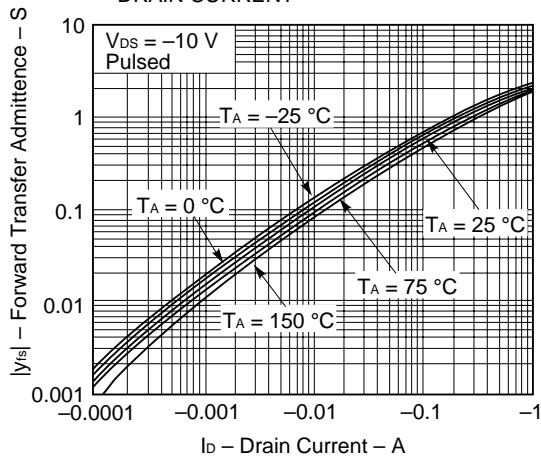
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



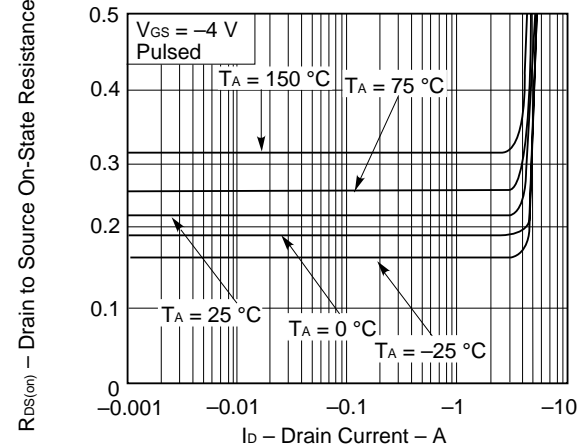
TRANSFER CHARACTERISTICS



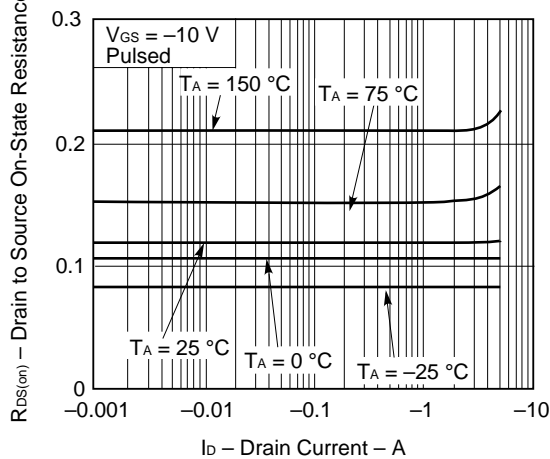
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



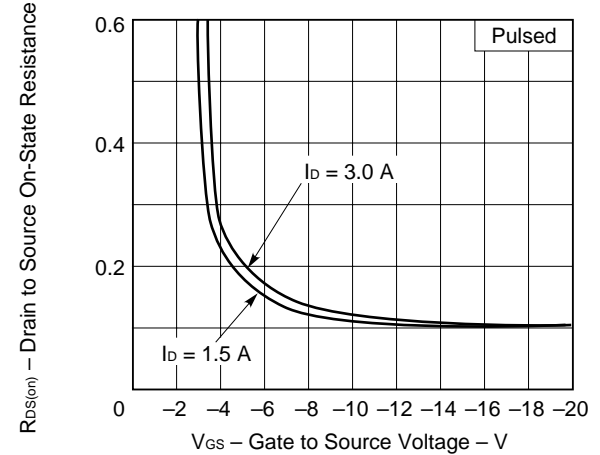
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



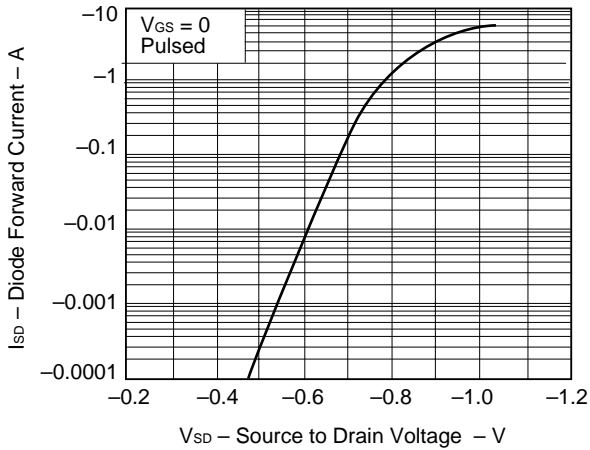
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



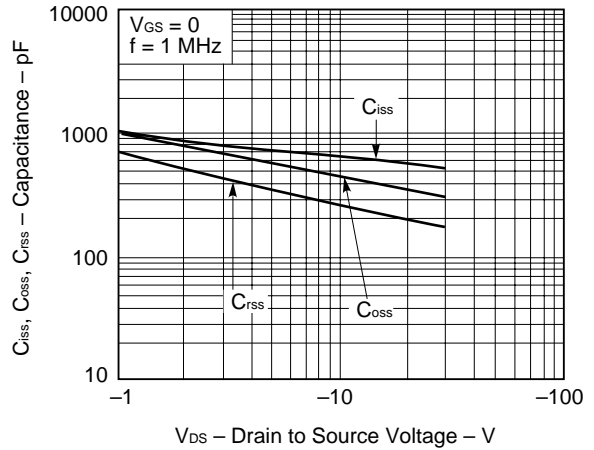
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



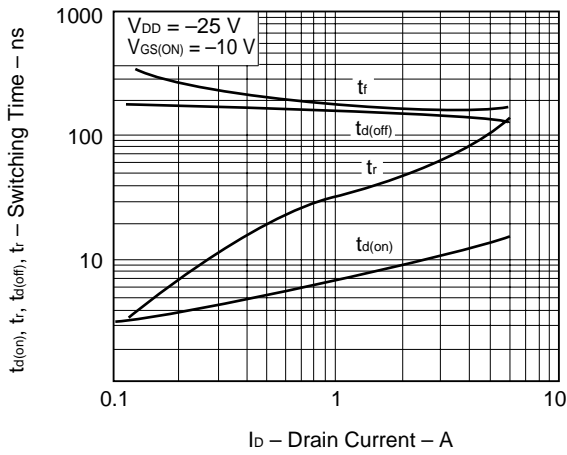
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



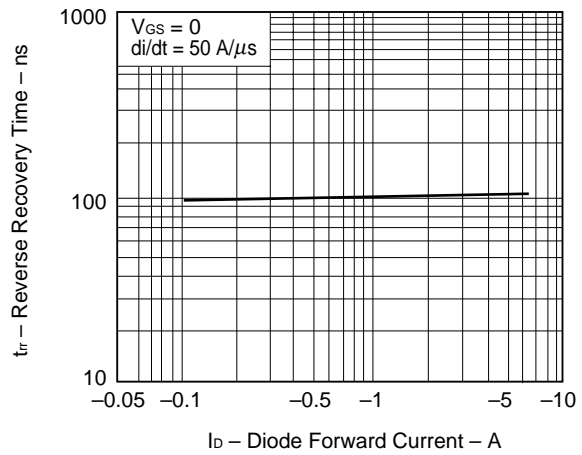
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



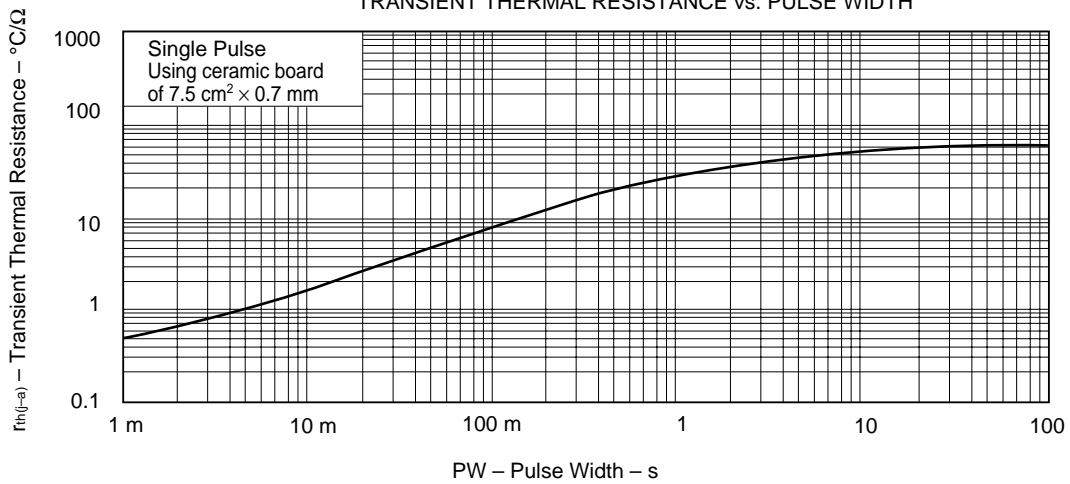
SWITCHING CHARACTERISTICS



REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT



TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



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Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots

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The quality grade of NEC devices is "Standard" unless otherwise specified in NEC's Data Sheets or Data Books. If customers intend to use NEC devices for applications other than those specified for Standard quality grade, they should contact an NEC sales representative in advance.

Anti-radioactive design is not implemented in this product.



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