

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

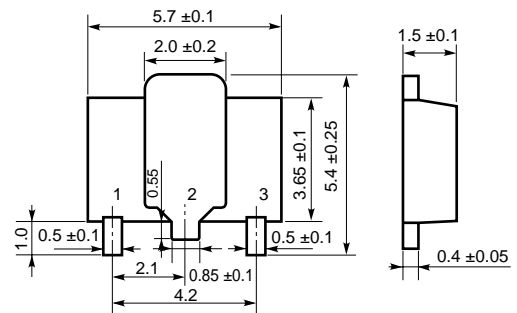
Please refer to "Quality Grades on NEC Semiconductor Devices" (Document No. C11531E) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

ABSOLUTE MAXIMUM RATINGS ($T_A = +25 \text{ }^\circ\text{C}$)

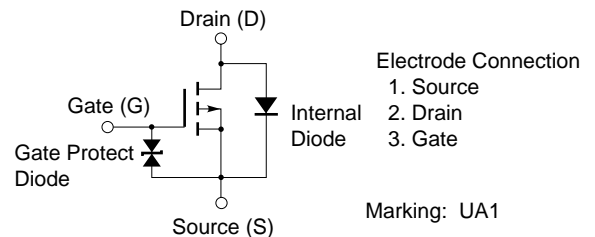
Parameter	Symbol	Conditions	Ratings	Unit
Drain-Source Voltage	V_{DSS}	$V_{GS} = 0$	-30	V
Gate-Source Voltage	V_{GSS}	$V_{DS} = 0$	-20/+10	V
Drain Current (DC)	$I_{D(DC)}$		-/+3.0	A
Drain Current (Pulse)	$I_{D(pulse)}$	PW \leq 10 ms Duty Cycle \leq 1 %	-/+6.0	A
Total Power Loss	P_T	Mounted on ceramic board of $7.5 \text{ cm}^2 \times 0.7 \text{ mm}$	2.0	W
Channel Temperature	T_{ch}		150	$^\circ\text{C}$
Storage Temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

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

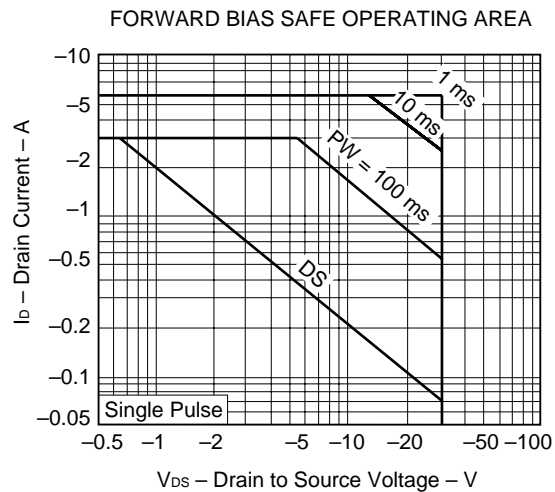
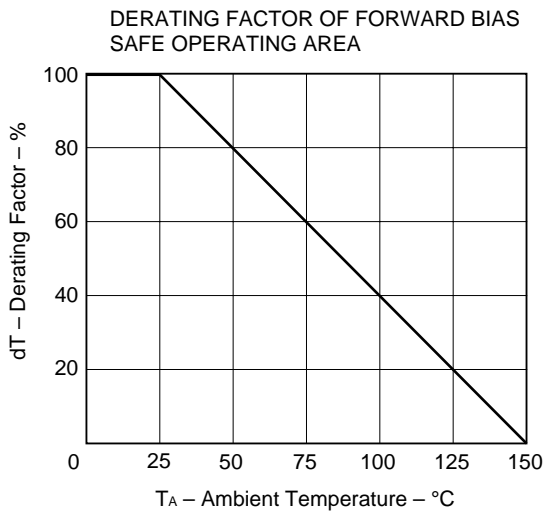


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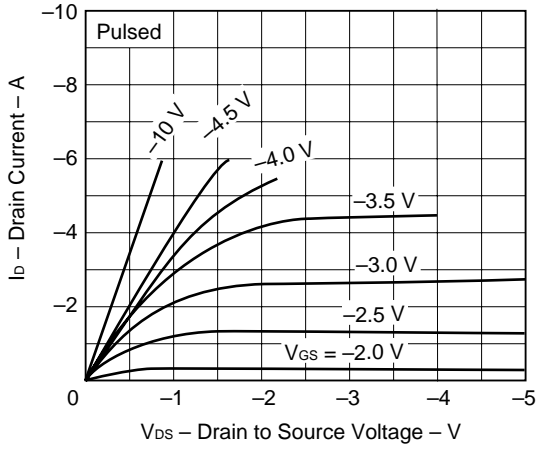
ELECTRICAL SPECIFICATIONS (T_A = +25 °C)

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

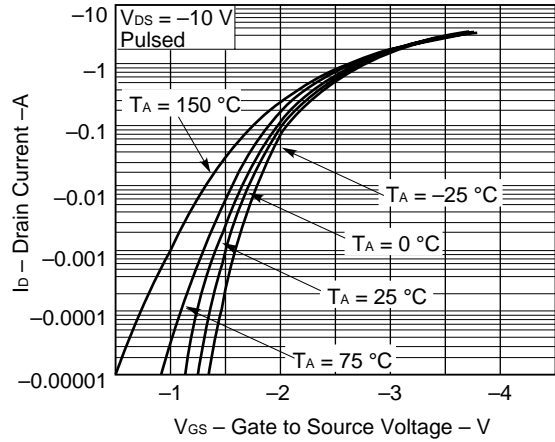
CHARACTERISTICS CURVES (T_A = +25 °C)



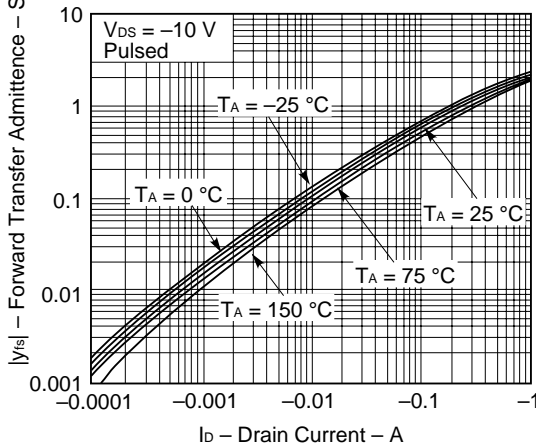
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



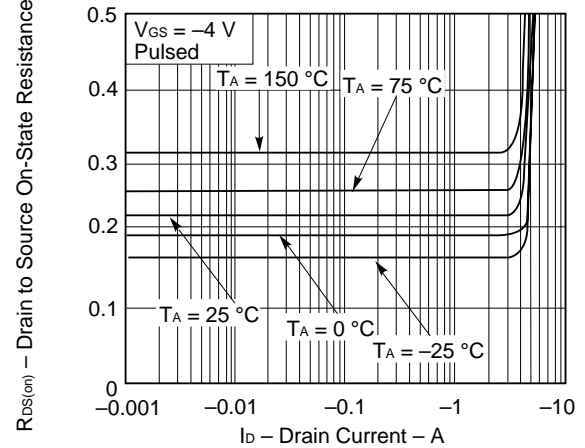
TRANSFER CHARACTERISTICS



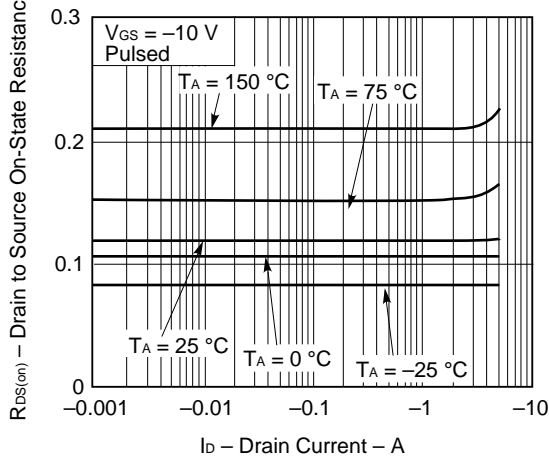
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



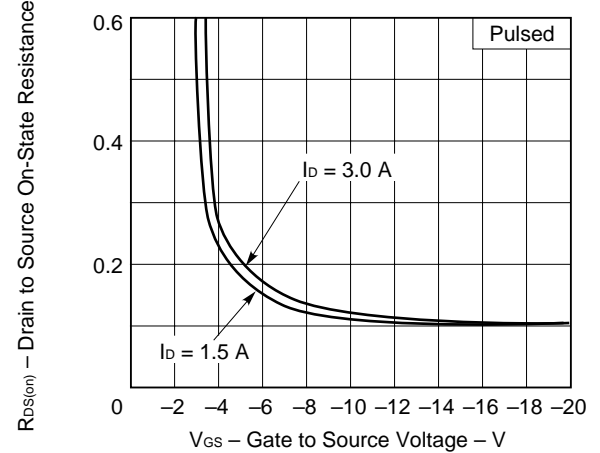
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



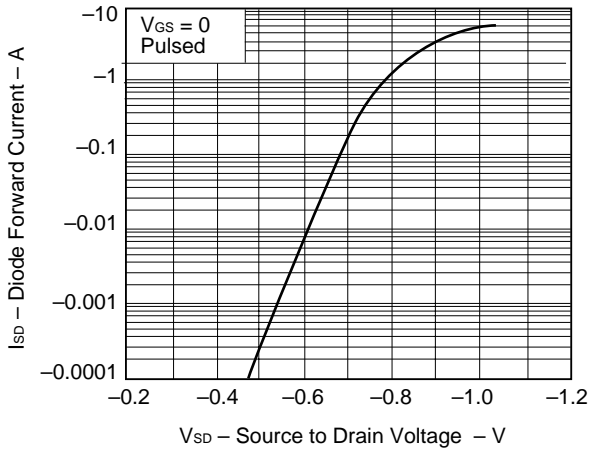
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



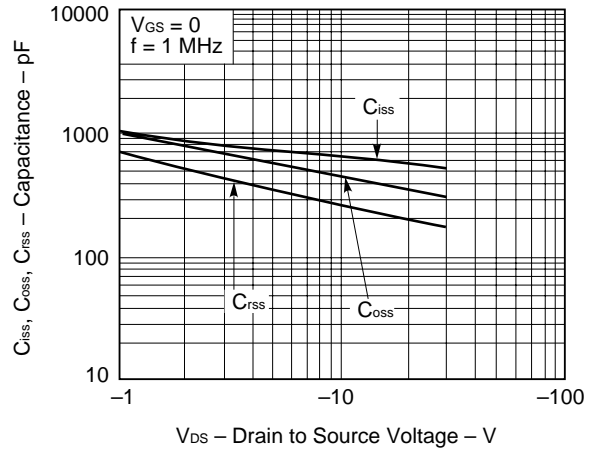
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



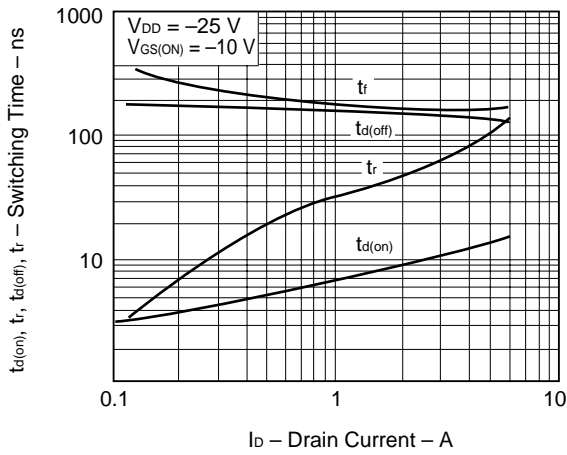
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



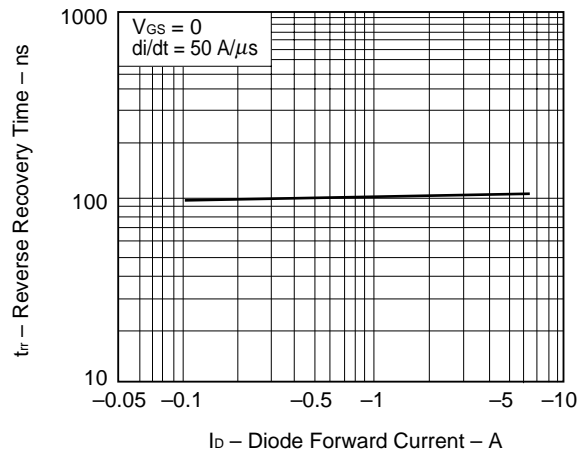
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



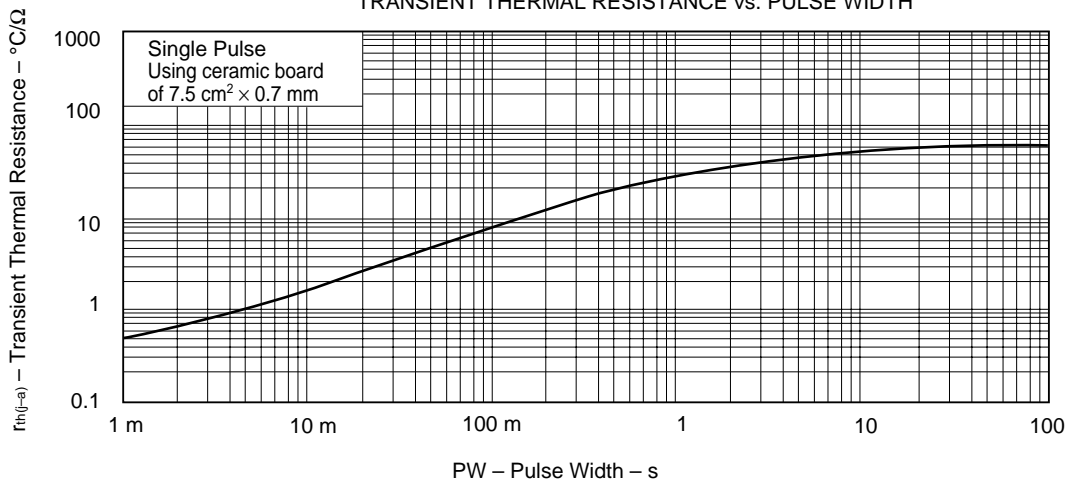
SWITCHING CHARACTERISTICS



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

Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

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Anti-radioactive design is not implemented in this product.