NEC

MOS FIELD EFFECT TRANSISTOR

2SJ411

P-CHANNEL SIGNAL MOS FET FOR SWITCHING

The 2SJ411 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 power control switches and DC/DC converters.

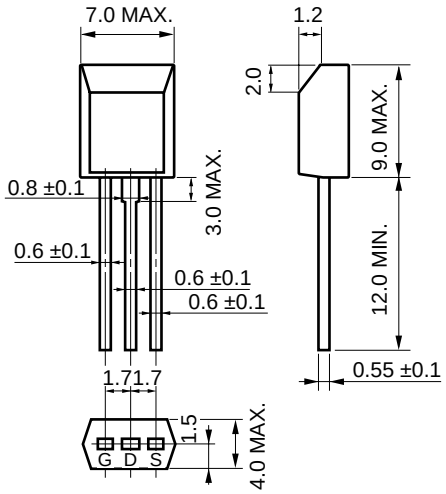
FEATURES

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

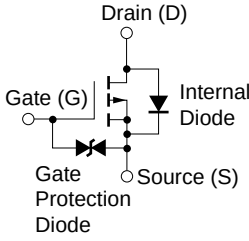
  $R_{DS(on)}$ = 0.24 Ω MAX. @V_{GS} = –4 V, I_D = –2.5 A

  $R_{DS(on)}$ = 0.11 Ω MAX. @V_{GS} = –10 V, I_D = –2.5 A

PACKAGE DIMENSIONS (in mm)



EQUIVALENT CIRCUIT



PIN CONNECTIONS
G: Gate
D: Drain
S: Source

ABSOLUTE MAXIMUM RATINGS (T_A = 25 ˚C)

PARAMETER	SYMBOL	TEST CONDITIONS	RATING	UNIT
Drain to Source Voltage	V_{DSS}	V_{GS} = 0	–30	V
Gate to Source Voltage	V_{GSS}	V_{DS} = 0	–20/+10	V
Drain Current (DC)	$I_{D(DC)}$		±5.0	A
Drain Current (Pulse)	$I_{D(pulse)}$	PW ≤ 10 μs Duty cycle ≤ 1 %	±20.0	A
Total Power Dissipation	P_{T1}	T_A = 25 ˚C	1.0	W
Total Power Dissipation	P_{T2}	T_C = 25 ˚C	6.0	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.

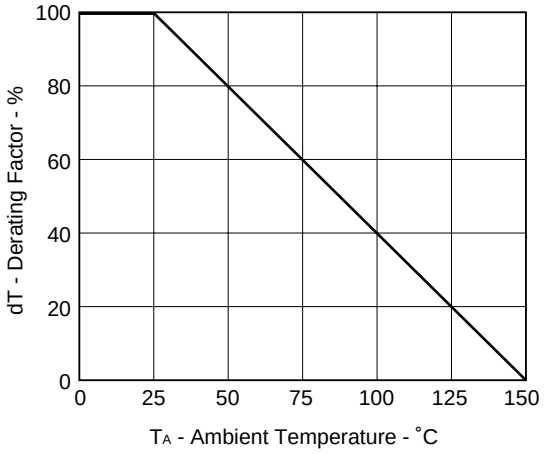
Document No. D11219EJ1V0DS00 (1st edition)
Date Published June 1996 P
Printed in Japan

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

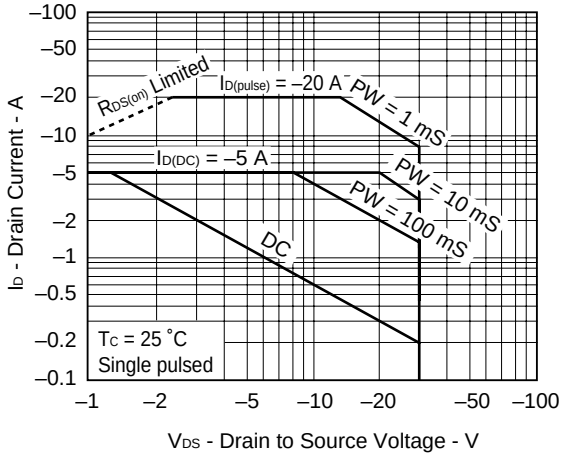
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-Off Current	I_{DSS}	V_{DS} = –30 V, V_{GS} = 0			–10	μA
Gate Leakage Current	I_{GSS}	V_{GS} = –16/+10 V, V_{DS} = 0			±10	μA
Gate Cut-Off Voltage	$V_{GS(off)}$	V_{DS} = –10 V, I_D = –1 mA	–1.0	–1.4	–2.0	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = –10 V, I_D = –2.5 A	3.0			S
Drain to Source On-State Resistance	$R_{DS(on)1}$	V_{GS} = –4 V, I_D = –2.5 A		0.175	0.24	Ω
Drain to Source On-State Resistance	$R_{DS(on)2}$	V_{GS} = –10 V, I_D = –2.5 A		0.096	0.11	Ω
Input Capacitance	C_{iss}	V_{DS} = –10 V, V_{GS} = 0		790		pF
Output Capacitance	C_{oss}	f = 1.0 MHz		580		pF
Reverse Transfer Capacitance	C_{rss}			280		pF
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = –15 V, I_D = –2.5 A		10		ns
Rise Time	t_r	$V_{GS(on)}$ = –10 V		110		ns
Turn-Off Delay Time	$t_{d(off)}$	R_G = 10 Ω, R_L = 6 Ω		195		ns
Fall Time	t_f			185		ns
Gate Input Charge	Q_G	V_{DS} = –24 V		29.8		nC
Gate to Source Charge	Q_{GS}	V_{GS} = –10 V		2.7		nC
Gate to Drain Charge	Q_{GD}	I_D = –5.0 A, I_G = –2 mA		11.5		nC
Internal Diode Forward Voltage	$V_{F(S-D)}$	I_F = 5.0 A, V_{GS} = 0		1.0		V
Internal Diode Reverse Recovery Time	t_{rr}	I_F = 5.0 A, V_{GS} = 0		140		ns
Internal Diode Reverse Recovery Charge	Q_{rr}	di/dt = 50 A/μs		160		nC

TYPICAL CHARACTERISTICS (T_A = 25 °C)

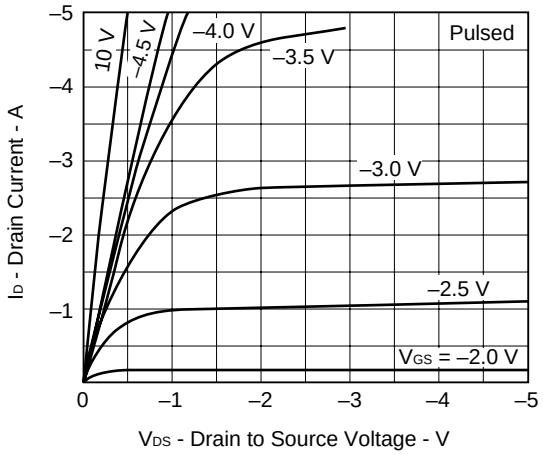
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



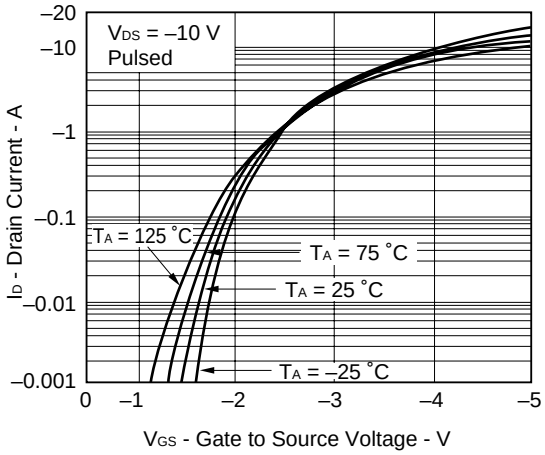
FORWARD BIAS SAFE OPERATING AREA



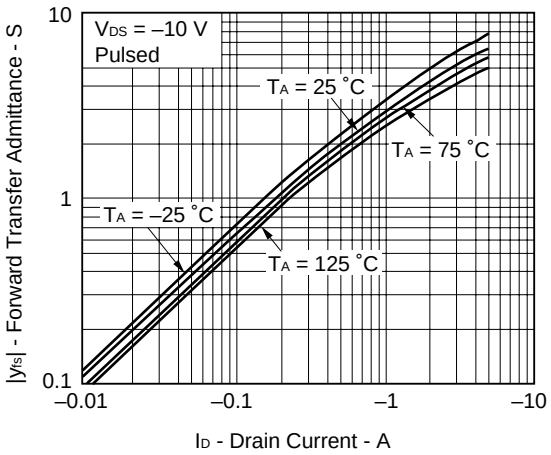
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



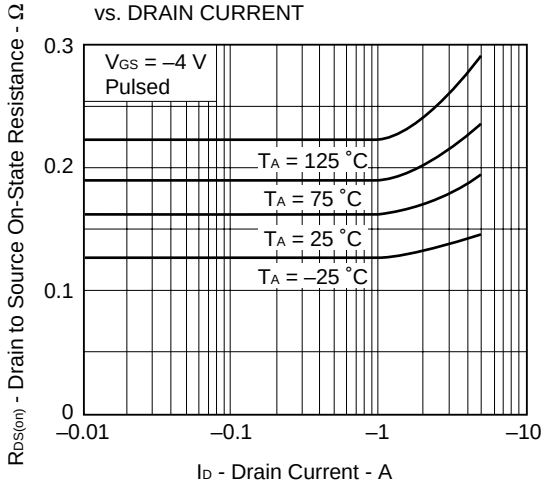
TRANSFER CHARACTERISTICS



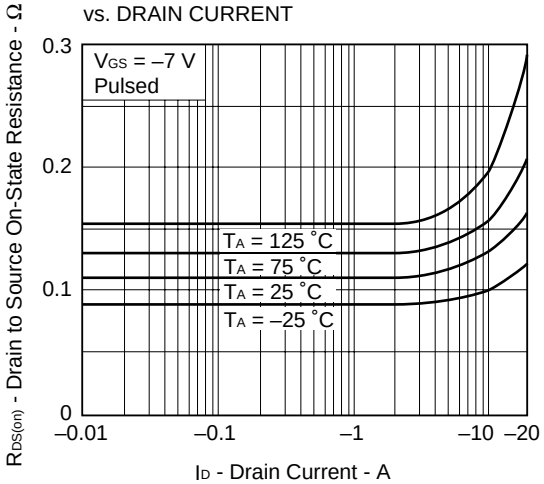
FORWARD TRANSFER ADMITTANCE
vs. DRAIN CURRENT



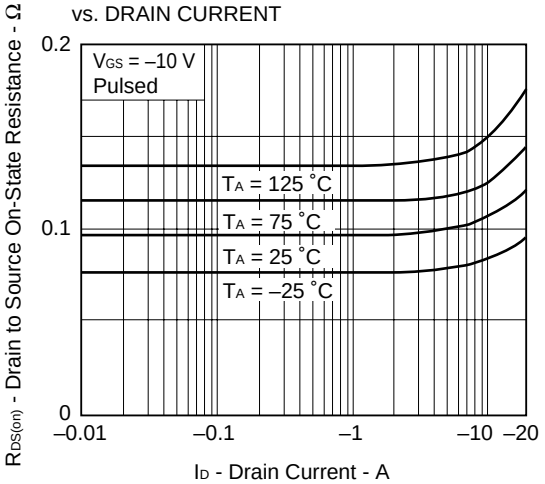
DRAIN TO SOURCE ON-STATE RESISTANCE
vs. DRAIN CURRENT



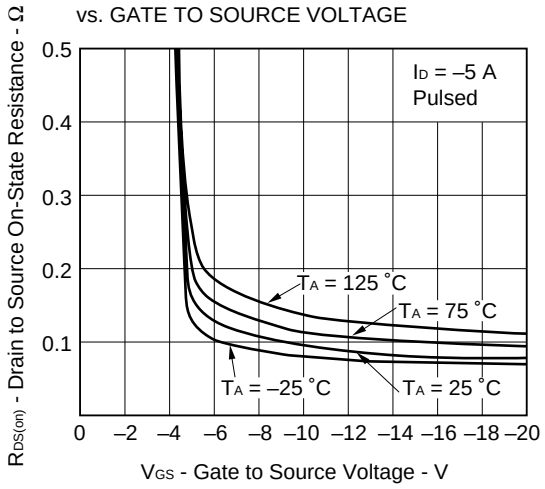
DRAIN TO SOURCE ON-STATE RESISTANCE
vs. DRAIN CURRENT



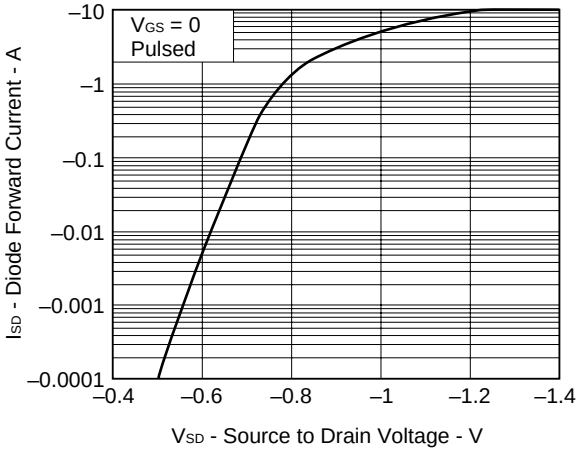
DRAIN TO SOURCE ON-STATE RESISTANCE
vs. DRAIN CURRENT



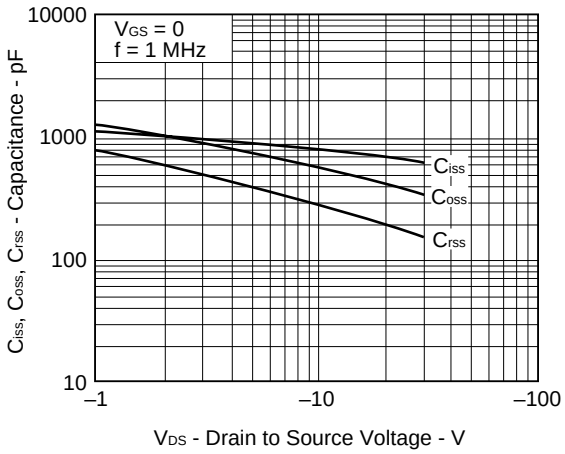
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



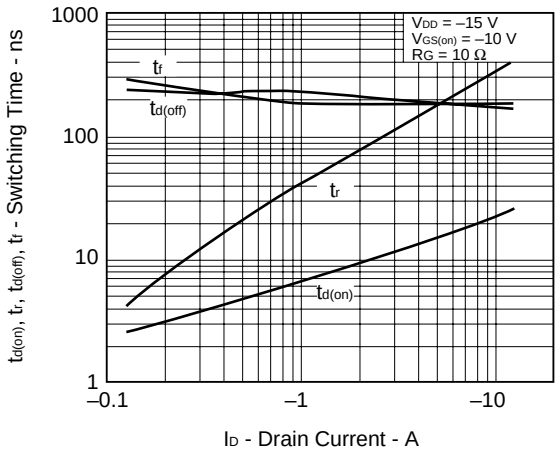
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



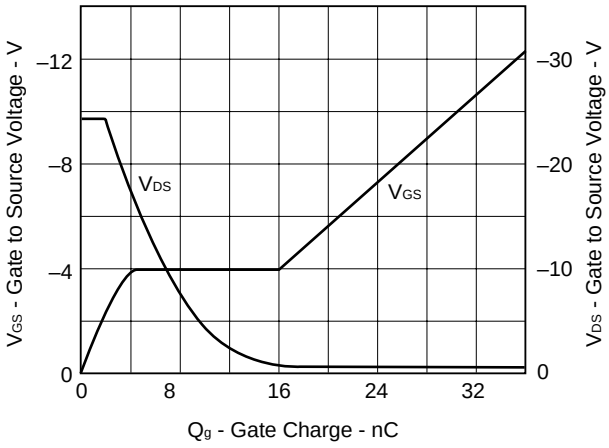
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE

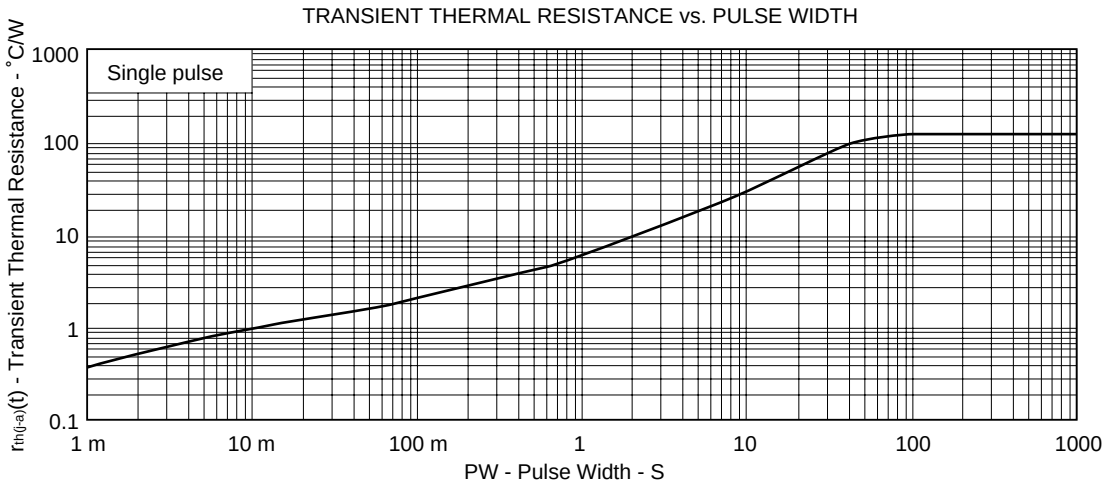


SWITCHING CHARACTERISTICS



DYNAMIC INPUT/OUTPUT CHARACTERISTICS





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

[MEMO]