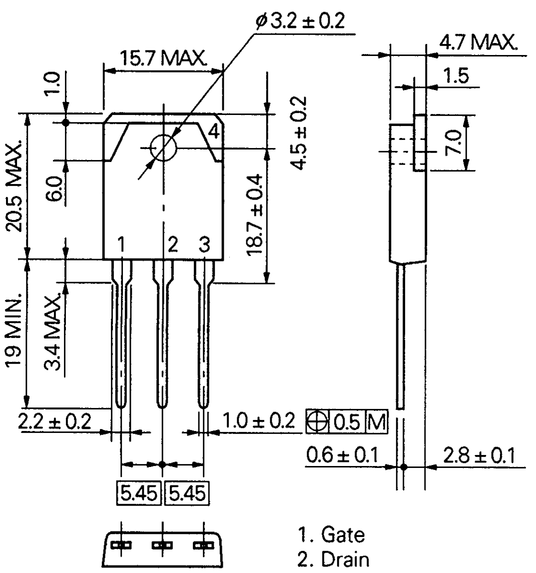
DATA SHEET

NEC

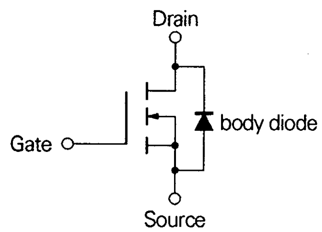
N-CHANNEL MOS FIELD EFFECT POWER TRANSISTOR
2SK1271

SWITCHING
N-CHANNEL POWER MOS FET
INDUSTRIAL USE

PACKAGE DIMENSIONS
(in millimeters)



1. Gate
2. Drain
3. Source
4. Fin (Drain)



DESCRIPTION
The 2SK1271 is N-channel MOS Field Effect Transistor designed for high voltage switching applications.

FEATURES
- High Voltage Rating V_{DSS} = 1 400 V
- Low On-state Resistance
  $R_{DS(on)}$ = 4.0 Ω MAX. (V_{GS} = 10 V, I_D = 3 A)
- Low C_{iss} C_{iss} = 1 800 pF TYP.

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

Maximum Temperatures			
Storage Temperature		–55 to +150	°C
Channel Temperature		150 MAX.	°C
Maximum Power Dissipation			
Total Power Dissipation (T_c = 25 °C)		240	W
Maximum Voltages and Currents (T_a = 25 °C)			
V_{DSS}	Drain to Source Voltage	1 400	V
V_{GSS}	Gate to Source Voltage	±20	V
$I_{D(DC)}$	Drain Current (DC)	± 5	A
$I_{D(pulse)}$*	Drain Current (pulse)	±10	A

* PW ≦ 10 μs, Duty Cycle ≦ 1 %

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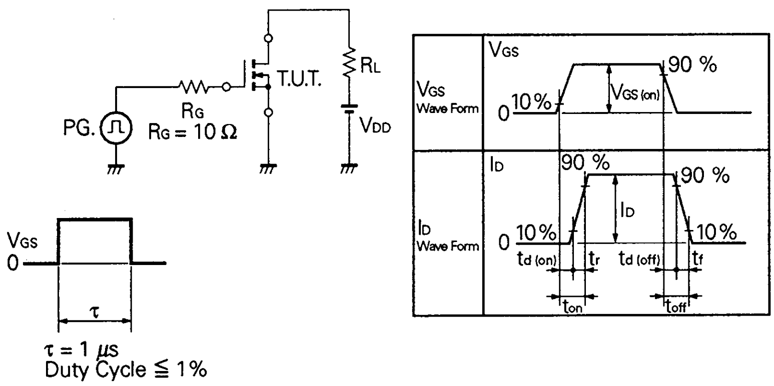
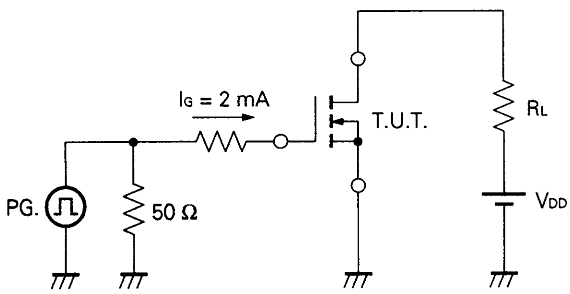
ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source On-state Resistance	$R_{DS(on)}$		3.5	4.0	Ω	V_{GS} = 10 V, I_D = 3 A
Gate to Source Cutoff Voltage	$V_{GS(off)}$	1.5		3.5	V	V_{DS} = 10 V, I_D = 1 mA
Forward Transfer Admittance	$\lvert y_{fs} \rvert$	1.5			S	V_{DS} = 20 V, I_D = 3 A
Drain Leakage Current	I_{DSS}			100	μA	V_{DS} = 1 120 V, V_{GS} = 0
Gate to Source Leakage Current	I_{GSS}			±100	μA	V_{GS} = ±20 V, V_{DS} = 0
Input Capacitance	C_{iss}		1 800		pF	V_{DS} = 10 V V_{GS} = 0 f = 1 MHz
Output Capacitance	C_{oss}		500		pF	
Reverse Transfer Capacitance	C_{rss}		360		pF	
Turn-On Delay Time	$t_{d(on)}$		25		ns	V_{GS} = 10 V V_{DD} = 150 V I_D = 3 A, R_G = 10 Ω R_L = 50 Ω
Rise Time	t_r		30		ns	
Turn-Off Delay Time	$t_{d(off)}$		220		ns	
Fall Time	t_f		40		ns	
Total Gate Charge	Q_G		125		nC	V_{GS} = 10 V I_D = 5 A V_{DD} = 450 V
Gate to Source Charge	Q_{GS}		15		nC	
Gate to Drain Charge	Q_{GD}		70		nC	
Diode Forward Voltage	$V_{F(S-D)}$		0.9		V	I_F = 5 A, V_{GS} = 0
Reverse Recovery Time	t_{rr}		1 400		ns	I_F = 5 A di/dt = 50 A/μs
Reverse Recovery Charge	Q_{rr}		30		μC	

Test Circuit 1: Switching Time

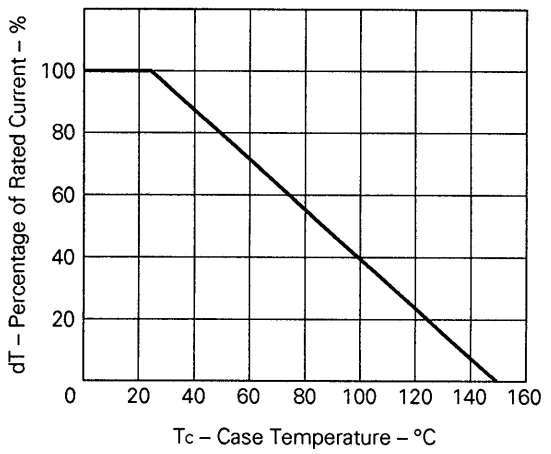


Test Circuit 2: Gate Charge

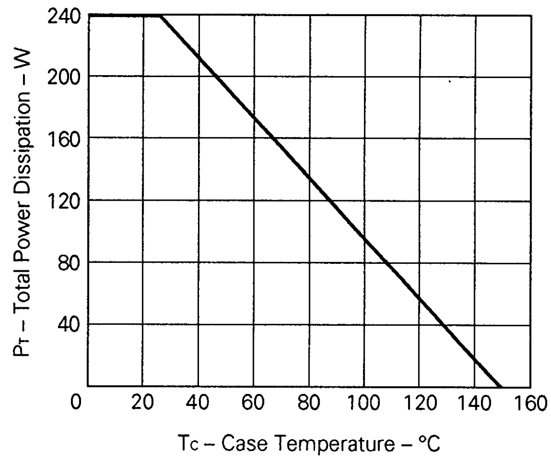


TYPICAL CHARACTERISTICS (T_a = 25 °C)

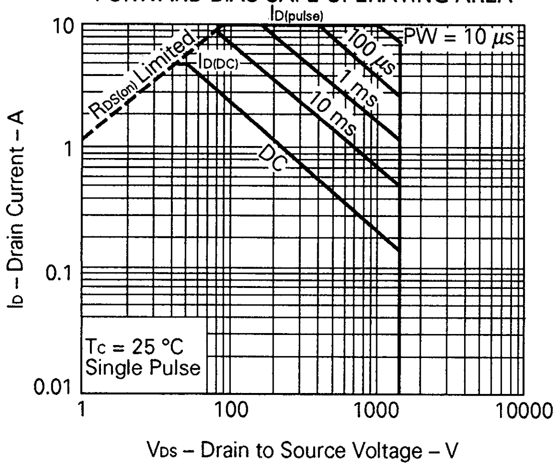
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



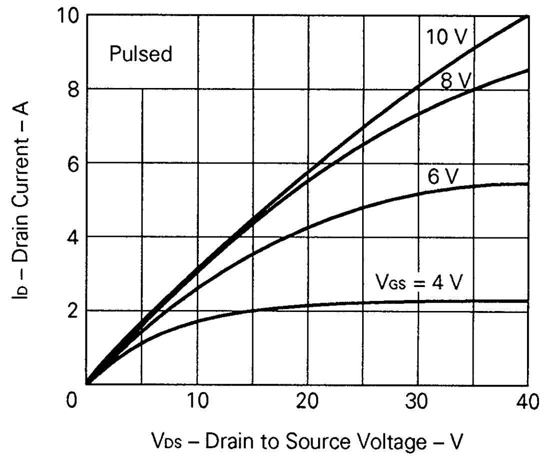
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



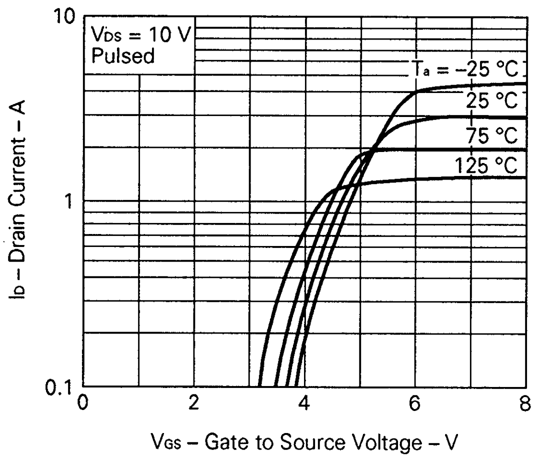
FORWARD BIAS SAFE OPERATING AREA



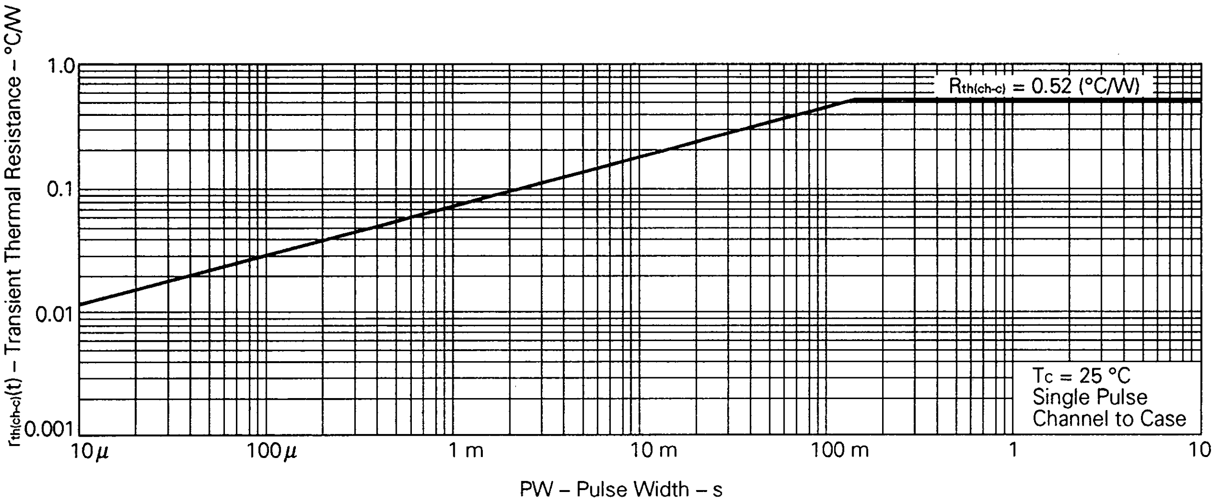
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



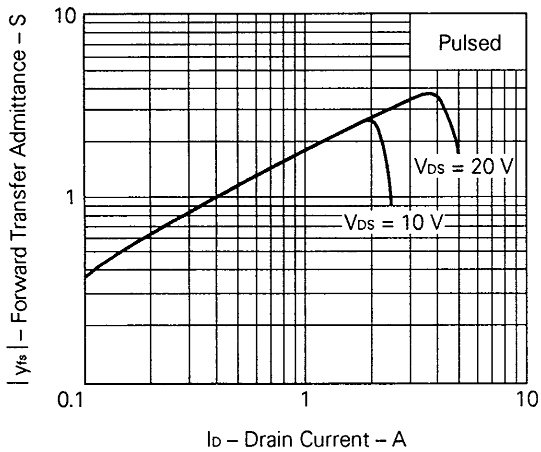
TRANSFER CHARACTERISTICS



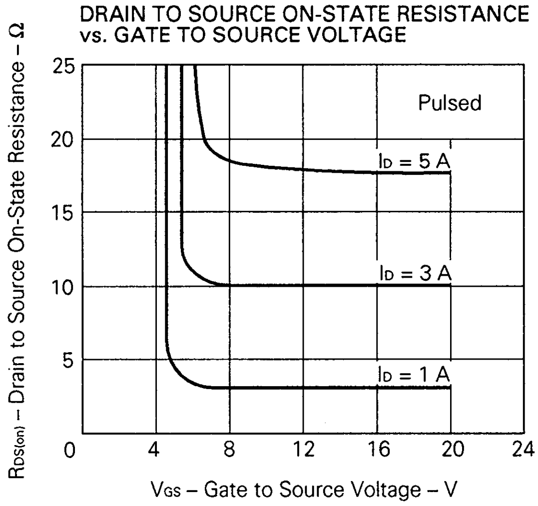
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



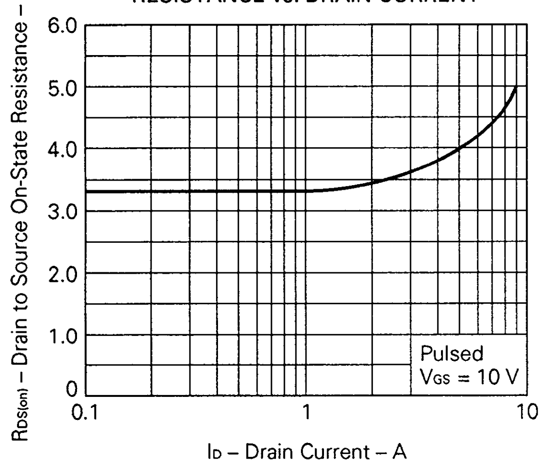
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



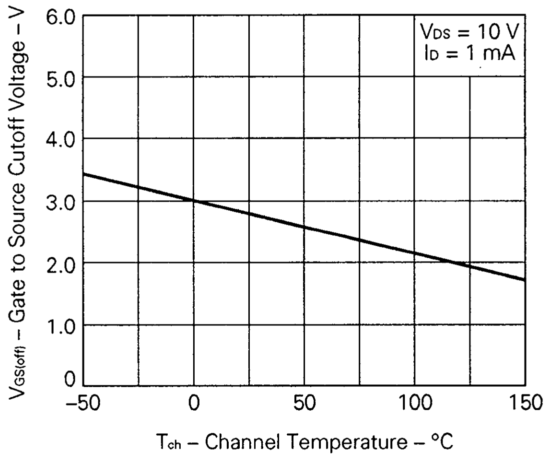
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



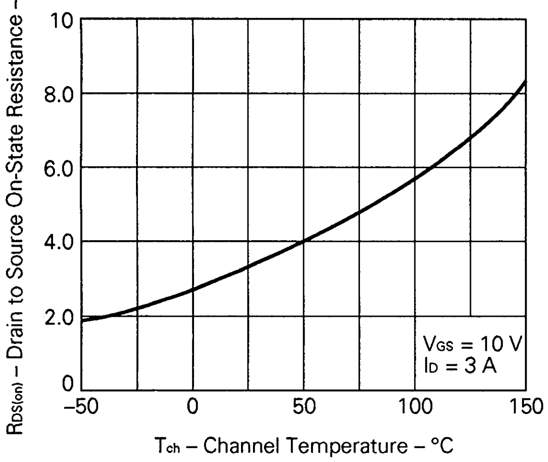
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



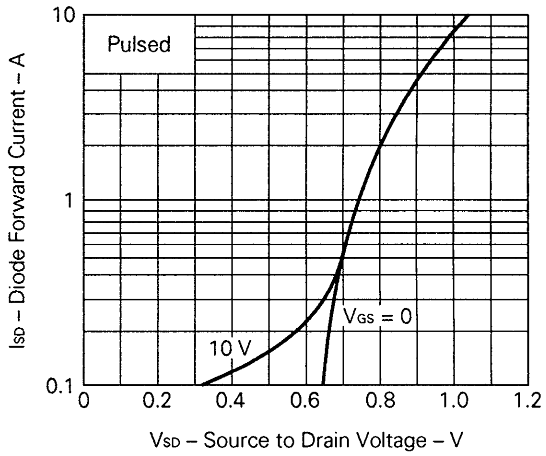
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE



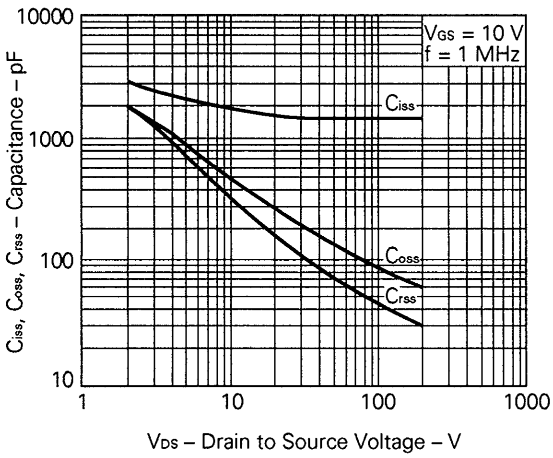
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



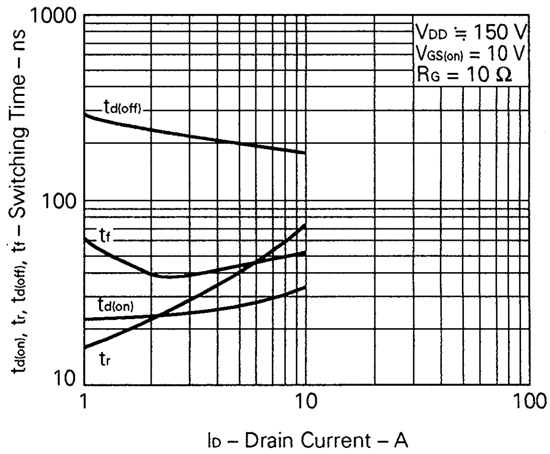
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



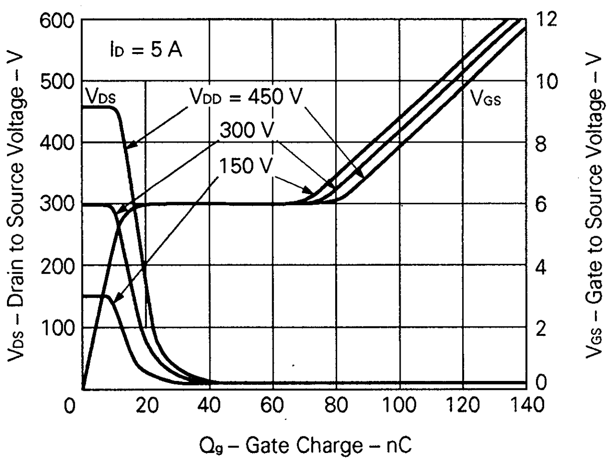
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS



DYNAMIC INPUT CHARACTERISTICS



REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT