

Phase-out/Discontinued

**SWITCHING
N-CHANNEL POWER MOS FET
INDUSTRIAL USE**

DESCRIPTION

The 2SK1502 is N-channel MOS Field Effect Transistor designed for high voltage switching applications.

FEATURES

- Low On-state Resistance
 $R_{DS(on)} = 2.0 \Omega$ ($V_{GS} = 10 V, I_D = 4 A$)
- Low C_{iss} $C_{iss} = 1550 pF$ TYP.
- Built-in G-S Gate Protection Diode
- High Avalanche Capability Ratings

QUALITY GRADE

Standard

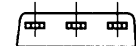
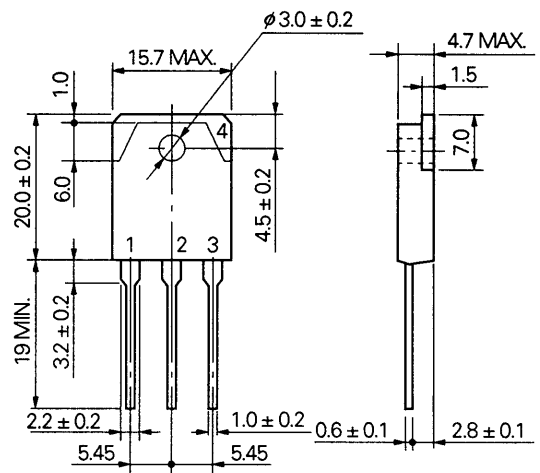
Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ C$)

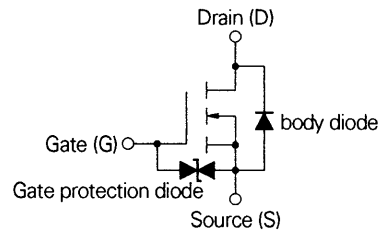
Drain to Source Voltage	V_{DSS}	900	V
Gate to Source Voltage	V_{GSS}	± 30	V
Drain Current (DC)	$I_{D(DC)}$	± 7.0	A
Drain Current (pulse)	$I_{D(pulse)^*}$	± 14	A
Total Power Dissipation ($T_c = 25^\circ C$)	P_T	120	W
Channel Temperature	T_{ch}	150	$^\circ C$
Storage Temperature	T_{stg}	-55 to +150	$^\circ C$

* $PW \leq 10 \mu s, Duty Cycle \leq 1 \%$

PACKAGE DIMENSIONS
in millimeters



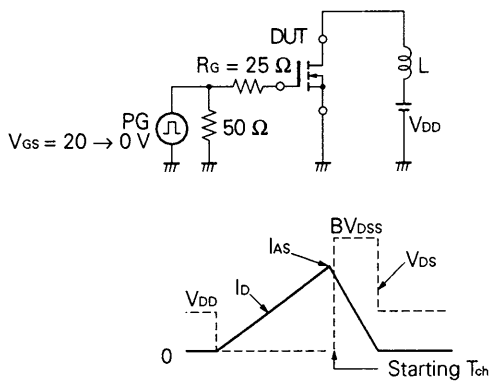
1. Gate
2. Drain
3. Source
4. Fin (Drain)



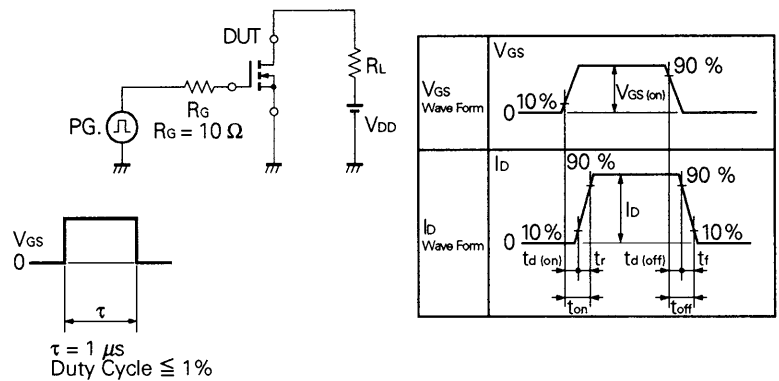
ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source On-state Resistance	R _{DS(on)}		1.7	2.0	Ω	V _{GS} = 10 V, I _D = 4 A
Gate to Source Cutoff Voltage	V _{GS(off)}	2.5		3.5	V	V _{DS} = 10 V, I _D = 1 mA
Forward Transfer Admittance	y _{fs}	2.0	5.8		S	V _{DS} = 20 V, I _D = 4 A
Drain Leakage Current	I _{DSS}			100	μA	V _{DS} = 900 V, V _{GS} = 0
Gate to Source Leakage Current	I _{GSS}			±10	μA	V _{GS} = ±30 V, V _{DS} = 0
Input Capacitance	C _{iss}		1 550		pF	V _{DS} = 10 V
Output Capacitance	C _{oss}		225		pF	V _{GS} = 0
Reverse Transfer Capacitance	C _{rss}		75		pF	f = 1 MHz
Turn-On Delay Time	t _{d(on)}		25		ns	V _{GS} = 10 V
Rise Time	t _r		30		ns	V _{DD} = 150 V
Turn-Off Delay Time	t _{d(off)}		155		ns	I _D = 4 A, R _G = 10 Ω
Fall Time	t _f		35		ns	R _L = 37.5 Ω
Total Gate Charge	Q _G		80		nC	V _{GS} = 10 V
Gate to Source Charge	Q _{GS}		5		nC	I _D = 7 A
Gate to Drain Charge	Q _{GD}		35		nC	V _{DD} = 450 V
Diode Forward Voltage	V _{F(S-D)}		0.9		V	I _F = 7 A, V _{GS} = 0
Reverse Recovery Time	t _{rr}		620		ns	I _F = 7 A, V _{GS} = 0
Reverse Recovery Charge	Q _{rr}		4.2		μC	di/dt = 50 A/μs
Single Avalanche Current	I _{AS}	7.0			A	V _{DD} = 150 V, L = 100 μH R _G = 25 Ω, V _{GS} = 20 V → 0 Unclamped Starting T _{ch} = 25 °C
Channel to Case Thermal Resistance	R _{th(ch-c)}			1.04	°C/W	Channel to Case

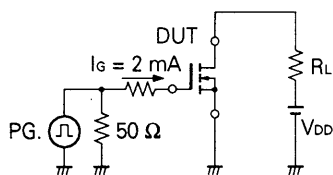
Test Circuit 1: Avalanche Capability



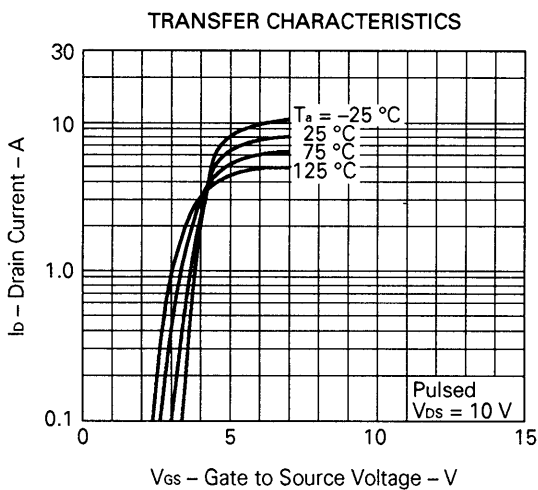
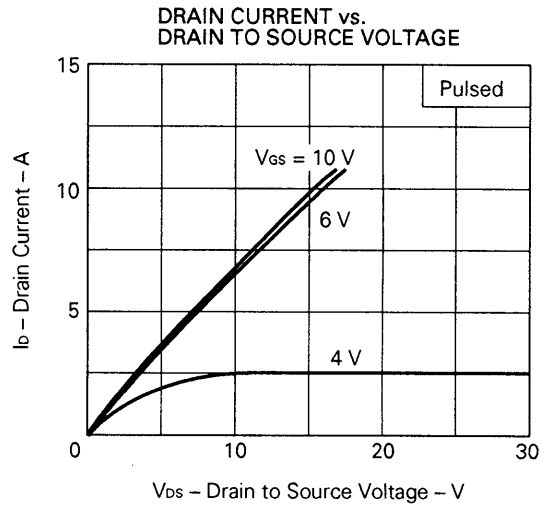
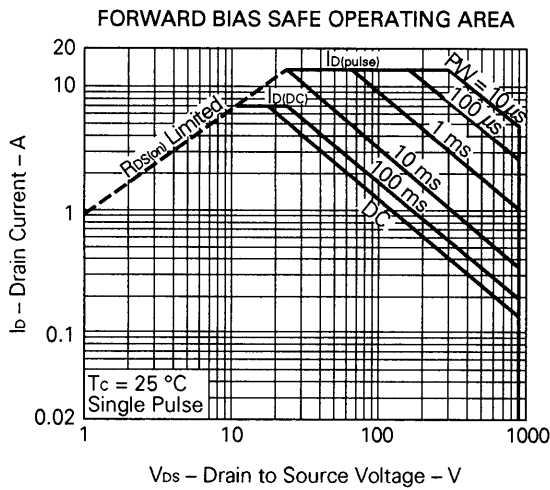
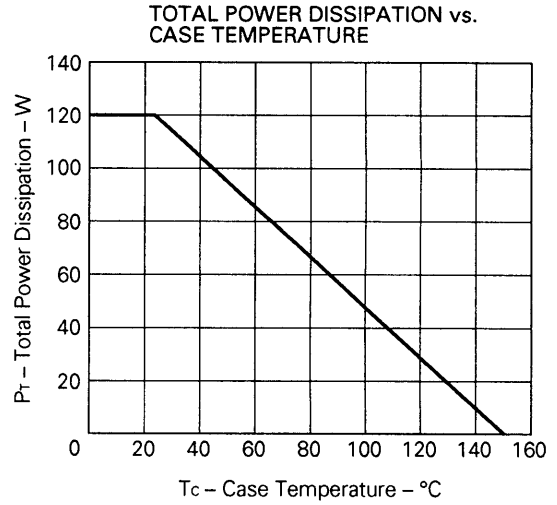
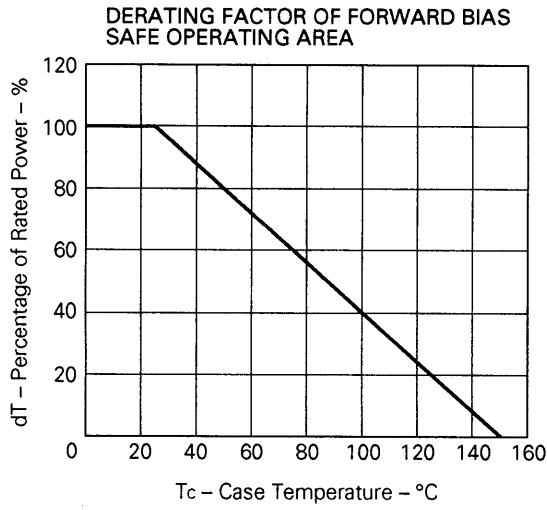
Test Circuit 2: Switching Time



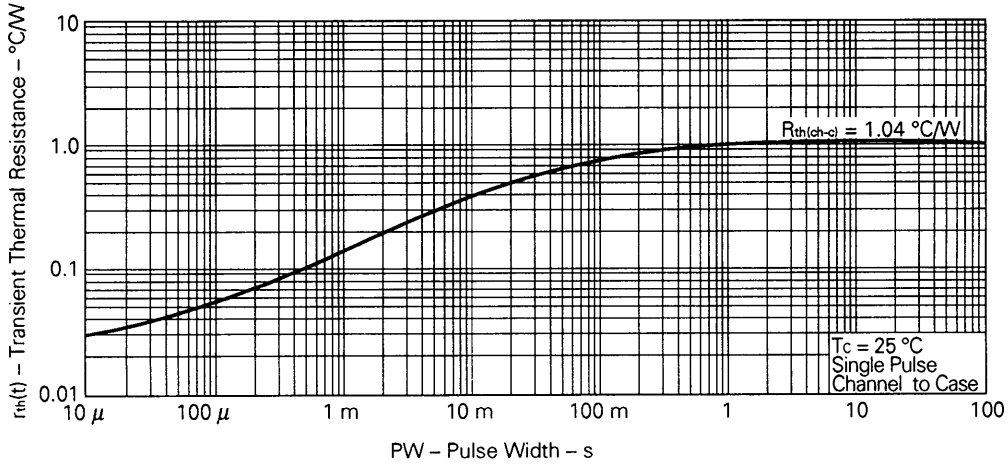
Test Circuit 3: Gate Charge



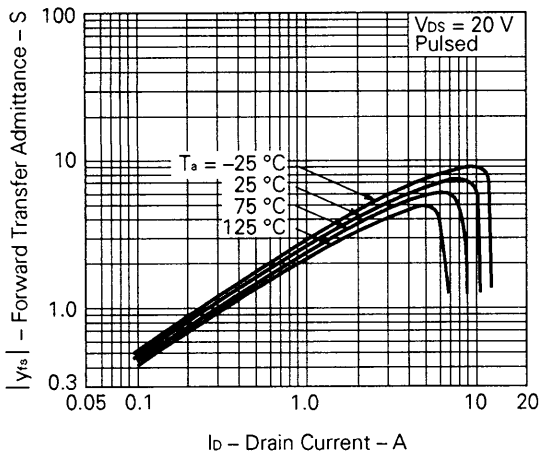
TYPICAL CHARACTERISTICS ($T_a = 25\text{ }^\circ\text{C}$)



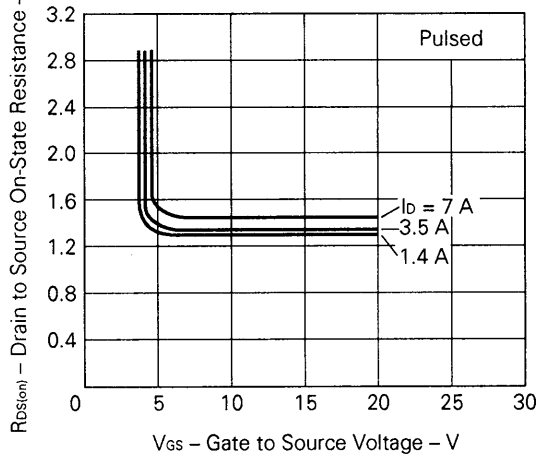
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



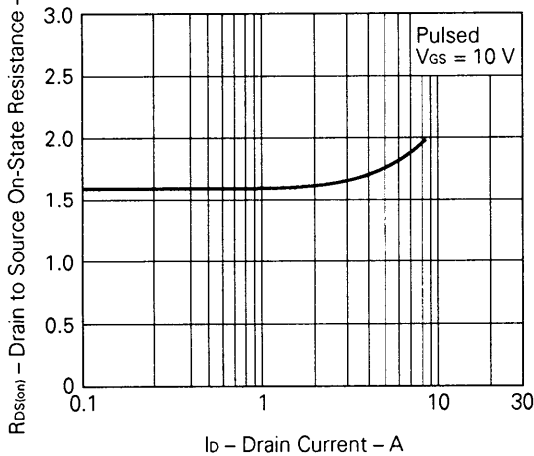
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



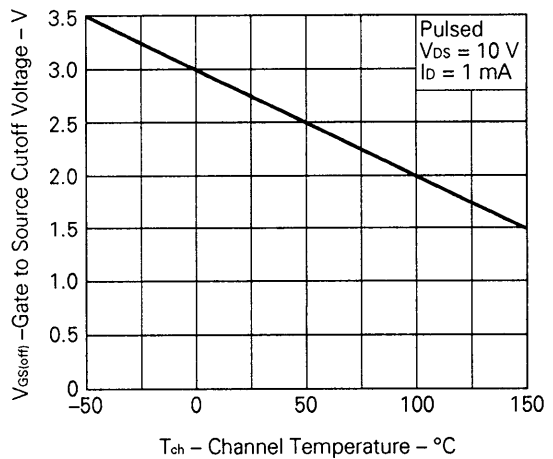
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



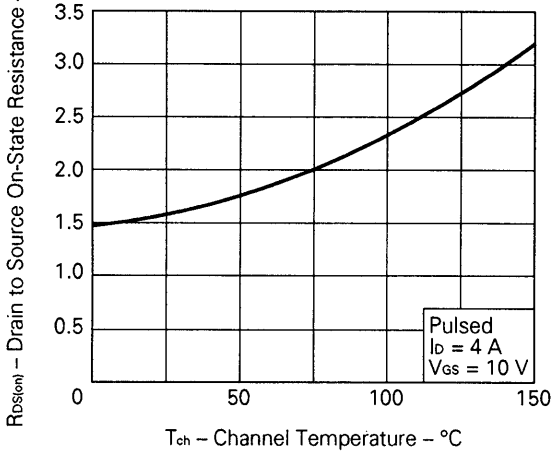
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



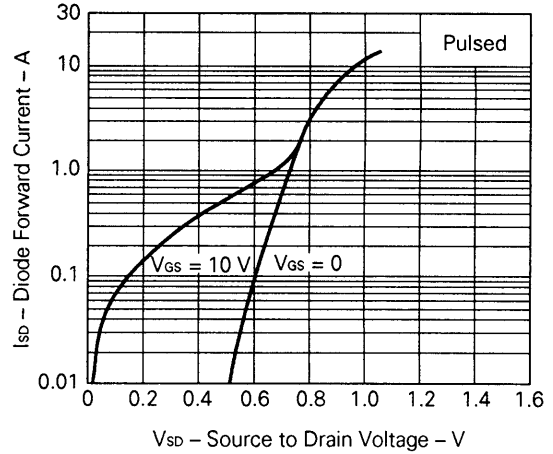
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE



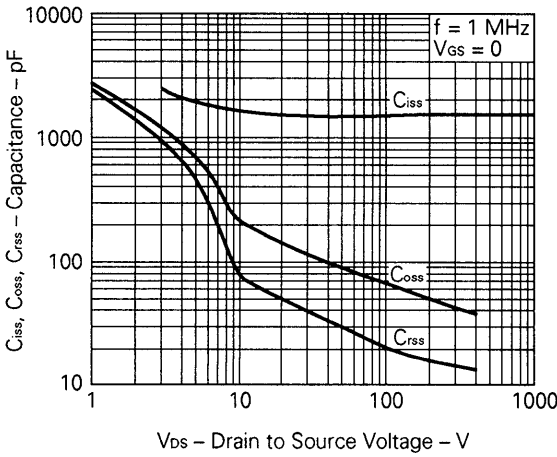
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



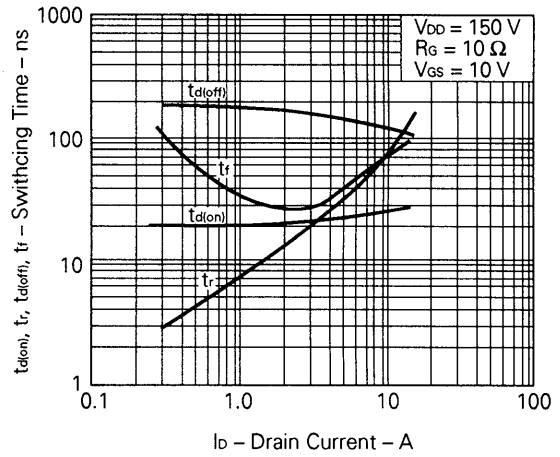
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



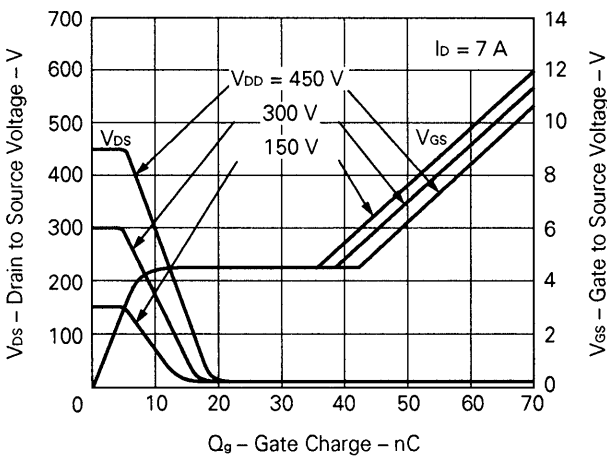
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS



DYNAMIC INPUT CHARACTERISTICS



REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT

