N-CHANNEL MOS FIELD EFFECT POWER TRANSISTOR

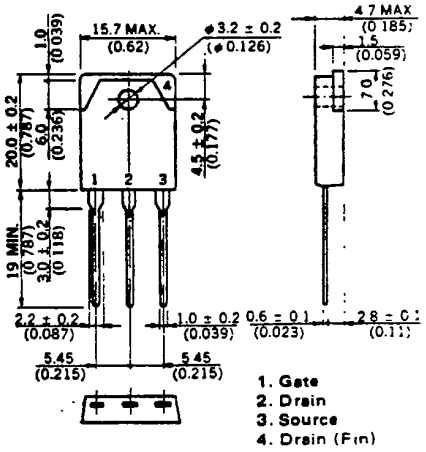
2SK785

DESCRIPTION The 2SK785 is N-channel MOS Field Effect Power Transistor designed for switching power supplies DC-DC converters.

FEATURES

- Suitable for switching power supplies, actuater controls, and pulse circuits.
- Low $R_{DS(on)}$
- No second breakdown

PACKAGE DIMENSIONS
in millimeters (inches)



ABSOLUTE MAXIMUM RATINGS

Maximum Temperatures

- Storage Temperature . . . . . −55 to +150 °C
- Channel Temperature . . . . . 150 °C Maximum

Maximum Power Dissipation (T_C = 25 °C)

- Total Power Dissipation . . . . . 150 W

Maximum Voltages and Currents (T_a = 25 °C)

V_{DSS}	Drain to Source Voltage	500	V
V_{GSS}	Gate to Source Voltage.	±20	V
$I_{D(DC)}$	Drain Current (DC)	±20	A
$I_{D(pulse)}$	Drain Current (pulse)*	±80	A

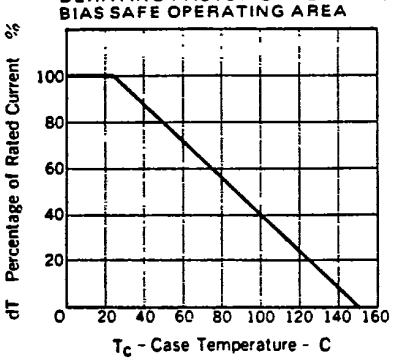
* PW ≤ 300 μs, Duty Cycle ≤ 2 %

ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

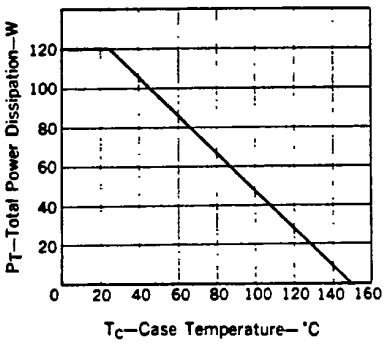
SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
I_{DSS}	Drain Leakage Current			100	μA	V_{DS} = 500 V, V_{GS} = 0
I_{GSS}	Gate to Source Leakage Current			±100	nA	V_{GS} = ±20 V, V_{DS} = 0
$V_{GS(off)}$	Gate to Source Cutoff Voltage	1.5		3.5	V	V_{DS} = 10 V, I_D = 1 mA
$\|Y_{fs}\|$	Forward Transfer Admittance	9.0			S	V_{DS} = 10 V, I_D = 10 A
$R_{DS(on)}$	Drain to Source On-State Resistance		0.3	0.4	Ω	V_{GS} = 10 V, I_D = 10 A
C_{iss}	Input Capacitance		3000		pF	V_{DS} = 10 V, V_{GS} = 0, f = 1 MHz
C_{oss}	Output Capacitance		900		pF	
C_{rss}	Reverse Transfer Capacitance		350		pF	
$t_{d(on)}$	Turn-On Delay Time		45		ns	I_D = 10 A, V_{CC} ≒ 150 V, $V_{GS(on)}$ = 10 V, R_L = 15 Ω, R_{in} = 10 Ω
t_r	Rise Time		60		ns	
$t_{d(off)}$	Turn-Off Delay Time		100		ns	
t_f	Fall Time		80		ns	

TYPICAL CHARACTERISTICS (T_a = 25 °C)

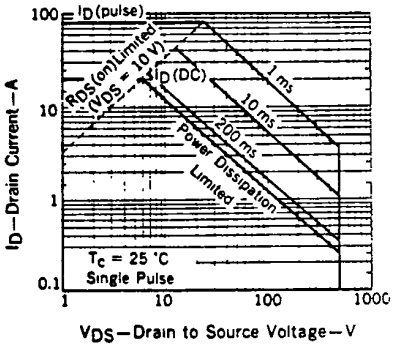
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



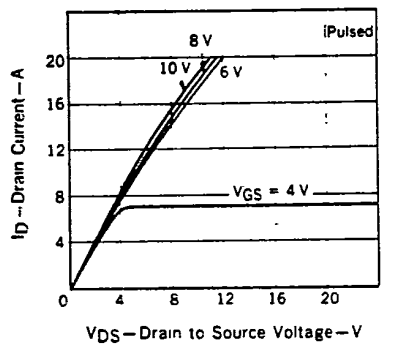
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



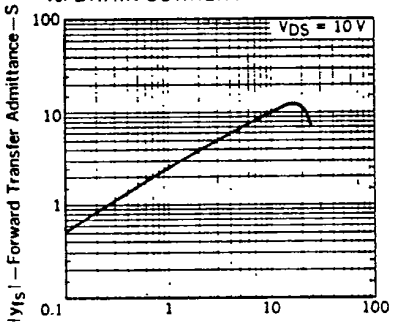
FORWARD BIAS SAFE OPERATING AREA



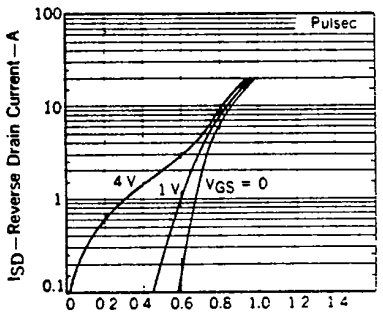
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



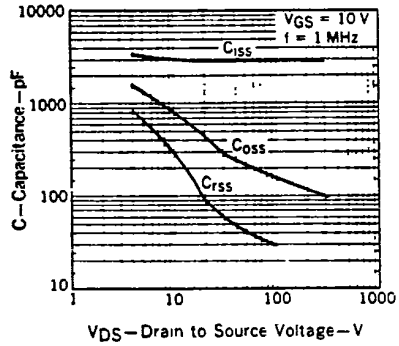
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



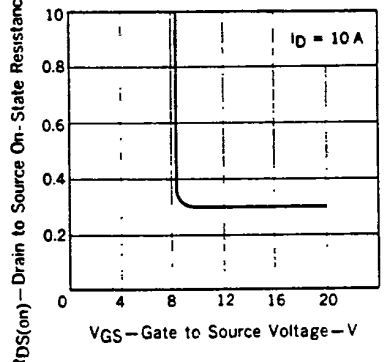
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



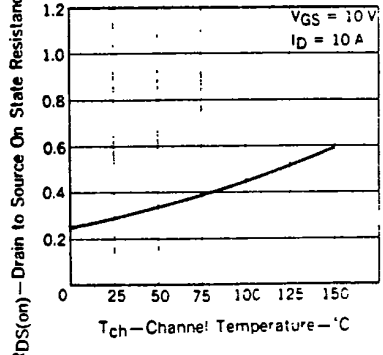
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



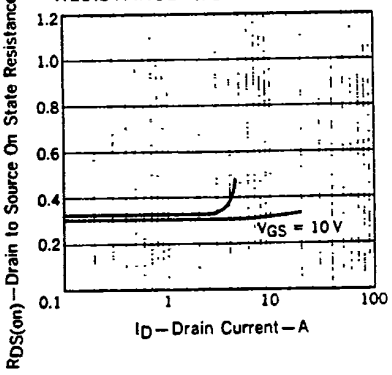
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



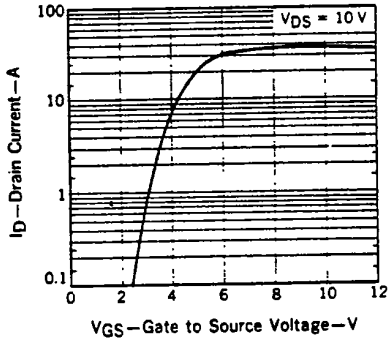
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



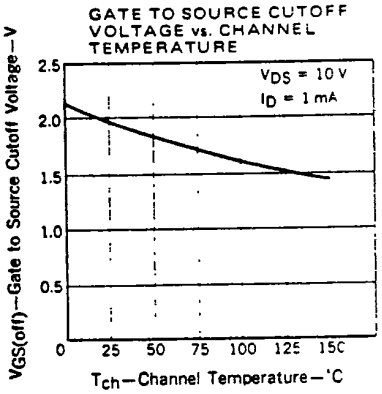
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



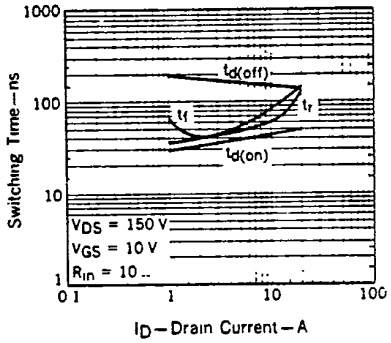
TRANSFER CHARACTERISTIC



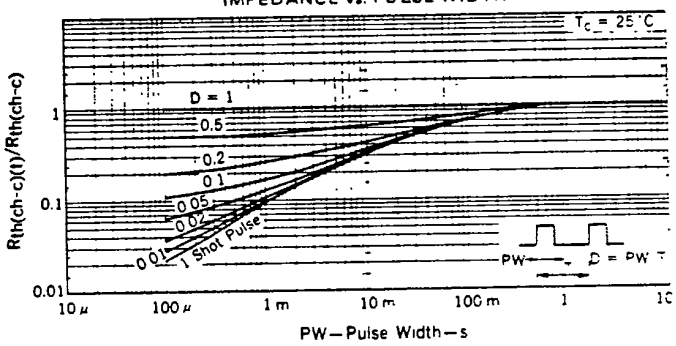
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE



SWITCHING CHARACTERISTICS



NORMALIZED TRANSIENT IMPEDANCE vs. PULSE WIDTH



SWITCHING TIME TEST CIRCUIT