NEC
ELECTRON DEVICE

MOS FIELD EFFECT TRANSISTOR

Phase-out/Discontinued

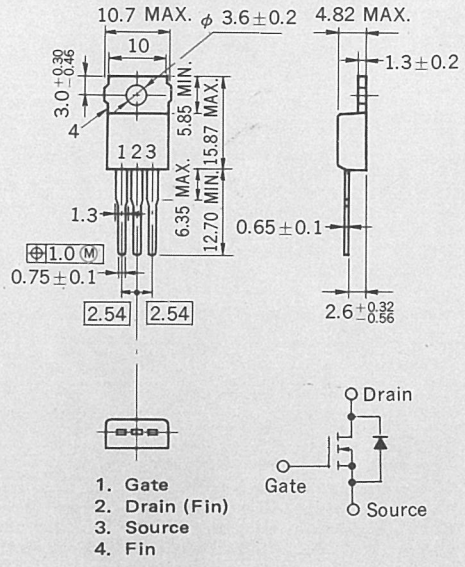
2SK339

HIGH SPEED, HIGH CURRENT SWITCHING
N-CHANNEL POWER MOS FET
INDUSTRIAL USE

DESCRIPTION

Suitable for DC-DC converters, hummer magnet driver and series regulator.

PACKAGE DIMENSIONS
in millimeters



FEATURES

- Medium Voltage $V_{DSS} \geqq 100$
- Low ON-Resistance $R_{DS(ON)} \leqq 0.5\ \Omega$
- Small mold package TO-220 AB
- High speed switching $t_r \leqq 50$ ns $t_f \leqq 50$ ns (at 3 A)
- Large S.O.A.

ABSOLUTE MAXIMUM RATINGS

Maximum Voltages and Currents (T_a = 25 °C)

Drain to Source Voltage	V_{DSS}	100	V
Gate to Source Voltage	V_{GSS}	±20	V
Continuous Drain Current	$I_{D(DC)}$	±5.0	A
Peak Drain Current	$I_{D(pulse)}$*	±7.5	A

Maximum Power Dissipation

Total Power Dissipation	$P_{T(T_c = 25\,°C)}$	40	W
Total Power Dissipation	$P_{T(T_a = 25\,°C)}$	1.5	W

Maximum Temperatures

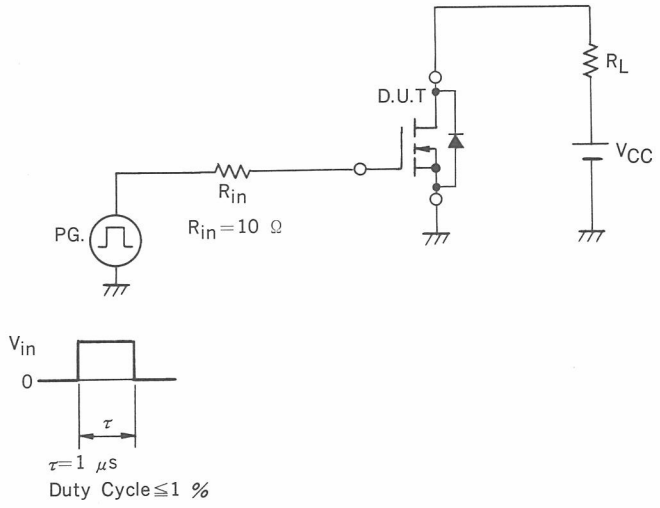
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	−55 to 150	°C

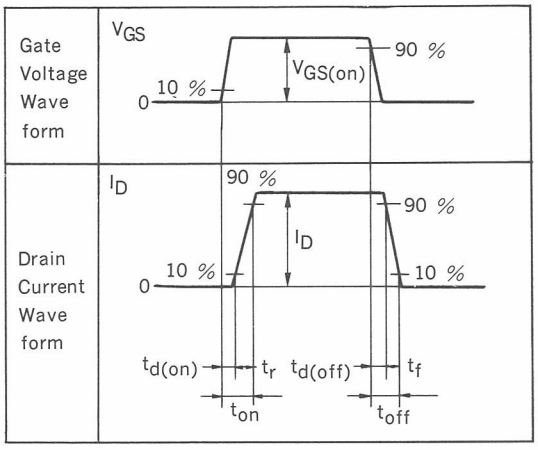
* Pulse; PW ≦ 10 ms, Duty Cycle ≦ 50 %

ELECTRICAL CHARACTERISTICS (T_a = 25 °C unless otherwise noted)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain Cutoff Current	I_{DSS}			50	μA	V_{DS} = 100 V, V_{GS} = 0
Gate Leakage Current	I_{GSS}			±100	nA	V_{GS} = ±20 V, V_{DS} = 0
Gate to Source Cutoff Voltage	$V_{GS(off)}$	1	1.6	5	V	V_{DS} = 10 V, I_D = 10 mA
Forward Transfer Admittance	$\|y_{fs}\|$	2			S	V_{DS} = 10 V, I_D = 3 A
Drain to Source On Resistance	$R_{DS(ON)}$			0.5	Ω	V_{GS} = 10 V, I_D = 3 A
Input Capacitance	C_{iss}		350	500	pF	V_{DS} = 10 V, V_{GS} = 0, f = 1 MHz
Output Capacitance	C_{oss}		220	400	pF	
Reverse Transfer Capacitance	C_{rss}		70	100	pF	
Turn-on Delay Time	$t_{d(on)}$		15	30	ns	I_D = 3 A, $V_{GS(on)}$ = 10 V, R_L = 17 Ω, V_{CC} ≒ 50 V, R_{in} = 10 Ω, See Test Circuit
Rise Time	t_r		25	50	ns	
Turn-off Delay Time	$t_{d(off)}$		30	50	ns	
Fall Time	t_f		15	30	ns	

SWITCHING TIME TEST CIRCUIT

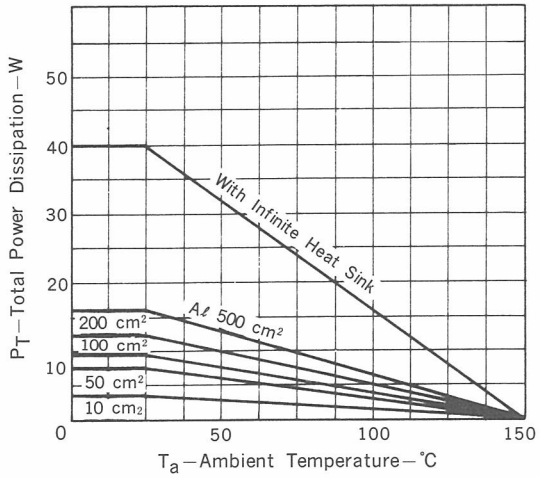




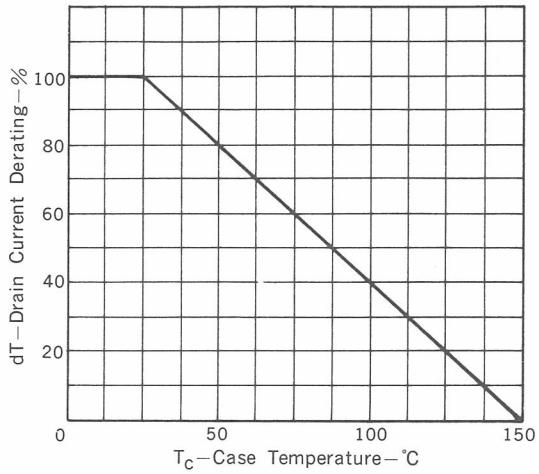
Phase-out/Discontinued

TYPICAL CHARACTERISTICS (T_a = 25 °C)

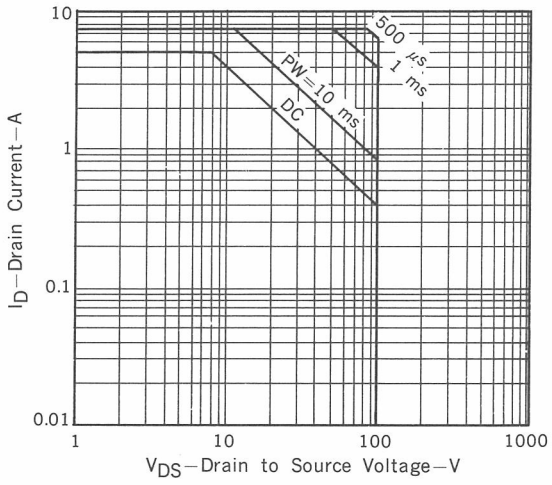
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



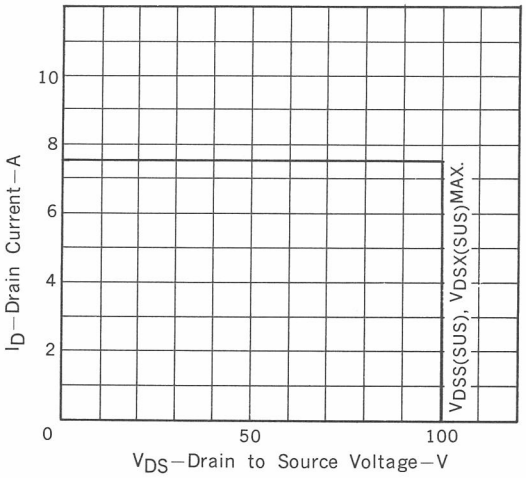
DERATING CURVE OF SAFE OPERATING AREA (FORWARD BIAS)



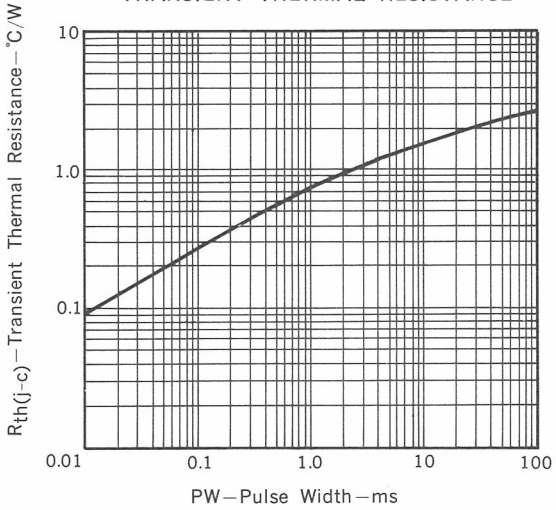
FORWARD BIAS SAFE OPERATING AREAS



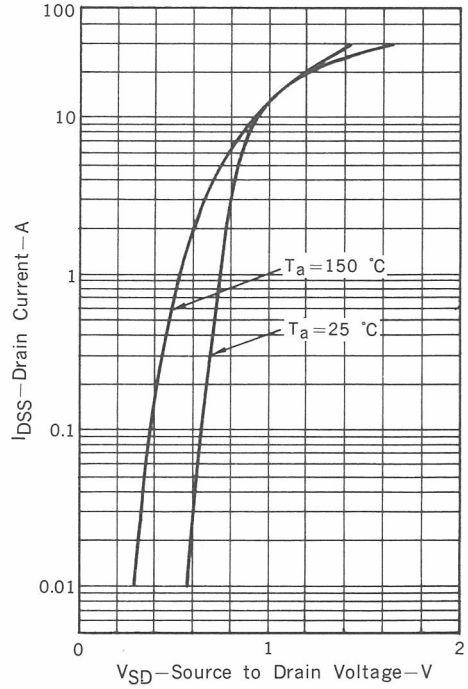
REVERSE BIAS SAFE OPERATING AREA



TRANSIENT THERMAL RESISTANCE

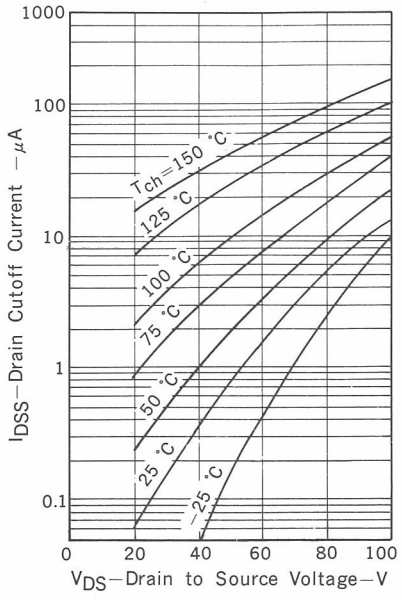


ZERO-GATE VOLTAGE DRAIN CURRENT vs. SOURCE TO DRAIN VOLTAGE

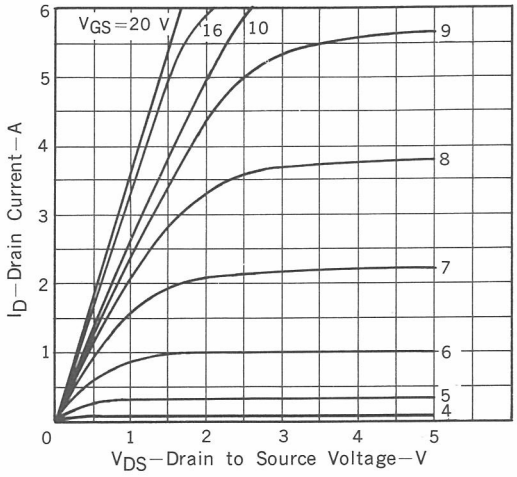


Phase-out/Discontinued

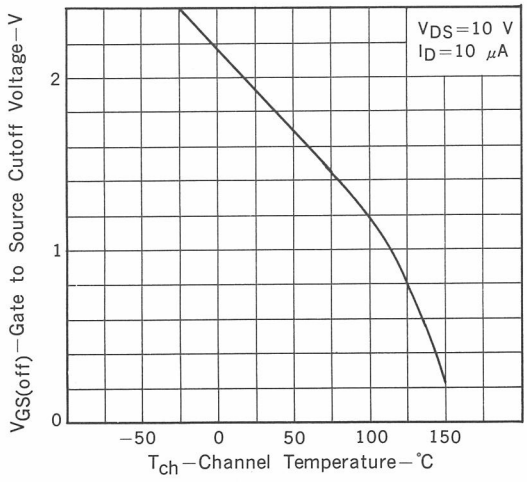
DRAIN LEAK CURRENT vs.
DRAIN TO SOURCE VOLTAGE



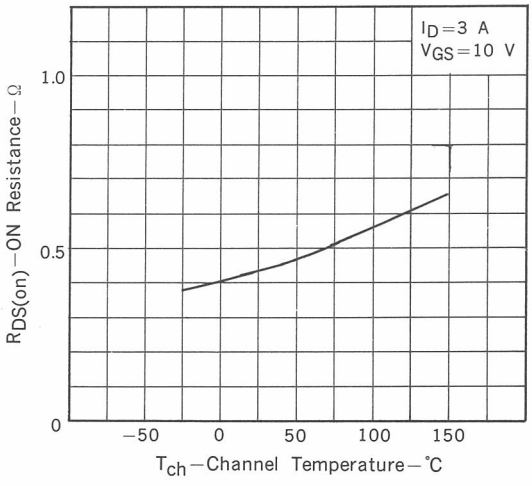
DRAIN CURRENT vs. DRAIN
TO SOURCE VOLTAGE



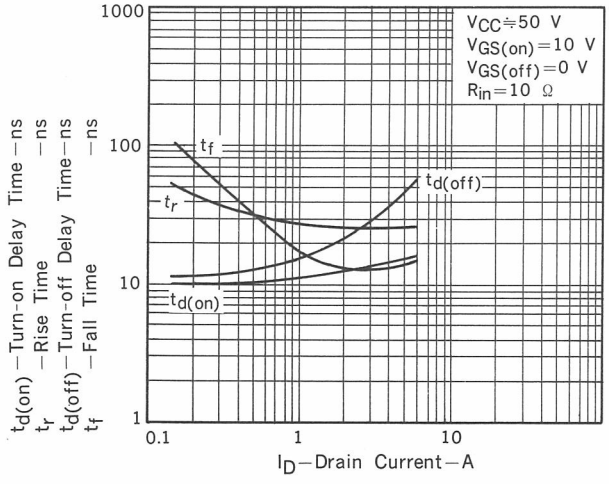
GATE TO SOURCE CUTOFF VOLTAGE vs.
CHANNEL TEMPERATURE



DRAIN TO SOURCE ON RESISTANCE vs.
CHANNEL TEMPERATURE



SWITCHING TIME CHARACTERISTICS



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APR.—5—83M
Printed in Japan