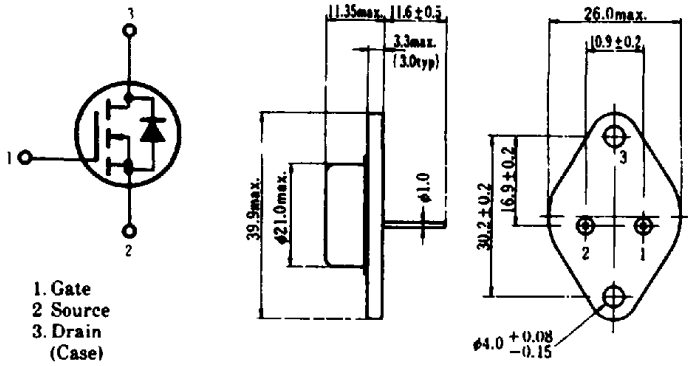
2SK512

SILICON N-CHANNEL MOS FET

HIGH SPEED POWER SWITCHING

■ FEATURES

- Low On-Resistance. (R_{on}=0.55Ω)
- High Speed Switching.
- High Voltage (V_{DSS}=500V)
- No Secondary Breakdown.
- Suitable for Switching Regulator, DC-DC Converter, and Motor Control.



1. Gate
2 Source
3. Drain
(Case)

(Dimensions in mm)

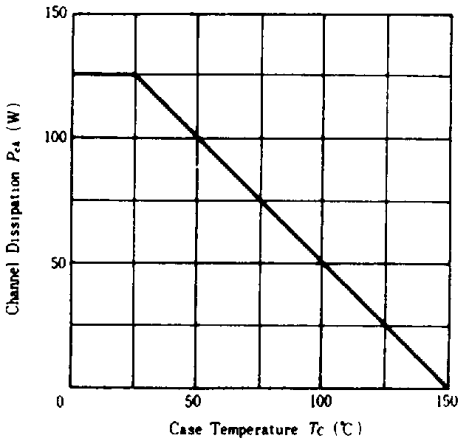
(JEDEC TO-3)

■ ABSOLUTE MAXIMUM RATINGS (T_a=25 °C)

Item	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	500	V
Gate-Source Voltage	V_{GSS}	±20	V
Drain Current	I_D	12	A
Drain Peak Current	$I_{D(peak)}$	20	A
Body-Drain Diode Reverse Drain Current	I_{DR}	12	A
Channel Dissipation	P_{ch}*	125	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	−55 ~ +150	°C

*Value at T_c=25 °C

POWER VS. TEMPERATURE DERATING

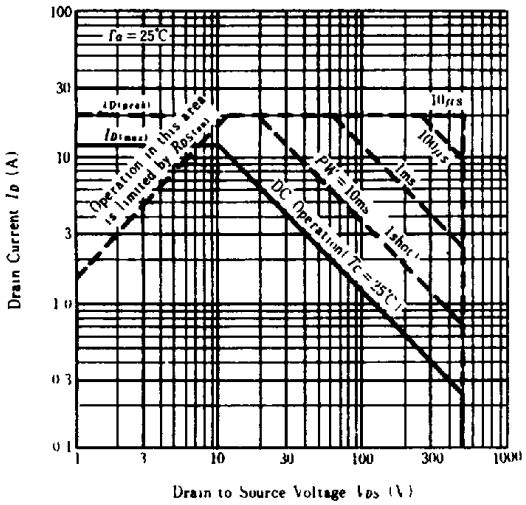


■ ELECTRICAL CHARACTERISTICS (T_a=25°C)

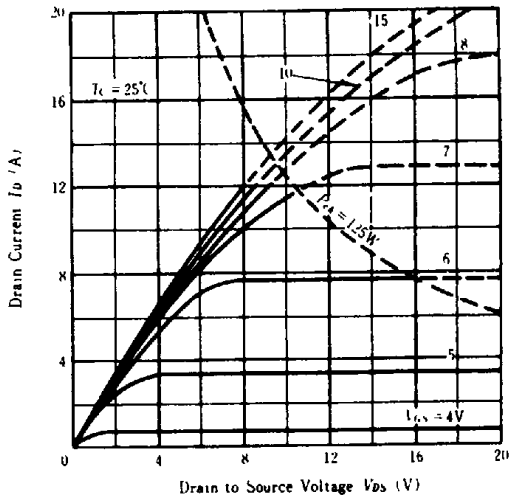
Item	Symbol	Test Condition	min.	typ.	max.	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=10mA, V_{GS}=0	500	—	—	V
Gate-Source Leak Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0	—	—	±1	μA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=400V, V_{GS}=0	—	—	1	mA
Gate-Source Cutoff Voltage	$V_{GS(off)}$	I_D=1mA, V_{DS}=10V	2.0	—	4.0	V
Static Drain-Source On State Resistance	$R_{DS(on)}$	I_D=6A, V_{GS}=15V*	—	0.55	0.65	Ω
Drain-Source Saturation Voltage	$V_{DS(on)}$	I_D=6A, V_{GS}=15V*	—	3.3	3.9	V
Forward Transfer Admittance	$\|y_{fs}\|$	I_D=6A, V_{DS}=10V*	2.5	3.5	—	S
Input Capacitance	C_{iss}	V_{DS}=10V, V_{GS}=0, f=1MHz	—	1800	—	pF
Output Capacitance	C_{oss}		—	400	—	pF
Reverse Transfer Capacitance	C_{rss}		—	50	—	pF
Turn-on Delay Time	$t_{d(on)}$	I_D=2A, V_{GS}=15V, R_L=15Ω	—	20	—	ns
Rise Time	t_r		—	45	—	ns
Turn-off Delay Time	$t_{d(off)}$		—	230	—	ns
Fall Time	t_f		—	70	—	ns
Body-Drain Diode Forward Voltage	V_{DF}	I_F=6A, V_{GS}=0	—	1.0	—	V
Body-Drain Diode Reverse Recovery Time	t_{rr}	I_F=6A, V_{GS}=0, di_F/dt=100A/μs	—	400	—	ns

*Pulse Test

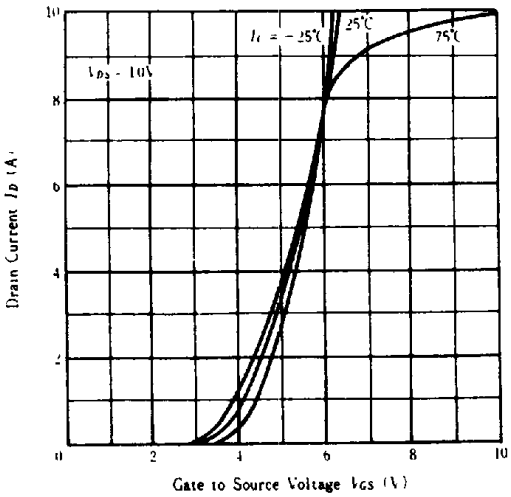
MAXIMUM SAFE OPERATION AREA



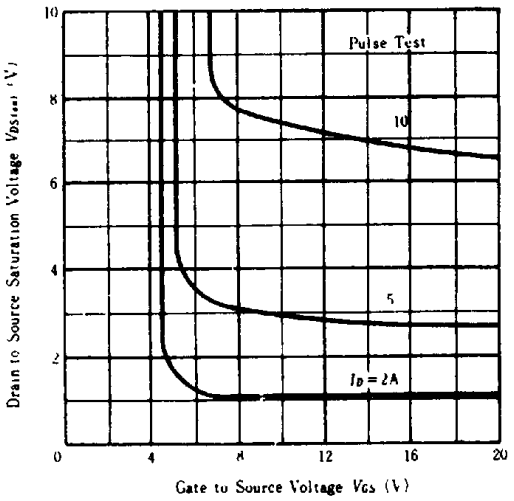
TYPICAL OUTPUT CHARACTERISTICS



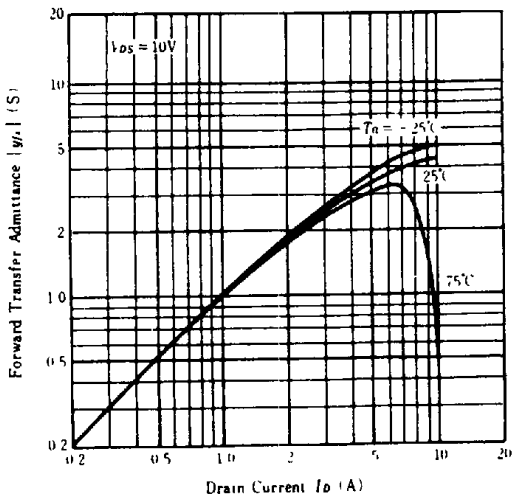
TYPICAL TRANSFER CHARACTERISTICS



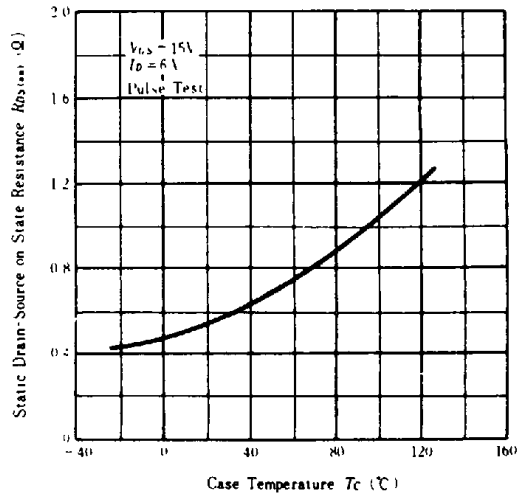
DRAIN-SOURCE SATURATION VOLTAGE VS. GATE-SOURCE VOLTAGE



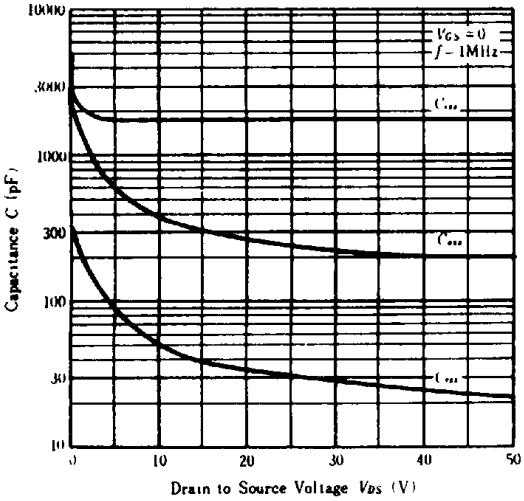
FORWARD TRANSFER ADMITTANCE VS. DRAIN CURRENT



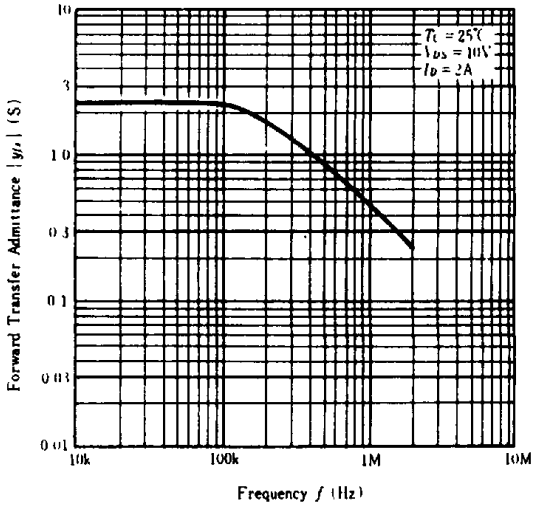
STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. TEMPERATURE



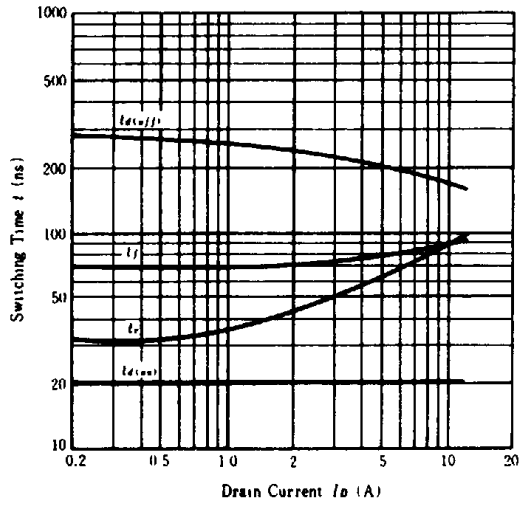
TYPICAL CAPACITANCE VS. DRAIN-SOURCE VOLTAGE



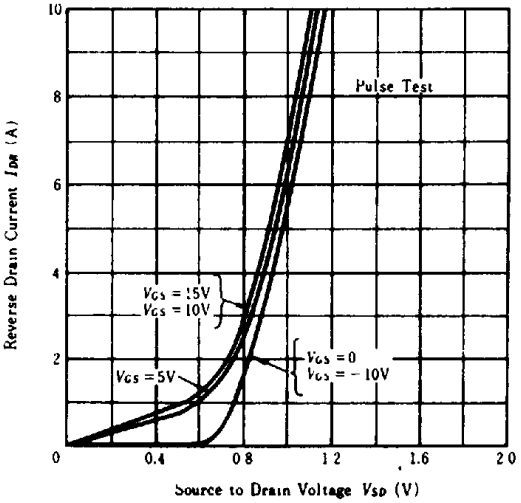
FORWARD TRANSFER ADMITTANCE VS. FREQUENCY



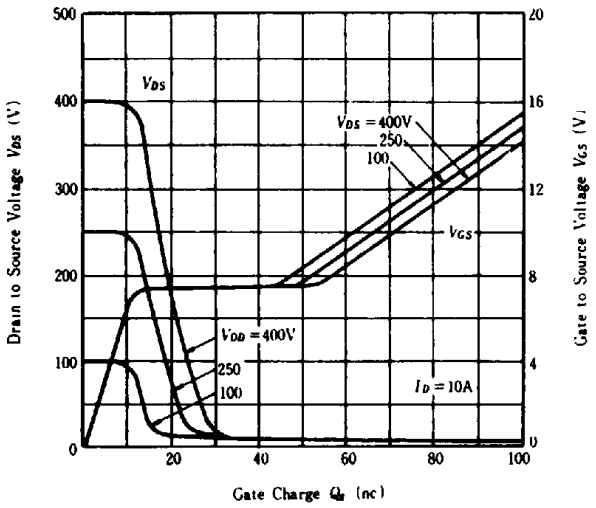
SWITCHING CHARACTERISTICS



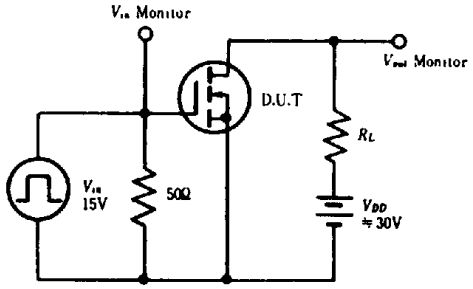
MAXIMUM BODY-DRAIN DIODE FORWARD VOLTAGE



DYNAMIC INPUT CHARACTERISTICS



SWITCHING TIME TEST CIRCUIT



WAVEFORMS