

# 2SK512

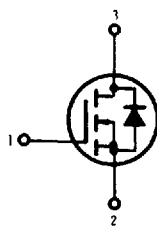
HITACHI/(OPTOELECTRONICS) 61E D

## SILICON N-CHANNEL MOS FET

### HIGH SPEED POWER SWITCHING

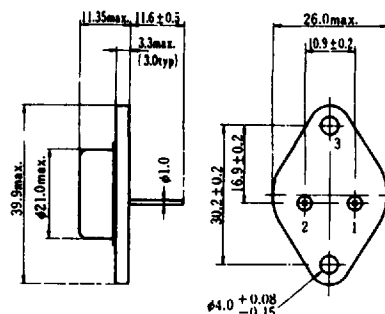
#### FEATURES

- Low On-Resistance. ( $R_{on}=0.55\Omega$ )
- 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)



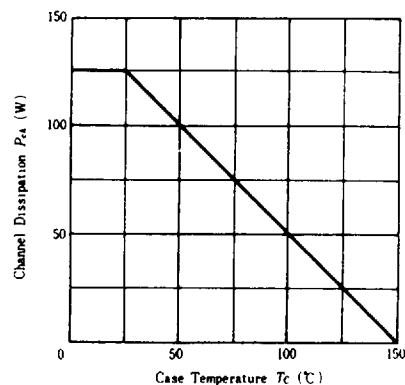
(JEDEC TO-3)

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

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

\*Value at  $T_c=25^\circ C$

#### POWER VS. TEMPERATURE DERATING

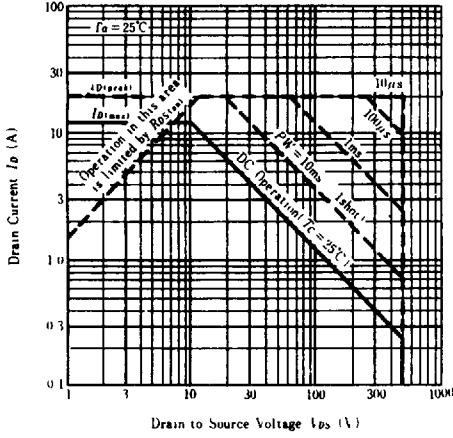


#### ELECTRICAL CHARACTERISTICS ( $T_a=25^\circ C$ )

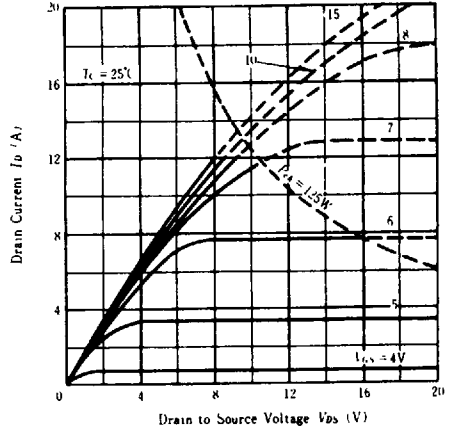
Item	Symbol	Test Condition	min.	typ.	max.	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=10mA, V_{GS}=0$	500	—	—	V
Gate-Source Leak Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0$	—	—	$\pm 1$	$\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=400V, V_{GS}=0$	—	—	1	mA
Gate-Source Cutoff Voltage	$V_{GS(off)}$	$I_D=1mA, V_{DS}=10V$	2.0	—	4.0	V
Static Drain-Source On State Resistance	$R_{DS(on)}$	$I_D=6A, V_{GS}=15V^*$	—	0.55	0.65	$\Omega$
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	$C_{is}$	$V_{DS}=10V, V_{GS}=0, f=1MHz$	—	1800	—	pF
Output Capacitance	$C_{os}$		—	400	—	pF
Reverse Transfer Capacitance	$C_{iss}$		—	50	—	pF
Turn-on Delay Time	$t_{d(on)}$	$I_D=2A, V_{GS}=15V, R_L=15\Omega$	—	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	$t_r$	$I_F=6A, V_{GS}=0$ $di_F/dt=100A/\mu s$	—	400	—	ns

\*Pulse Test

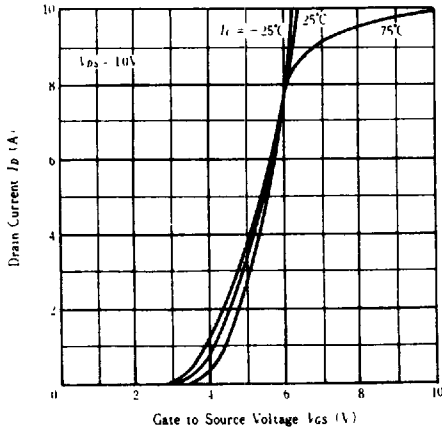
**MAXIMUM SAFE OPERATION AREA**



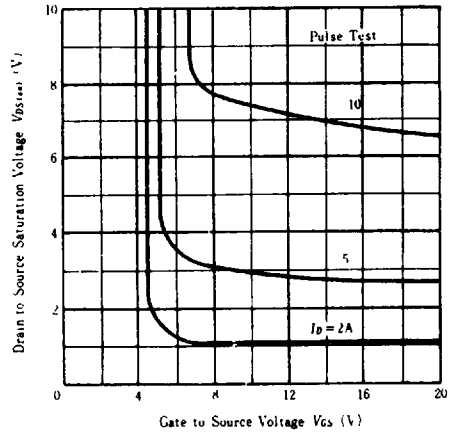
**TYPICAL OUTPUT CHARACTERISTICS**



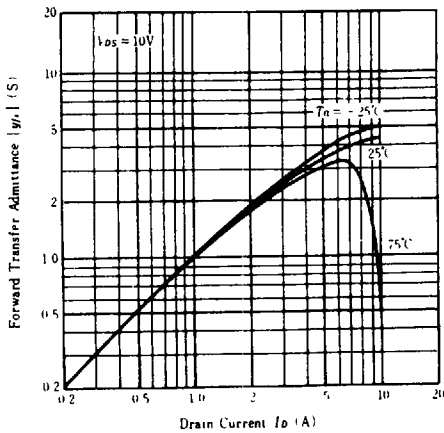
**TYPICAL TRANSFER CHARACTERISTICS**



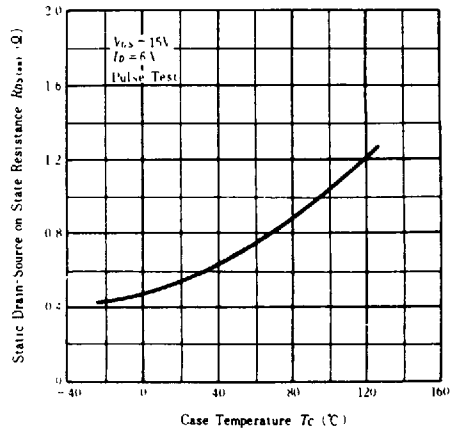
**DRAIN-SOURCE SATURATION VOLTAGE VS. GATE-SOURCE VOLTAGE**



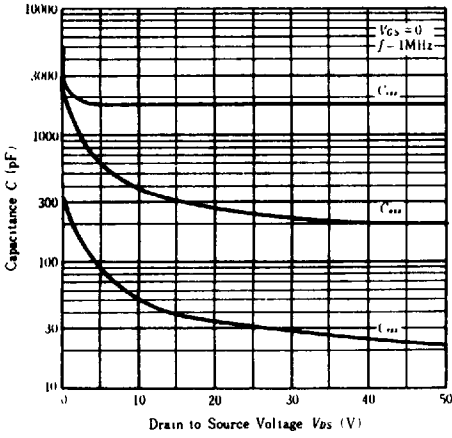
**FORWARD TRANSFER ADMITTANCE VS. DRAIN CURRENT**



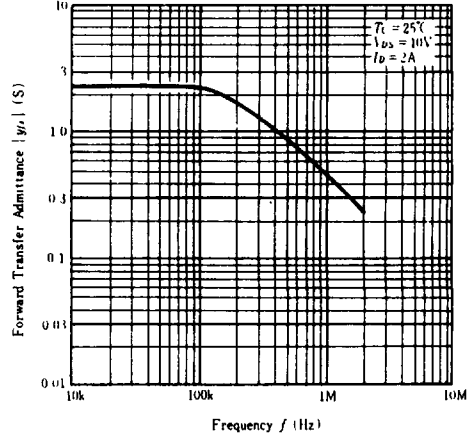
**STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. TEMPERATURE**



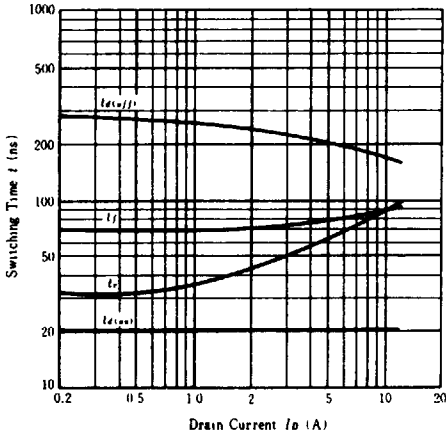
**TYPICAL CAPACITANCE VS. DRAIN-SOURCE VOLTAGE**



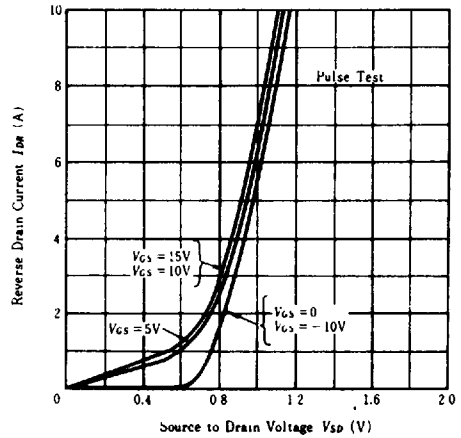
**FORWARD TRANSFER ADMITTANCE VS. FREQUENCY**



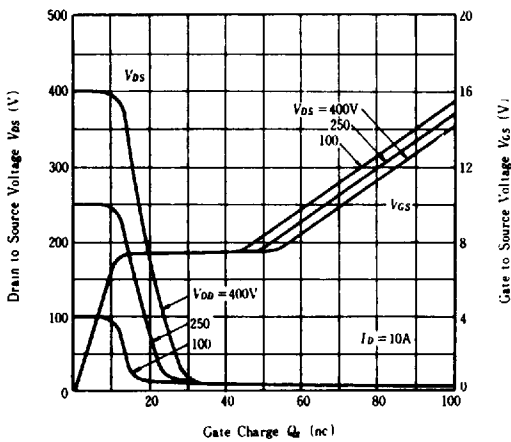
**SWITCHING CHARACTERISTICS**



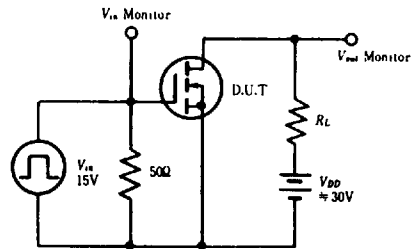
**MAXIMUM BODY-DRAIN DIODE FORWARD VOLTAGE**



**DYNAMIC INPUT CHARACTERISTICS**



**SWITCHING TIME TEST CIRCUIT**



**WAVEFORMS**

