

# 2SK399

HITACHI/(OPTOELECTRONICS) 61E D

## SILICON N-CHANNEL MOS FET

**HIGH SPEED POWER SWITCHING,  
HIGH FREQUENCY POWER AMPLIFIER**  
Complementary pair with 2SJ113

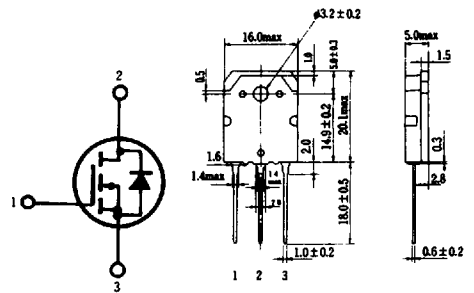
### FEATURES

- Low On-Resistance.
- High Speed Switching.
- High Cutoff Frequency.
- No Secondary Breakdown.
- Suitable for Switching Regulator, DC-DC Converter, Motor Control, and Ultrasonic Power Oscillators.

### ABSOLUTE MAXIMUM RATINGS ( $T_c=25^\circ\text{C}$ )

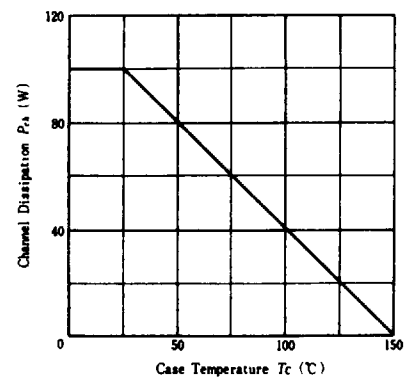
Item	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current	$I_D$	10	A
Drain Peak Current	$I_{D(\text{peak})}$	15	A
Body-Drain Diode Reverse Drain Current	$I_{DR}$	10	A
Channel Dissipation	$P_{ch}^*$	100	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	$-55 \sim +150$	$^\circ\text{C}$

\*Value at  $T_c=25^\circ\text{C}$



1. Gate  
2. Drain (Flange)  
3. Source  
(Dimensions in mm)  
**(TO-3P)**

### POWER VS. TEMPERATURE DERATING



### ELECTRICAL CHARACTERISTICS ( $T_c=25^\circ\text{C}$ )

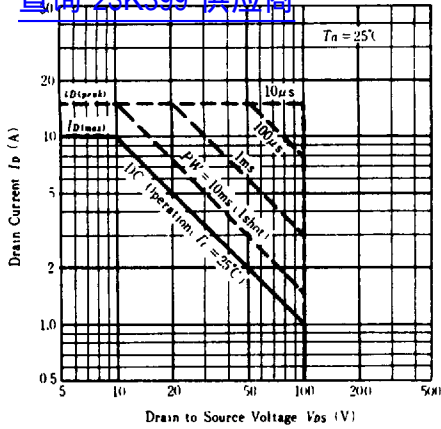
Item	Symbol	Test Condition	min.	typ.	max.	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=10\text{mA}, V_{GS}=0$	100	—	—	V
Gate-Source Leak Current	$I_{GSS}$	$V_{GS}=\pm 20\text{V}, V_{DS}=0$	—	—	$\pm 1$	$\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=80\text{V}, V_{GS}=0$	—	—	1	mA
Gate-Source Cutoff Voltage	$V_{GS(off)}$	$I_D=1\text{mA}, V_{DS}=10\text{V}$	2.0	—	5.0	V
Static Drain-Source On State Resistance	$R_{DS(on)}$	$I_D=5\text{A}, V_{GS}=15\text{V}^*$	—	0.20	0.25	$\Omega$
Drain-Source Saturation Voltage	$V_{DS(sat)}$	$I_D=5\text{A}, V_{GS}=15\text{V}^*$	—	1.0	1.25	V
Forward Transfer Admittance	$ y_f $	$I_D=5\text{A}, V_{DS}=10\text{V}^*$	1.5	2.0	—	S
Input Capacitance	$C_{iss}$	$V_{DS}=10\text{V}, V_{GS}=0$ $f=1\text{MHz}$	—	800	—	pF
Output Capacitance	$C_{oss}$		—	500	—	pF
Reverse Transfer Capacitance	$C_{rss}$		—	70	—	pF
Turn-on Delay Time	$t_{d(on)}$	$I_D=2\text{A}, V_{GS}=15\text{V}$ $R_L=15\Omega$	—	15	—	ns
Rise Time	$t_r$		—	35	—	ns
Turn-off Delay Time	$t_{d(off)}$		—	60	—	ns
Fall Time	$t_f$		—	50	—	ns
Body-Drain Diode Forward Voltage	$V_{DF}$	$I_F=5\text{A}, V_{GS}=0$	—	0.9	—	V
Body-Drain Diode Reverse Recovery Time	$t_r$	$I_F=5\text{A}, V_{GS}=0$ $di_F/dt=50\text{A}/\mu\text{s}$	—	300	—	ns

\*Pulse Test

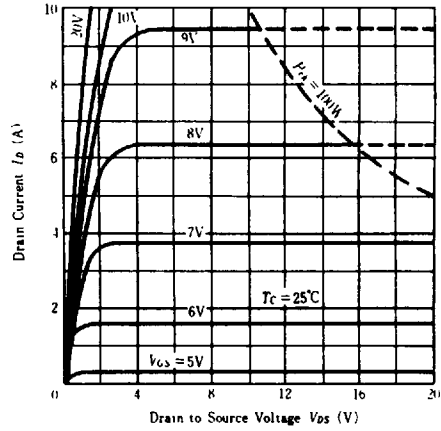
HITACHI/(OPTOELECTRONICS)

MAXIMUM SAFE OPERATION AREA

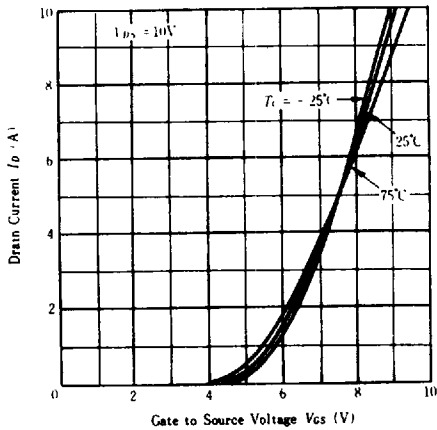
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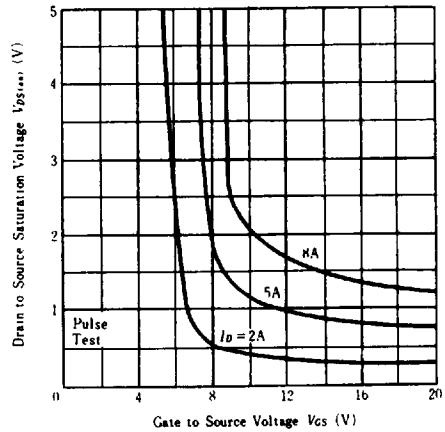
TYPICAL OUTPUT CHARACTERISTICS



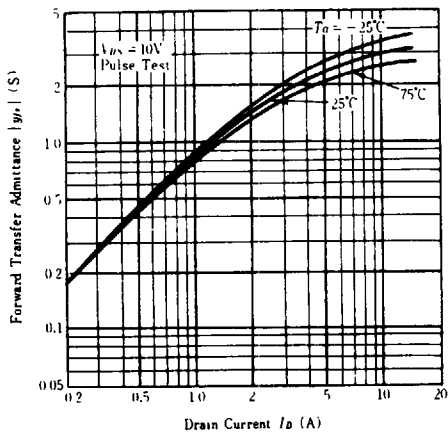
TYPICAL TRANSFER CHARACTERISTICS



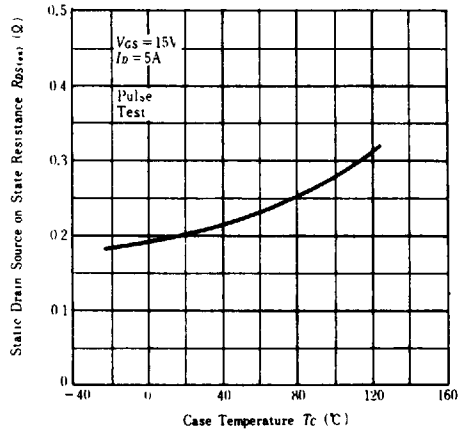
DRAIN-SOURCE SATURATION VOLTAGE VS. GATE-SOURCE VOLTAGE



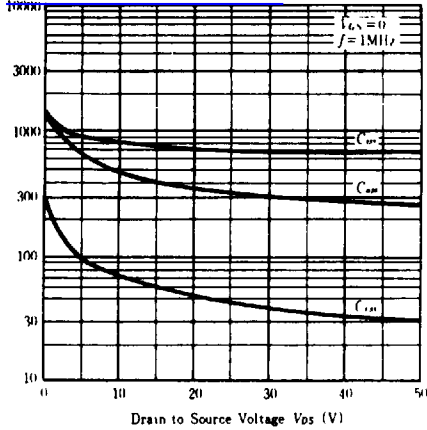
FORWARD TRANSFER ADMITTANCE VS. DRAIN CURRENT



STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. TEMPERATURE

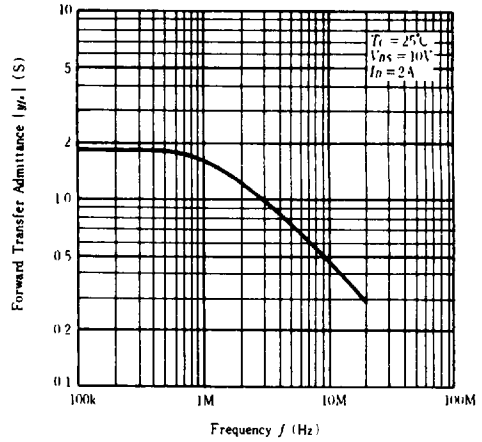


TYPICAL CAPACITANCE VS. DRAIN-SOURCE VOLTAGE

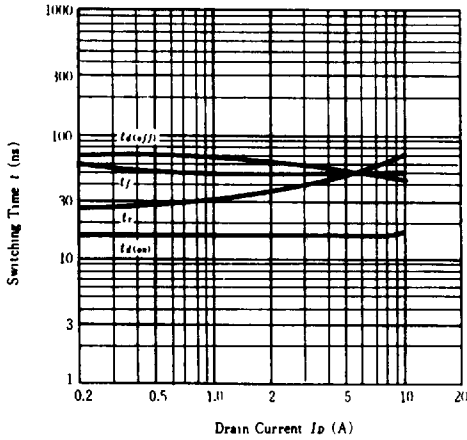


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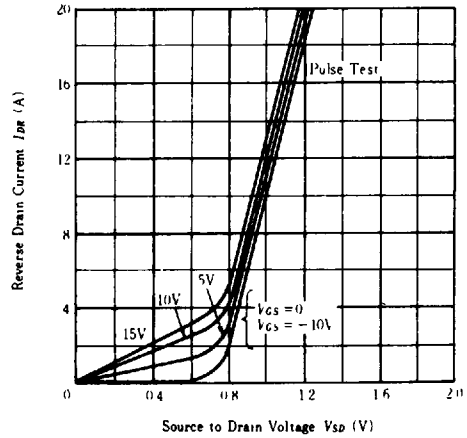
FORWARD TRANSFER ADMITTANCE VS. FREQUENCY



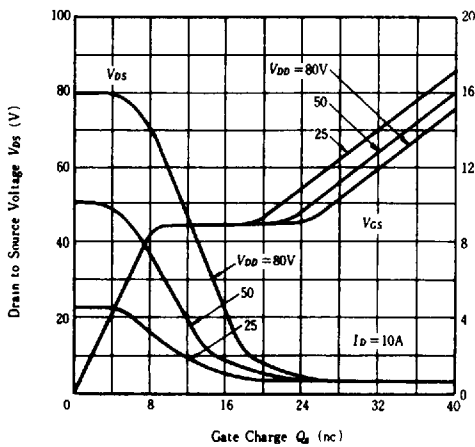
SWITCHING CHARACTERISTICS



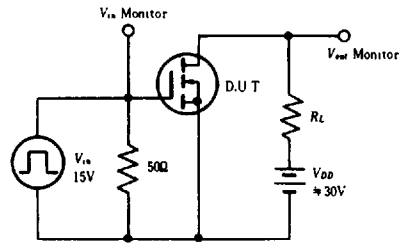
MAXIMUM BODY-DIODE FORWARD VOLTAGE



DYNAMIC INPUT CHARACTERISTICS



SWITCHING TIME TEST CIRCUIT



WAVEFORMS

