

# 2SK413, 2SK414

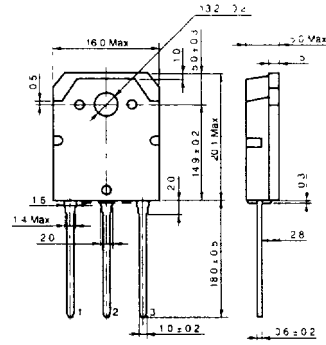
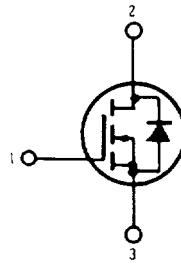
355-951/963

## SILICON N-CANNEL MOS FET

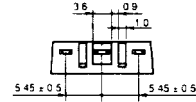
HIGH SPEED POWER SWITCHING,  
HIGH FREQUENCY POWER AMPLIFIER  
Complementary pair with 2SJ118, 119

### FEATURES

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



- 1 Gate
  - 2 Drain (Flange)
  - 3 Source
- (Dimensions in mm)



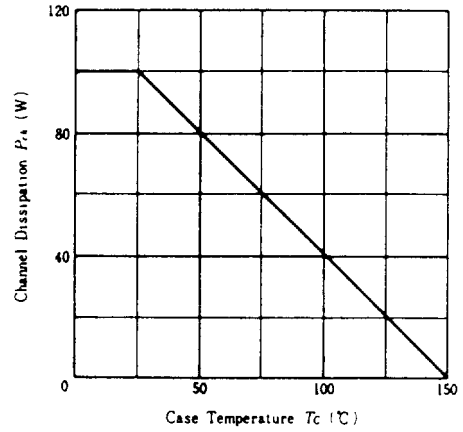
(TO-3P)

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

Item	Symbol	Rating		Unit
		2SK413	2SK414	
Drain-Source Voltage	$V_{DSS}$	140	160	V
Gate-Source Voltage	$V_{GSS}$	±20		V
Drain Current	$I_D$	8		A
Drain Peak Current	$I_{D(peak)}$	12		A
Body-Drain Diode Reverse Drain Current	$I_{DR}$	8		A
Channel Dissipation	$P_{ch}^*$	100		W
Channel Temperature	$T_{ch}$	150		$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 ~ +150		$^\circ\text{C}$

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

### POWER VS TEMPERATURE DERATING

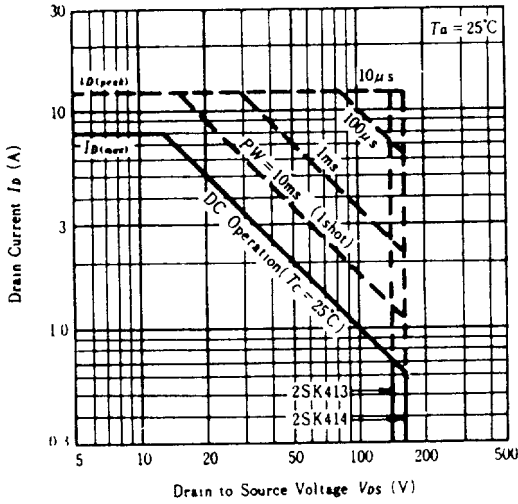


### ELECTRICAL CHARACTERISTICS ( $T_c=25^\circ\text{C}$ )

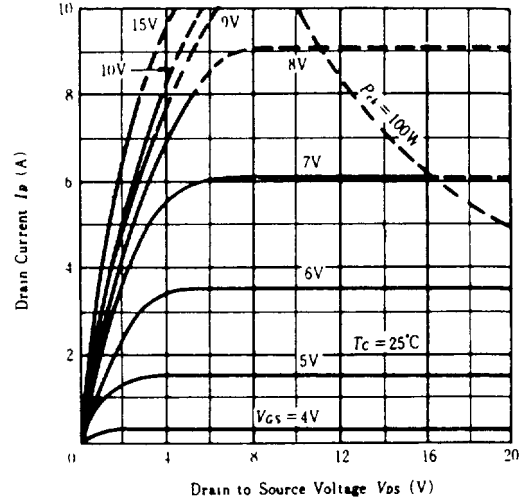
Item	Symbol	Test Condition	min.	typ	max	Unit
Drain-Source Breakdown Voltage	2SK413	$I_D=10\text{mA}, V_{GS}=0$	140	—	—	V
	2SK414		160	—	—	V
Gate-Source Leak Current	$I_{GSS}$	$V_{GS}=\pm 20\text{V}, V_{DS}=0$	—	—	±1	$\mu\text{A}$
Zero Gate Voltage Drain Current	2SK413	$V_{DS}=120\text{V}, V_{GS}=0$	—	—	1	mA
	2SK414		$V_{DS}=140\text{V}, V_{GS}=0$	—	—	1
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	$R_{DS(on)}$	$I_D=4\text{A}, V_{GS}=15\text{V}^*$	—	0.4	0.5	$\Omega$
Drain-Source Saturation Voltage	$V_{DS(on)}$	$I_D=4\text{A}, V_{GS}=15\text{V}^*$	—	1.6	2.0	V
Forward Transfer Admittance	$ y_f $	$I_D=4\text{A}, V_{DS}=10\text{V}^*$	1.0	2.0	—	S
Input Capacitance	$C_{iss}$	$V_{DS}=10\text{V}, V_{GS}=0$ $f=1\text{MHz}$	—	800	—	pF
Output Capacitance	$C_{oss}$		—	330	—	pF
Reverse Transfer Capacitance	$C_{riss}$		—	60	—	pF
Turn-on Delay Time	$t_{don}$	$I_D=2\text{A}, V_{GS}=15\text{V}$ $R_L=15\Omega$	—	15	—	ns
Rise Time	$t_r$		—	35	—	ns
Turn-off Delay Time	$t_{doff}$		—	60	—	ns
Fall Time	$t_f$		—	50	—	ns
Body-Drain Diode Forward Voltage	$V_{DF}$	$I_F=4\text{A}, V_{GS}=0$	—	0.9	—	V
Body-Drain Diode Reverse Recovery Time	$t_{rr}$	$I_F=4\text{A}, V_{GS}=0$ $di_F/dt=50\text{A}/\mu\text{s}$	—	250	—	ns

\* Pulse Test

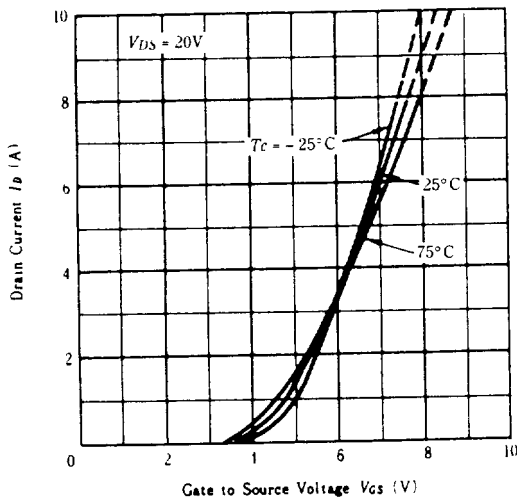
**MAXIMUM SAFE OPERATION AREA**



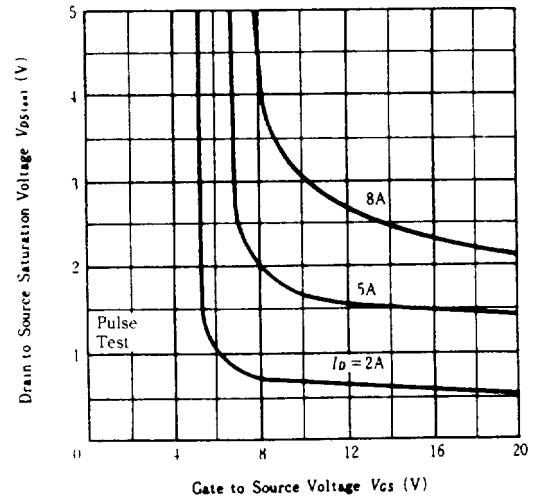
**TYPICAL OUTPUT CHARACTERISTICS**



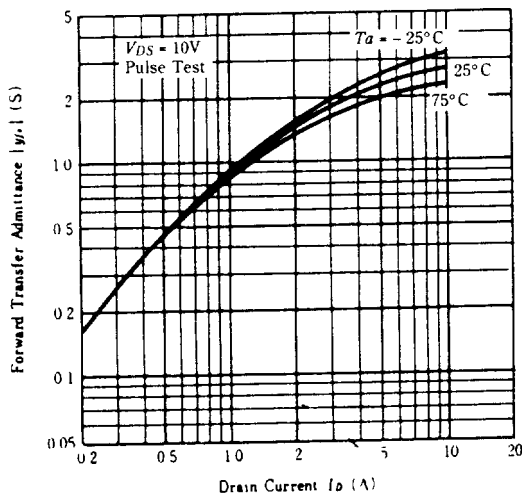
**TYPICAL TRANSFER CHARACTERISTICS**



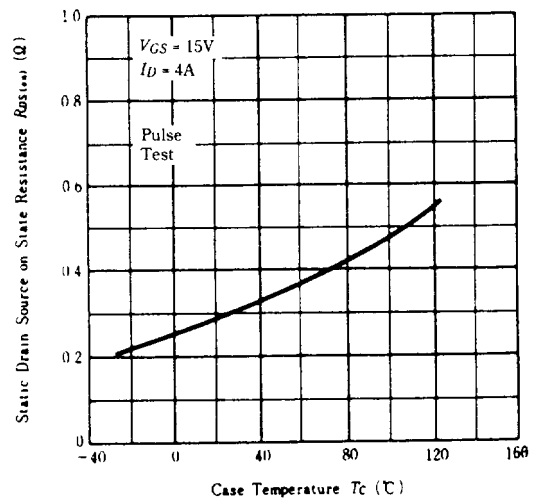
**DRAIN-SOURCE SATURATION VOLTAGE VS GATE-SOURCE VOLTAGE**



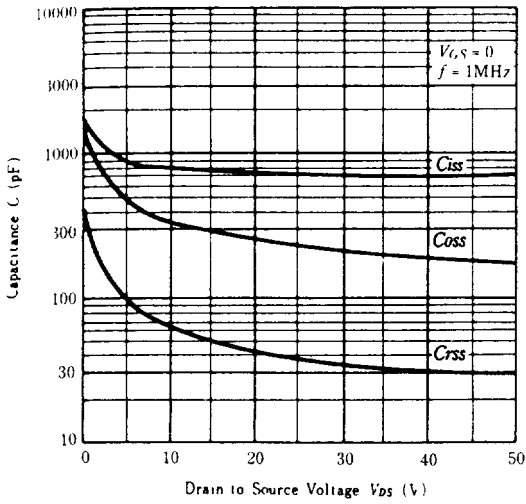
**FORWARD TRANSFER ADMITTANCE VS DRAIN CURRENT**



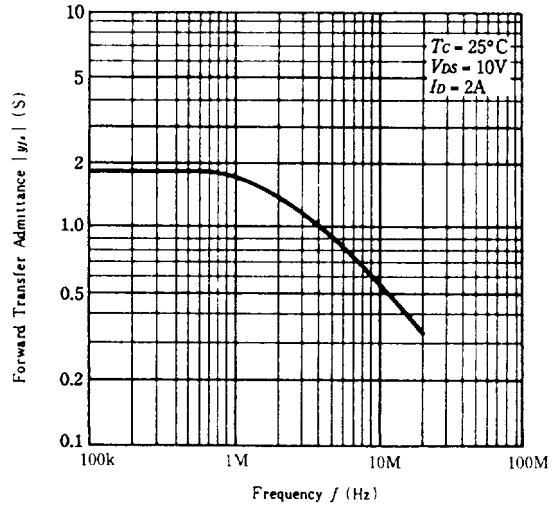
**STATIC DRAIN-SOURCE ON STATE RESISTANCE VS TEMPERATURE**



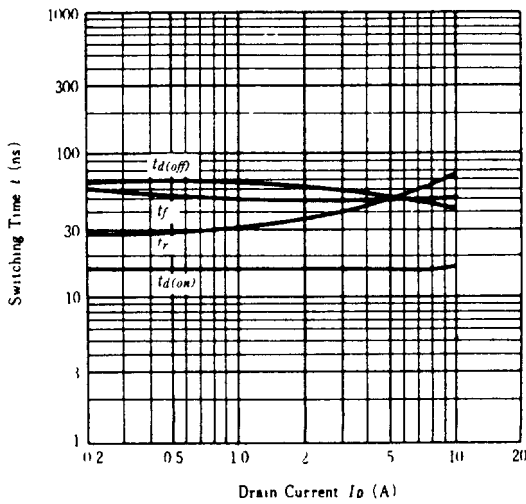
**TYPICAL CAPACITANCE VS. DRAIN-SOURCE VOLTAGE**



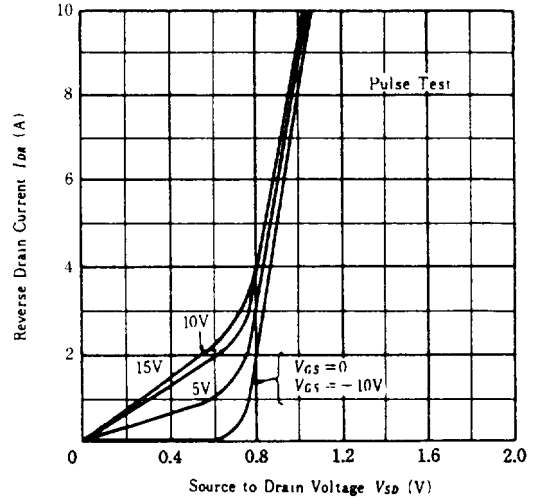
**FORWARD TRANSFER ADMITTANCE VS FREQUENCY**



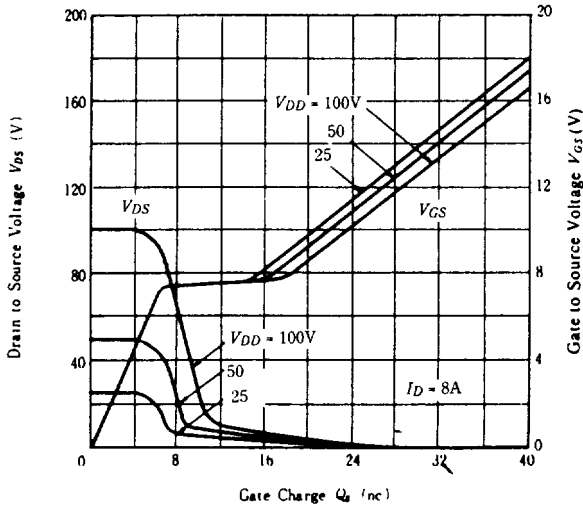
**SWITCHING CHARACTERISTICS**



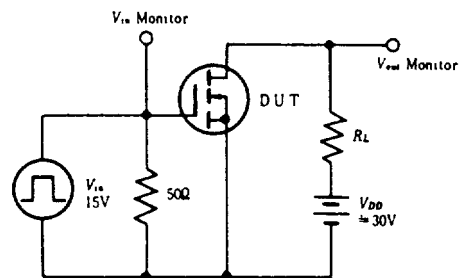
**MAXIMUM BODY-DRAIN DIODE FORWARD VOLTAGE**



**DYNAMIC INPUT CHARACTERISTICS**



**SWITCHING TIME TEST CIRCUIT**



**WAVEFORMS**

