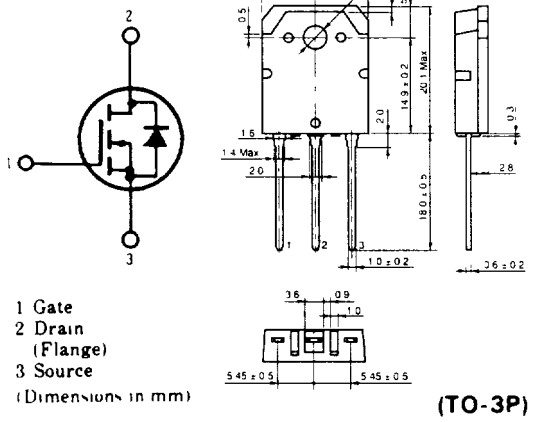
2SK413, 2SK414

355-951 / 963

SILICON N-CHANNEL MOS FET

HIGH SPEED POWER SWITCHING, HIGH FREQUENCY POWER AMPLIFIER

Complementary pair with 2SJ118, 119



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

(TO-3P)

FEATURES

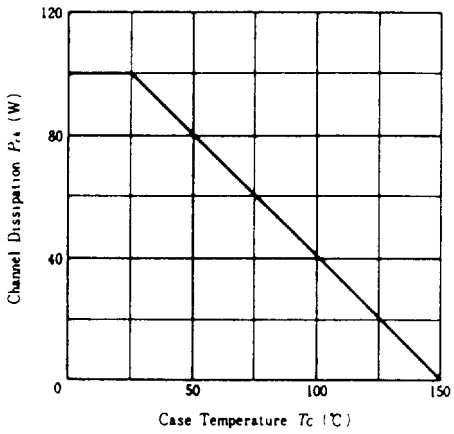
- Low On-Resistance
- High Speed Switching
- High Cutoff Frequency
- No Secondary Breakdown
- Suitable for Switching Regulator, DC-DC Converter, PWM Amplifiers, and Ultrasonic Power Oscillators

ABSOLUTE MAXIMUM RATINGS (T_a=25 °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		°C
Storage Temperature	T_{stg}	−55 ~ +150		°C

*Value at T_c=25 °C

POWER VS TEMPERATURE DERATING

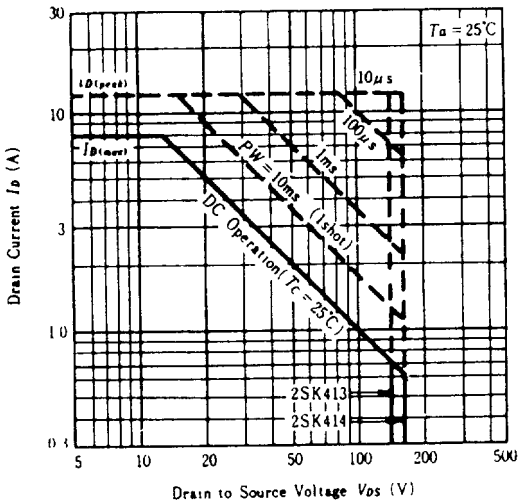


ELECTRICAL CHARACTERISTICS (T_a=25 °C)

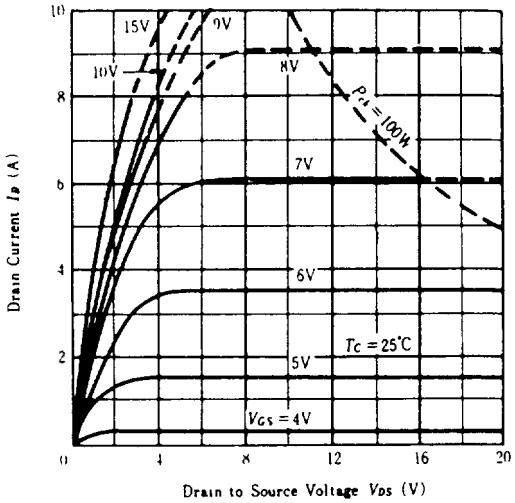
Item		Symbol	Test Condition	min.	typ	max	Unit
Drain-Source Breakdown Voltage	2SK413	$V_{(BR)DSS}$	I_D=10mA, V_{GS}=0	140	—	—	V
	2SK414			160	—	—	V
Gate-Source Leak Current		I_{GSS}	V_{GS}=±20V, V_{DS}=0	—	—	±1	μA
Zero Gate Voltage Drain Current	2SK413	I_{DSS}	V_{DS}=120V, V_{GS}=0	—	—	1	mA
	2SK414		V_{DS}=140V, V_{GS}=0				
Gate-Source Cutoff Voltage		$V_{GS(off)}$	I_D=1mA, V_{DS}=10V	2.0	—	5.0	V
Static Drain-Source On State Resistance		$R_{DS(on)}$	I_D=4A, V_{GS}=15V*	—	0.4	0.5	Ω
Drain-Source Saturation Voltage		$V_{DS(on)}$	I_D=4A, V_{GS}=15V*	—	1.6	2.0	V
Forward Transfer Admittance		$\|y_{fs}\|$	I_D=4A, V_{DS}=10V*	1.0	2.0	—	S
Input Capacitance		C_{iss}	V_{DS}=10V, V_{GS}=0 f=1MHz	—	800	—	pF
Output Capacitance		C_{oss}		—	330	—	pF
Reverse Transfer Capacitance		C_{rss}		—	60	—	pF
Turn-on Delay Time		$t_{d(on)}$	I_D=2A, V_{GS}=15V R_L=15Ω	—	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=4A, V_{GS}=0	—	0.9	—	V
Body-Drain Diode Reverse Recovery Time		t_{rr}	I_F=4A, V_{GS}=0 di_F/dt=50A/μs	—	250	—	ns

*Pulse Test

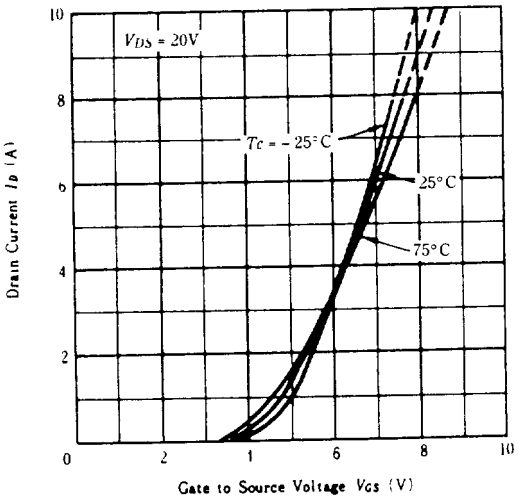
MAXIMUM SAFE OPERATION AREA



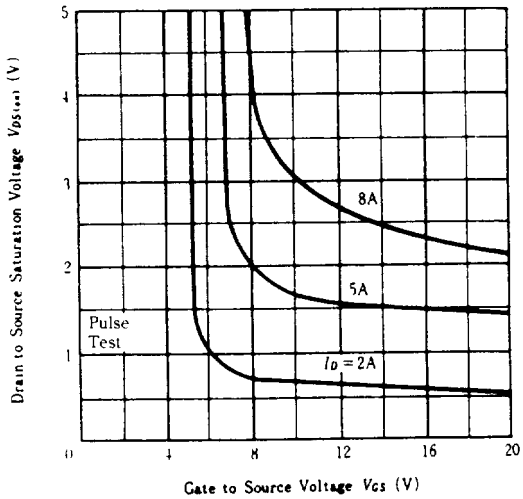
TYPICAL OUTPUT CHARACTERISTICS



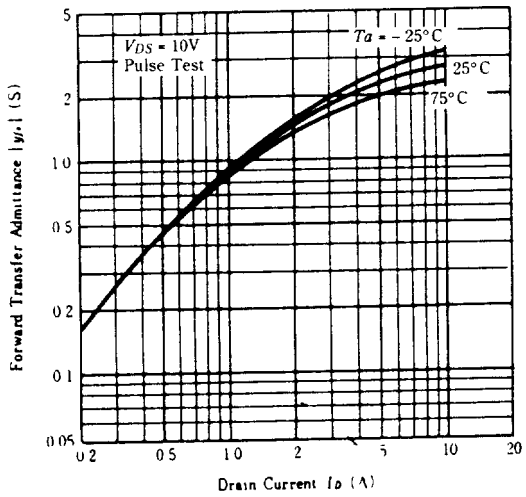
TYPICAL TRANSFER CHARACTERISTICS



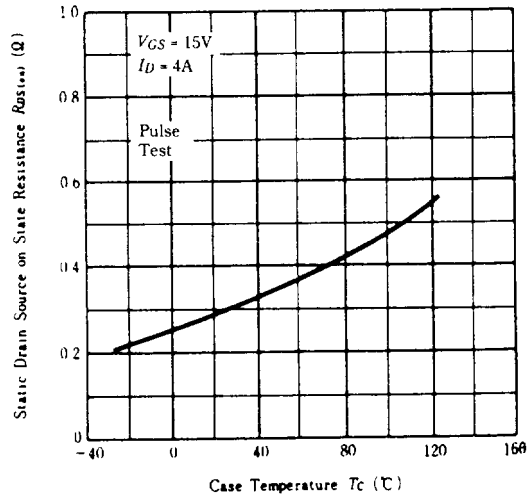
DRAIN-SOURCE SATURATION VOLTAGE VS GATE-SOURCE VOLTAGE



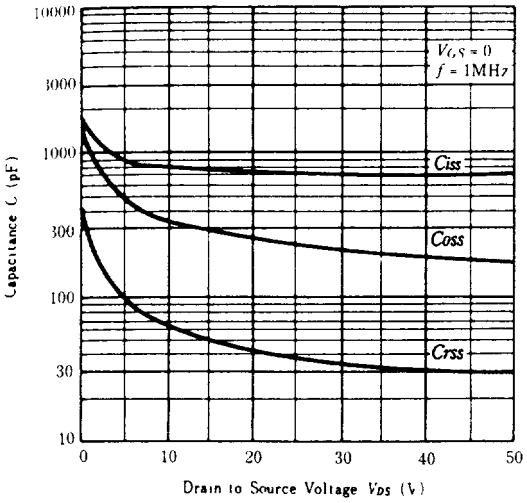
FORWARD TRANSFER ADMITTANCE VS DRAIN CURRENT



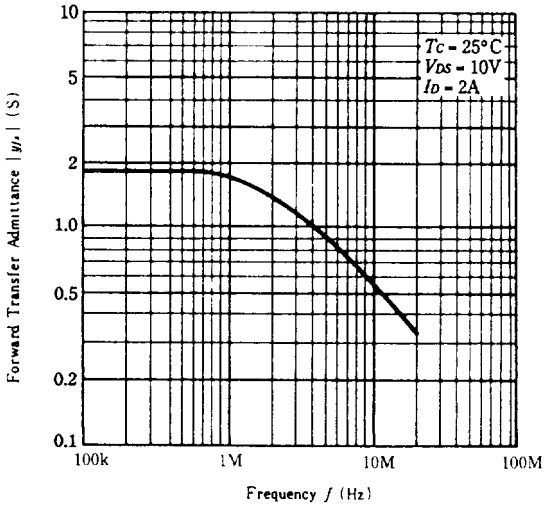
STATIC DRAIN-SOURCE ON STATE RESISTANCE VS TEMPERATURE



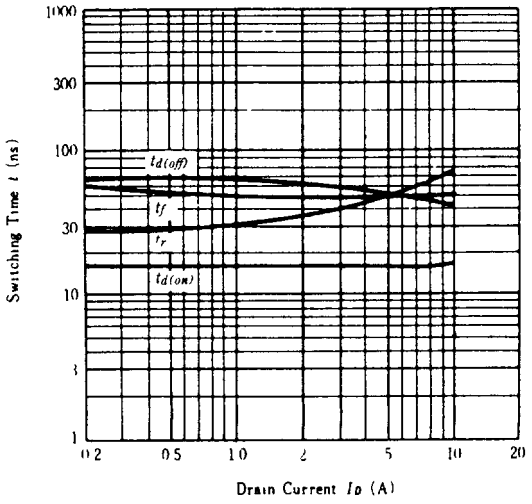
TYPICAL CAPACITANCE VS. DRAIN-SOURCE VOLTAGE



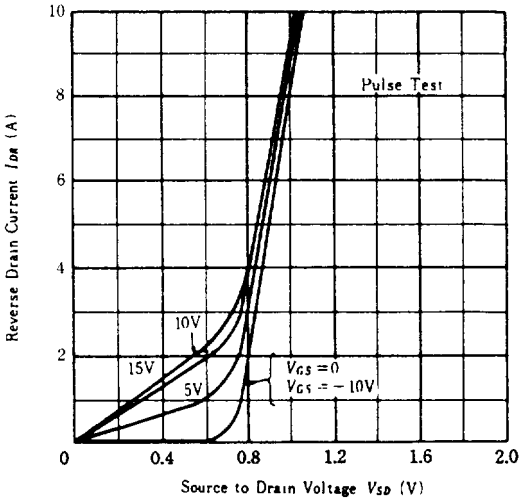
FORWARD TRANSFER ADMITTANCE VS FREQUENCY



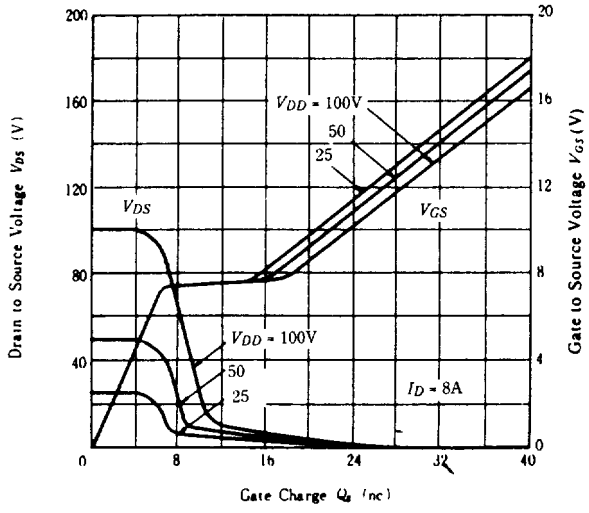
SWITCHING CHARACTERISTICS



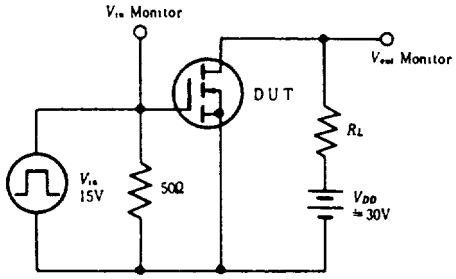
MAXIMUM BODY-DRAIN DIODE FORWARD VOLTAGE



DYNAMIC INPUT CHARACTERISTICS



SWITCHING TIME TEST CIRCUIT



WAVEFORMS