2SK312, 2SK313

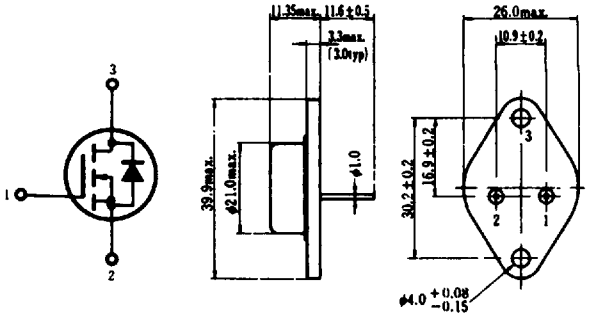
HITACHI/(OPTOELECTRONICS)

SILICON N-CHANNEL MOS FET

HIGH SPEED POWER SWITCHING, HIGH FREQUENCY POWER AMPLIFIER

■ 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.



1. Gate
2. Source
3. Drain (Case)

(JEDEC TO-3)

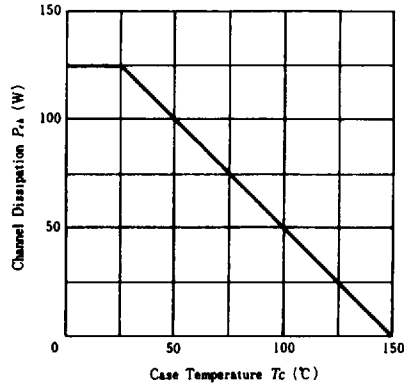
(Dimensions in mm)

■ ABSOLUTE MAXIMUM RATINGS (T_a=25 °C)

Item	Symbol	Rating		Unit
		2SK312	2SK313	
Drain-Source Voltage	V_{DSS}	400	450	V
Gate-Source Voltage	V_{GSS}	±20		V
Drain Current	I_D	12		A
Drain Peak Current	$I_{D(peak)}$	18		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

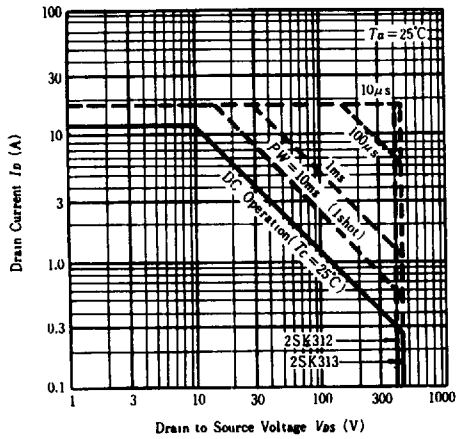


■ ELECTRICAL CHARACTERISTICS (T_a=25 °C)

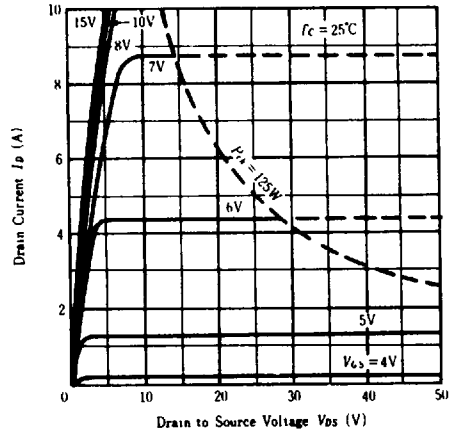
Item		Symbol	Test Condition	min.	typ.	max.	Unit
Drain-Source Breakdown Voltage	2SK312	$V_{(BR)DSS}$	I_D=10mA, V_{GS}=0	400	—	—	V
	2SK313			450	—	—	V
Gate-Source Leak Current		I_{GSS}	V_{GS}=±20V, V_{DS}=0	—	—	±1	μA
Zero Gate Voltage Drain Current	2SK312	I_{DSS}	V_{DS}=320V, V_{GS}=0	—	—	1	mA
	2SK313		V_{DS}=360V, V_{GS}=0				
Gate-Source Cutoff Voltage		$V_{GS(off)}$	I_D=1mA, V_{DS}=10V	1.0	—	5.0	V
Static Drain-Source On State Resistance		$R_{DS(on)}$	I_D=6A, V_{GS}=15V*	—	0.67	0.9	Ω
Drain-Source Saturation Voltage		$V_{DS(on)}$	I_D=6A, V_{GS}=15V*	—	4.0	5.4	V
Forward Transfer Admittance		$\|y_{fs}\|$	I_D=6A, V_{DS}=10V*	1.5	2.5	—	S
Input Capacitance		C_{iss}	V_{DS}=10V, V_{GS}=0, f=1MHz	—	1500	—	pF
Output Capacitance		C_{oss}		—	330	—	pF
Reverse Transfer Capacitance		C_{rss}		—	35	—	pF
Turn-on Delay Time		$t_{d(on)}$	I_D=2A, V_{GS}=15V, R_L=15Ω	—	20	—	ns
Rise Time		t_r		—	50	—	ns
Turn-off Delay Time		$t_{d(off)}$		—	140	—	ns
Fall Time		t_f		—	60	—	ns
Body-Drain Diode Forward Voltage		V_{DF}	I_F=6A, V_{GS}=0	—	0.9	—	V
Body-Drain Diode Reverse Recovery Time		t_{rr}	I_F=6A, V_{GS}=0, di_F/dt=100A/μs	—	400	—	ns

*Pulse Test

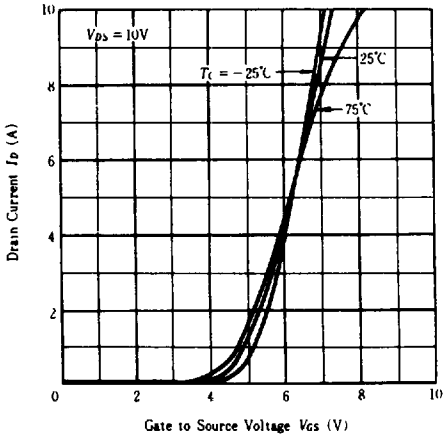
MAXIMUM SAFE OPERATION AREA



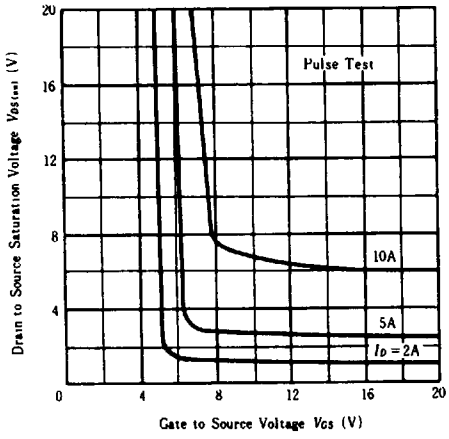
TYPICAL OUTPUT CHARACTERISTICS



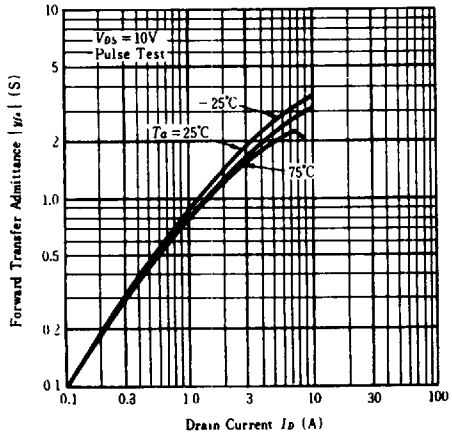
TYPICAL TRANSFER CHARACTERISTICS



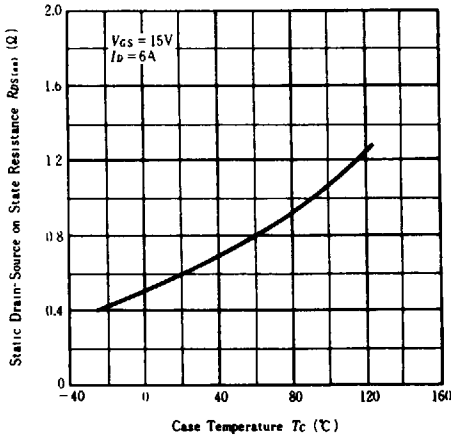
DRAIN-SOURCE SATURATION VOLTAGE VS. GATE-SOURCE VOLTAGE



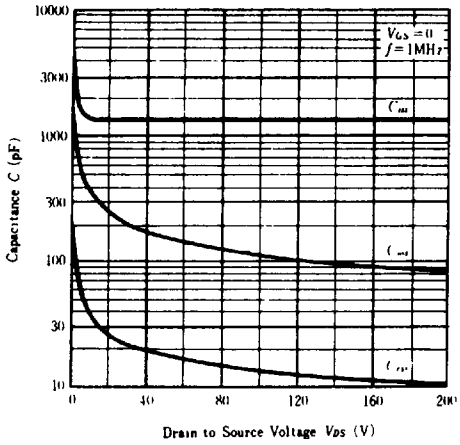
FORWARD TRANSFER ADMITTANCE VS. DRAIN CURRENT



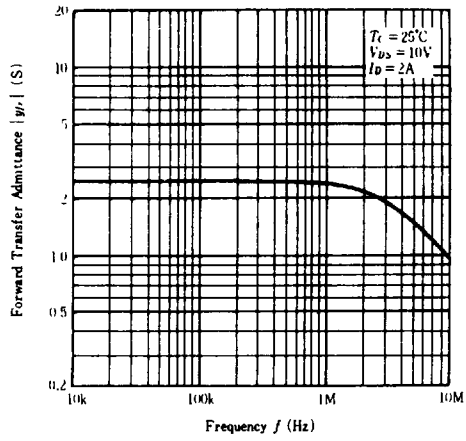
STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. TEMPERATURE



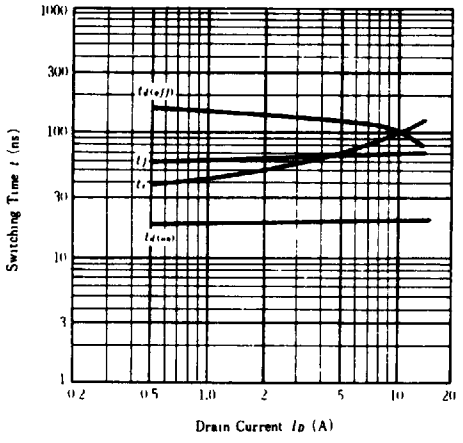
TYPICAL CAPACITANCE VS. DRAIN-SOURCE VOLTAGE



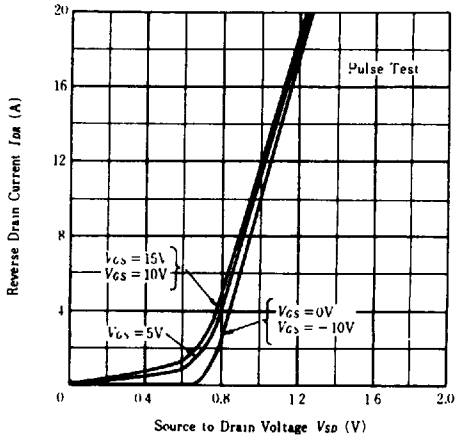
FORWARD TRANSFER ADMITTANCE VS. FREQUENCY



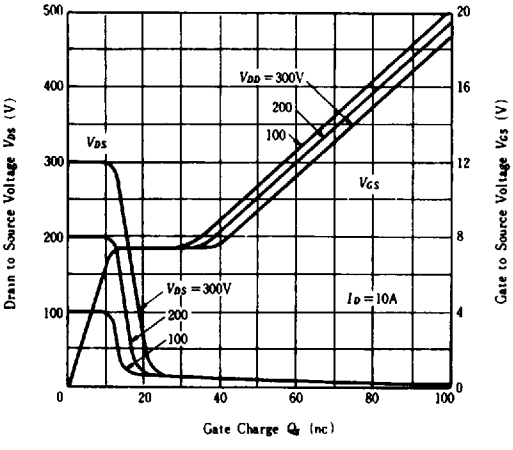
SWITCHING CHARACTERISTICS



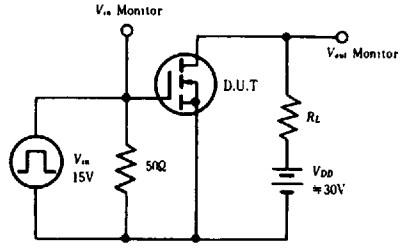
MAXIMUM BODY-DRAIN DIODE FORWARD VOLTAGE



DYNAMIC INPUT CHARACTERISTICS



SWITCHING TIME TEST CIRCUIT



WAVEFORMS