

2SK312, 2SK313

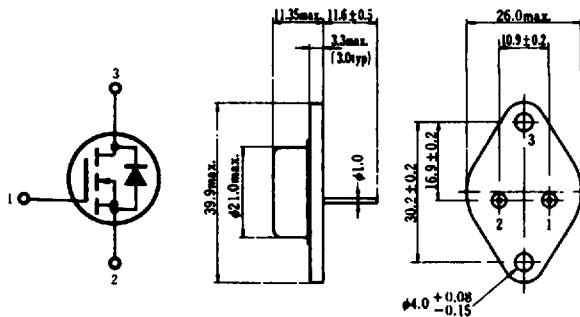
SILICON N-CHANNEL MOS FET

HITACHI/(OPTOELECTRONICS)

**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)

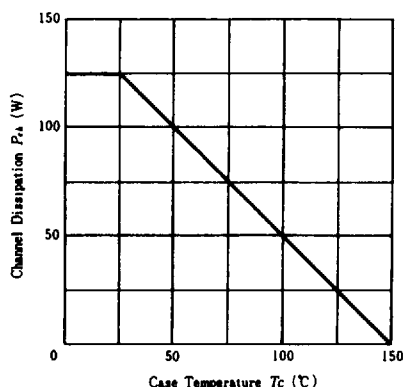
(Dimensions in mm)

■ ABSOLUTE MAXIMUM RATINGS ($T_a=25^\circ\text{C}$)

Item	Symbol	Rating		Unit
		2SK312	2SK313	
Drain-Source Voltage	V_{DS}	400	450	V
Gate-Source Voltage	V_{GS}	± 20		V
Drain Current	I_D	12		A
Drain Peak Current	$I_{D(\text{peak})}$	18		A
Body-Drain Diode Reverse Drain Current	I_{DR}	12		A
Channel Dissipation	P_{ch}^*	125		W
Channel Temperature	T_{ch}	150		$^\circ\text{C}$
Storage Temperature	T_{stg}	$-55 \sim +150$		$^\circ\text{C}$

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

POWER VS. TEMPERATURE DERATING



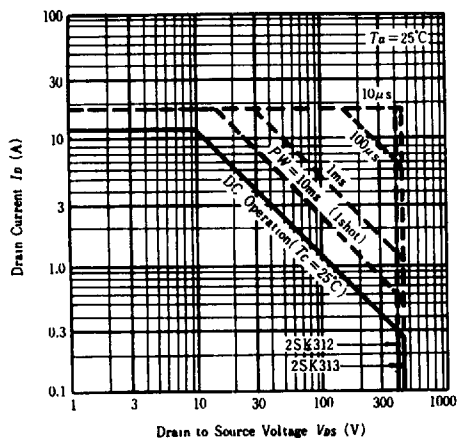
■ ELECTRICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$)

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

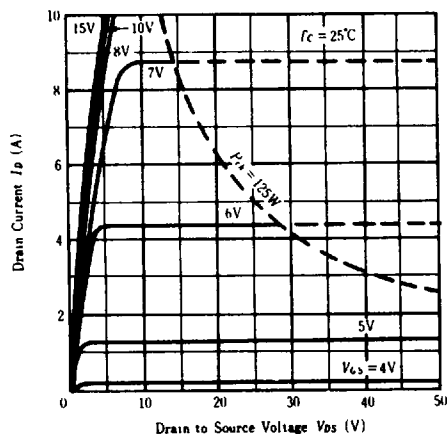
*Pulse Test

HITACHI/(OPTOELECTRONICS)

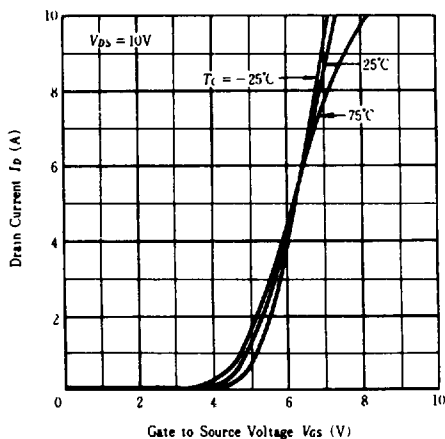
MAXIMUM SAFE OPERATION AREA



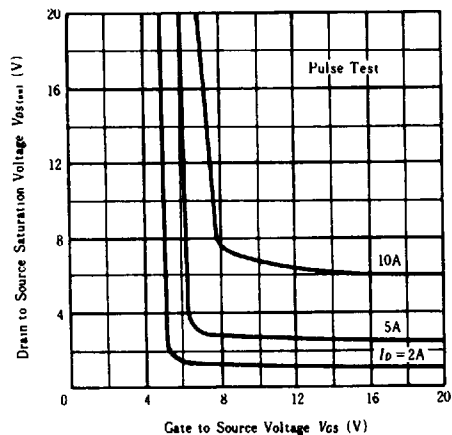
TYPICAL OUTPUT CHARACTERISTICS



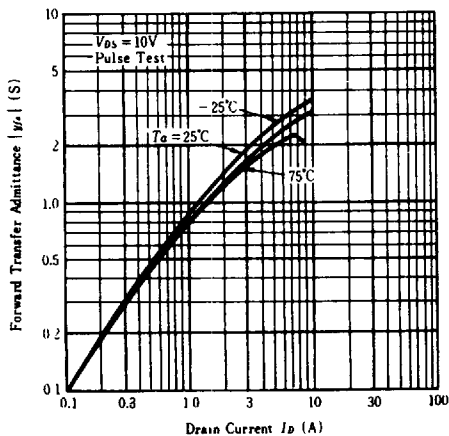
TYPICAL TRANSFER CHARACTERISTICS



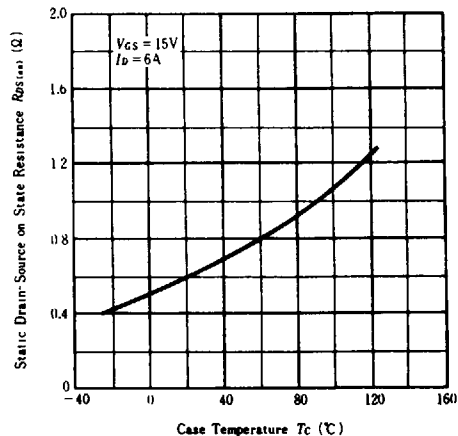
DRAIN-SOURCE SATURATION VOLTAGE VS. GATE-SOURCE VOLTAGE



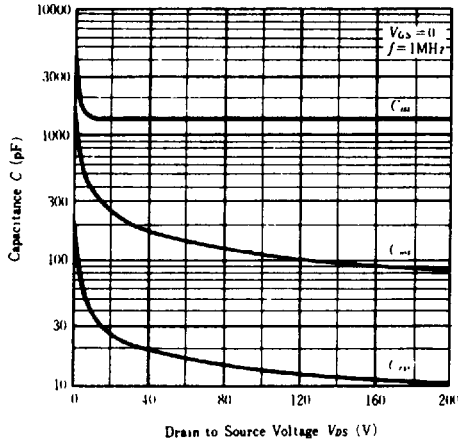
FORWARD TRANSFER ADMITTANCE VS. DRAIN CURRENT



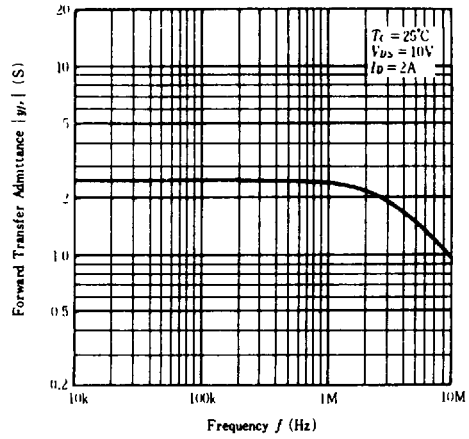
STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. TEMPERATURE



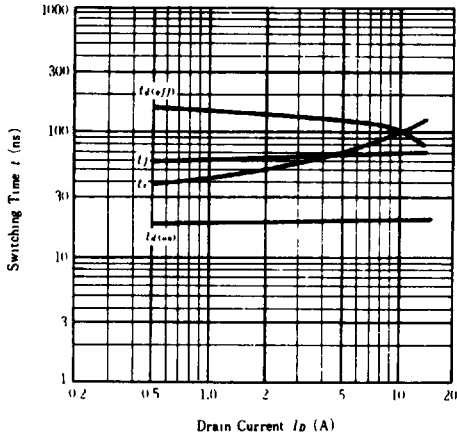
TYPICAL CAPACITANCE VS. DRAIN-SOURCE VOLTAGE



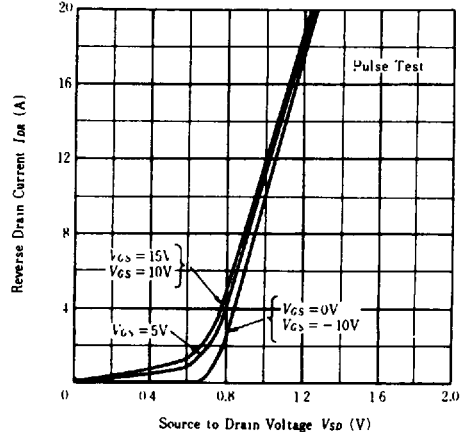
FORWARD TRANSFER ADMITTANCE VS. FREQUENCY



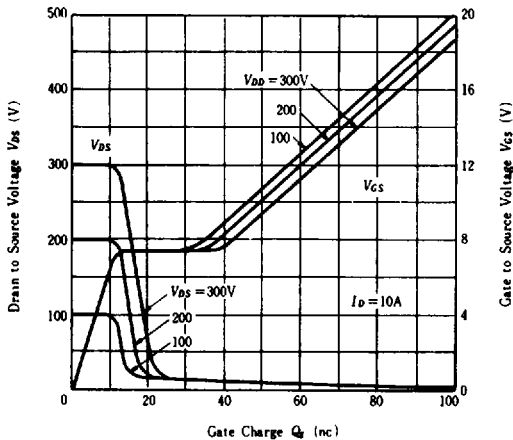
SWITCHING CHARACTERISTICS



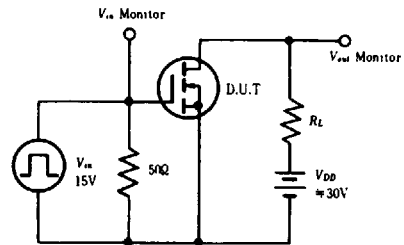
MAXIMUM BODY-DRAIN DIODE FORWARD VOLTAGE



DYNAMIC INPUT CHARACTERISTICS



SWITCHING TIME TEST CIRCUIT



WAVEFORMS

