

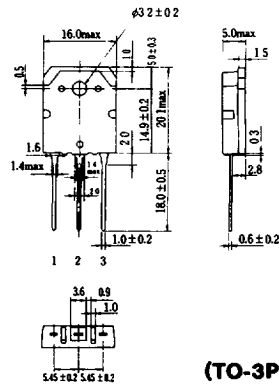
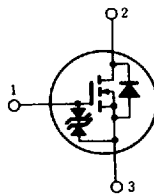
# 2SK682, 2SK683

SILICON N-CHANNEL MOS FET

## HIGH SPEED POWER SWITCHING

### ■ FEATURES

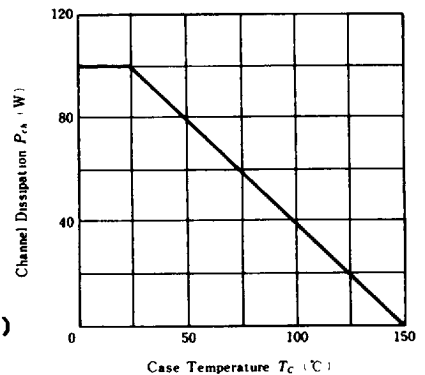
- Low On-Resistance
- High Speed Switching
- Low Drive Current
- No Secondary Breakdown
- Suitable for Switching Regulator, DC-DC Converter and Motor Driver



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

(TO-3P)

### POWER VS. TEMPERATURE DERATING



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

Item	Symbol	2SK682	2SK683	Unit
Drain-Source Voltage	$V_{DSS}$	450	500	V
Gate-Source Voltage	$V_{GSS}$	±20		V
Drain Current	$I_D$	12		A
Drain Peak Current	$I_{D(pulse)}$ *	48		A
Body-Drain Diode Reverse Drain Current	$I_{DR}$	12		A
Channel Dissipation	$P_{ch}$ **	100		W
Channel Temperature	$T_{ch}$	150		°C
Storage Temperature	$T_{stg}$	-55 ~ +150		°C

\*PW ≤ 10μs, duty cycle ≤ 1%  
\*\*Value at  $T_c=25^\circ\text{C}$

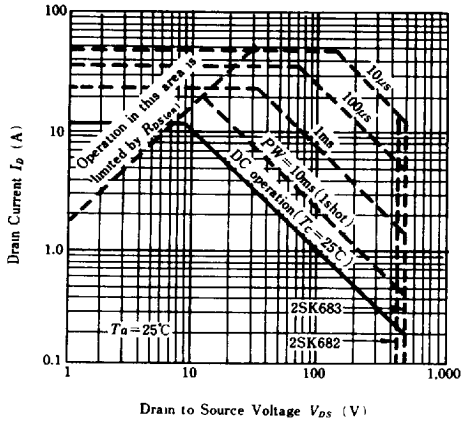
HITACHI/(OPTOELECTRONICS)

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

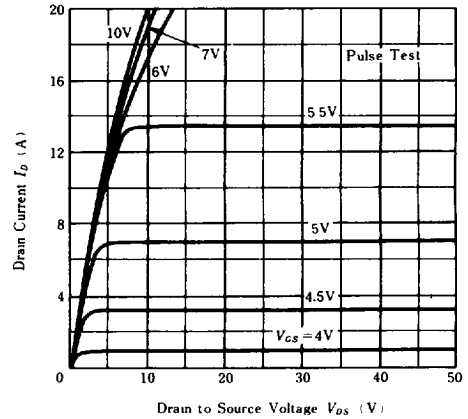
Item	Symbol	Test Condition	min.	typ.	max.	Unit
Drain-Source Breakdown Voltage	2SK682	$I_D=10\text{mA}, V_{GS}=0$	450	—	—	V
	2SK683		500	—	—	
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	$I_G=\pm 100\mu\text{A}, V_{DS}=0$	±20	—	—	V
Gate-Source Leak Current	$I_{GSS}$	$V_{GS}=\pm 16\text{V}, V_{DS}=0$	—	—	±10	μA
Zero Gate Voltage Drain Current	2SK682	$V_{DS}=360\text{V}, V_{GS}=0$	—	—	250	μA
	2SK683		$V_{DS}=400\text{V}, V_{GS}=0$	—	—	
Gate-Source Cutoff Voltage	$V_{GS(off)}$	$I_D=1\text{mA}, V_{DS}=10\text{V}$	2.0	—	4.0	V
Static Drain-Source On State Resistance	2SK682	$I_D=6\text{A}, V_{GS}=10\text{V}^*$	—	0.4	0.55	Ω
	2SK683		—	0.45	0.60	
Forward Transfer Admittance	$ y_{fs} $	$I_D=6\text{A}, V_{DS}=10\text{V}^*$	6	10	—	S
Input Capacitance	$C_{iss}$	$V_{DS}=10\text{V}, V_{GS}=0, f=1\text{MHz}$	—	2050	—	pF
Output Capacitance	$C_{oss}$		—	720	—	pF
Reverse Transfer Capacitance	$C_{rss}$		—	80	—	pF
Turn-on Delay Time	$t_{d(on)}$	$I_D=6\text{A}, V_{GS}=10\text{V}, R_L=5\Omega$	—	25	—	ns
Rise Time	$t_r$		—	85	—	ns
Turn-off Delay Time	$t_{d(off)}$		—	145	—	ns
Fall Time	$t_f$		—	85	—	ns
Body-Drain Diode Forward Voltage	$V_{DF}$	$I_F=12\text{A}, V_{GS}=0$	—	1.0	—	V
Body-Drain Diode Reverse Recovery Time	$t_{rr}$	$I_F=12\text{A}, V_{GS}=0, dI_F/dt=100\text{A}/\mu\text{s}$	—	120	—	ns

\*Pulse Test

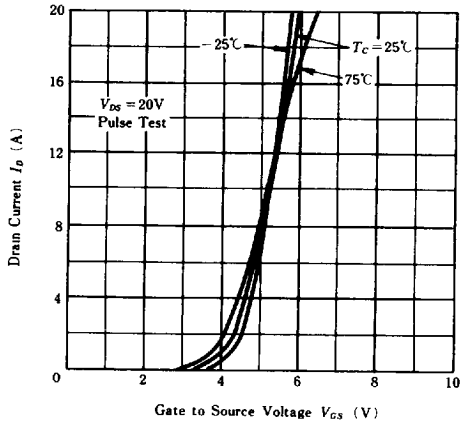
MAXIMUM SAFE OPERATION AREA



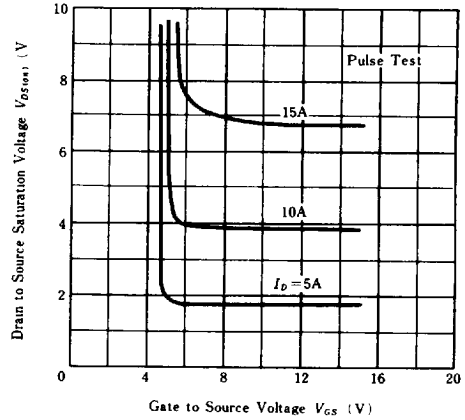
TYPICAL OUTPUT CHARACTERISTICS



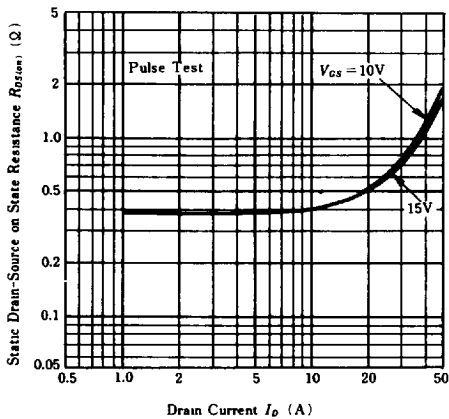
TYPICAL TRANSFER CHARACTERISTICS



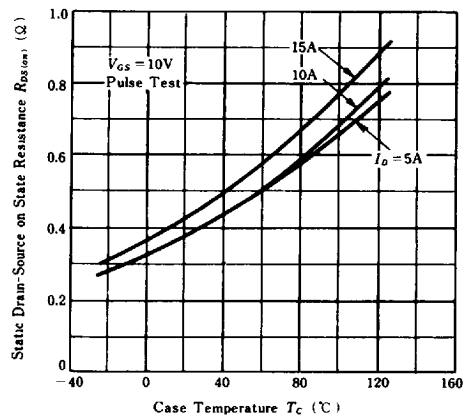
DRAIN-SOURCE SATURATION VOLTAGE VS. GATE-SOURCE VOLTAGE



STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. DRAIN CURRENT

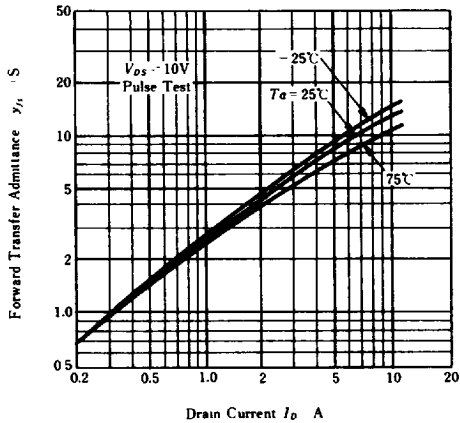


STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. TEMPERATURE

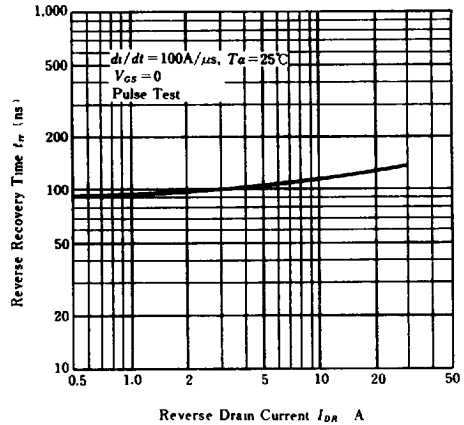


HITACHI/(OPTOELECTRONICS)

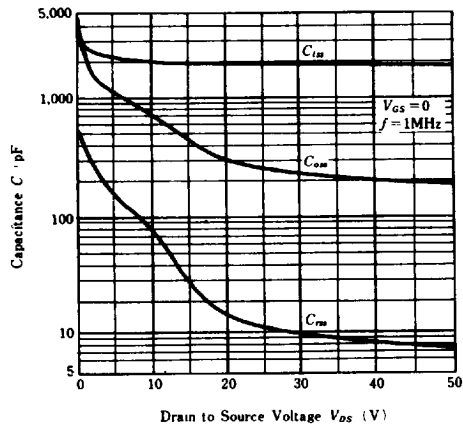
**FORWARD TRANSFER ADMITTANCE VS. DRAIN CURRENT**



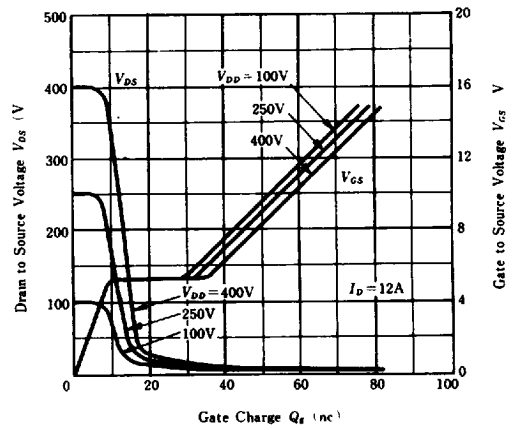
**BODY DRAIN DIODE REVERSE RECOVERY TIME**



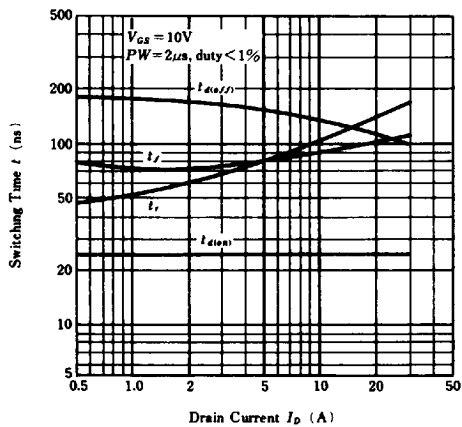
**TYPICAL CAPACITANCE VS. DRAIN-SOURCE VOLTAGE**



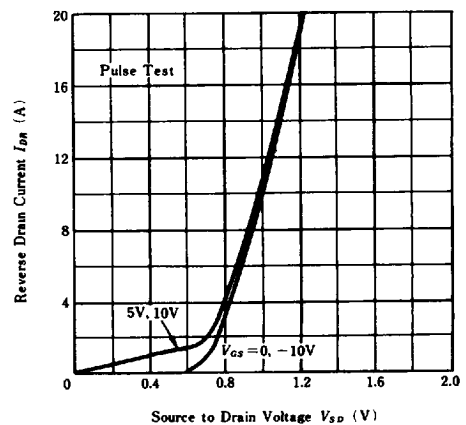
**DYNAMIC INPUT CHARACTERISTICS**



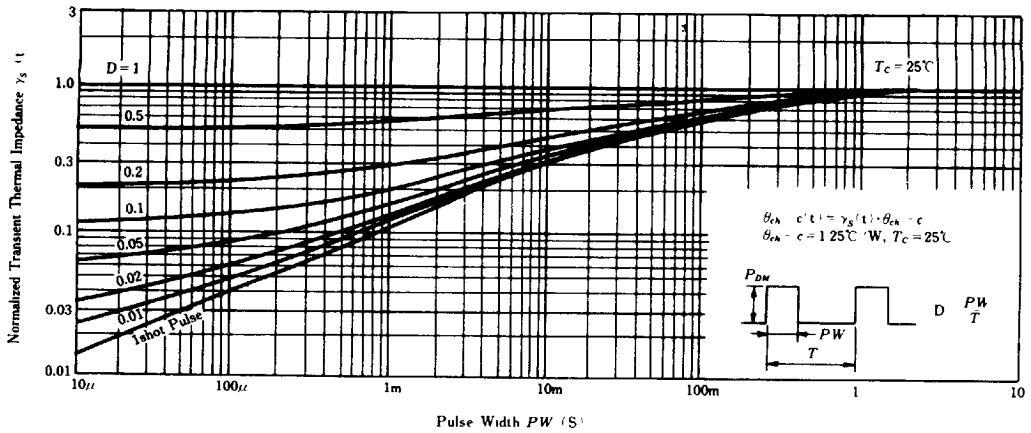
**SWITCHING CHARACTERISTICS**



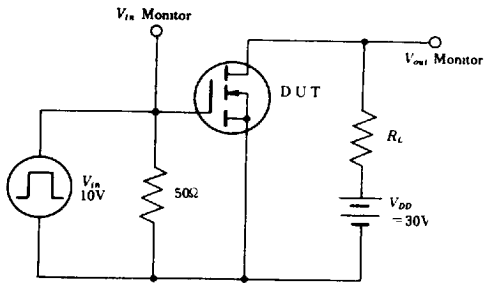
**REVERSE DRAIN CURRENT VS. SOURCE TO DRAIN VOLTAGE**



**NORMALIZED TRANSIENT THERMAL IMPEDANCE VS. PULSE WIDTH**



**SWITCHING TIME TEST CIRCUIT**



**WAVEFORMS**

