

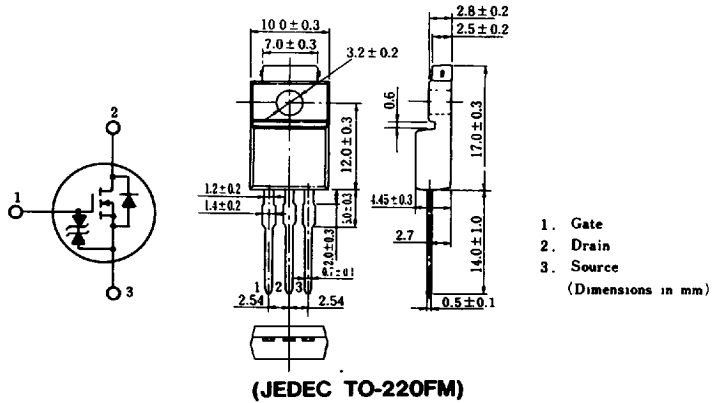
# 2SK1230

■ 4496205 0013261 179 ■ HITACHI  
HITACHI/(OPTOELECTRONICS) 61E D-

## 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 and DC-DC Converter



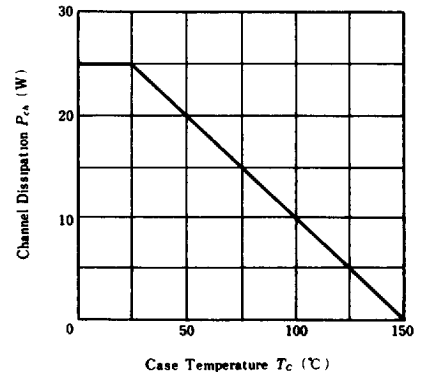
### ABSOLUTE MAXIMUM RATINGS ( $T_a=25^\circ\text{C}$ )

Item	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DSS}$	120	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Drain Current	$I_D$	10	A
Drain Peak Current	$I_{D(pulse)}$ *	40	A
Body-Drain Diode Reverse Drain Current	$I_{DR}$	10	A
Channel Dissipation	$P_{ch}$ **	25	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	$-55 \sim +150$	$^\circ\text{C}$

\*PW $\leq 10\mu\text{s}$ , duty cycle $\leq 1\%$

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

### POWER VS. TEMPERATURE DERATING

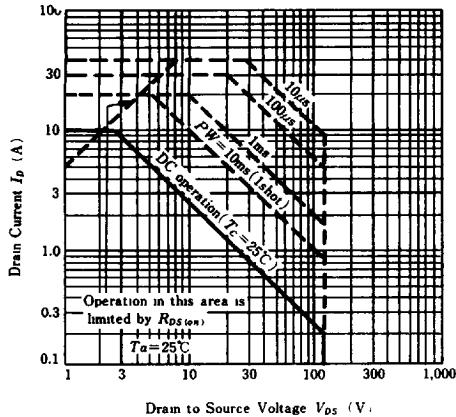


### ELECTRICAL CHARACTERISTICS ( $T_a=25^\circ\text{C}$ )

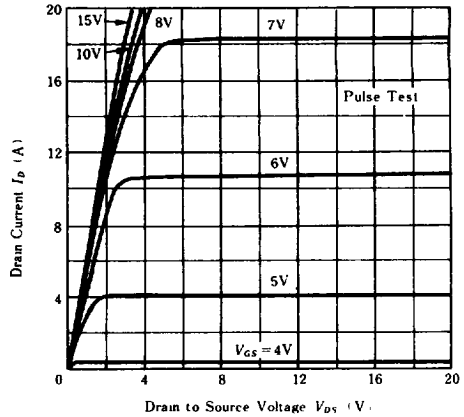
Item	Symbol	Test Condition	min.	typ.	max.	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=10\text{mA}$ , $V_{GS}=0$	120	—	—	V
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	$I_G=\pm 100\mu\text{A}$ , $V_{DS}=0$	$\pm 20$	—	—	V
Gate-Source Leak Current	$I_{GSS}$	$V_{GS}=\pm 16\text{V}$ , $V_{DS}=0$	—	—	$\pm 10$	$\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=100\text{V}$ , $V_{GS}=0$	—	—	250	$\mu\text{A}$
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	$R_{DS(on)}$	$I_D=5\text{A}$ , $V_{GS}=10\text{V}^*$	—	0.15	0.20	$\Omega$
Forward Transfer Admittance	$ y_{fs} $	$I_D=5\text{A}$ , $V_{DS}=10\text{V}^*$	3.0	5.0	—	S
Input Capacitance	$C_{iss}$	$V_{DS}=10\text{V}$ , $V_{GS}=0$ , $f=1\text{MHz}$	—	730	—	pF
Output Capacitance	$C_{oss}$		—	330	—	pF
Reverse Transfer Capacitance	$C_{rss}$		—	40	—	pF
Turn-on Delay Time	$t_{d(on)}$	$I_D=5\text{A}$ , $V_{GS}=10\text{V}$ , $R_L=6\Omega$	—	15	—	ns
Rise Time	$t_r$		—	40	—	ns
Turn-off Delay Time	$t_{d(off)}$		—	70	—	ns
Fall Time	$t_f$		—	45	—	ns
Body-Drain Diode Forward Voltage	$V_{DF}$	$I_F=10\text{A}$ , $V_{GS}=0$	—	1.2	—	V
Body-Drain Diode Reverse Recovery Time	$t_{rr}$	$I_F=10\text{A}$ , $V_{GS}=0$ , $di_F/dt=50\text{A}/\mu\text{s}$	—	200	—	ns

\*Pulse Test

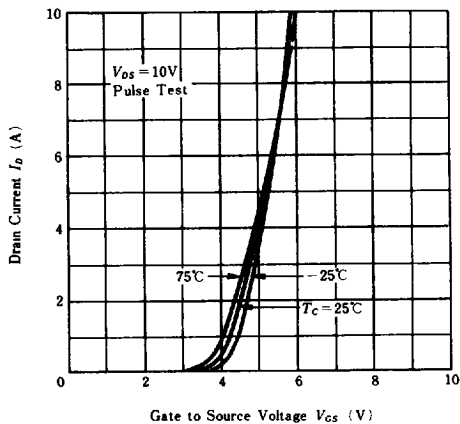
**MAXIMUM SAFE OPERATION AREA**



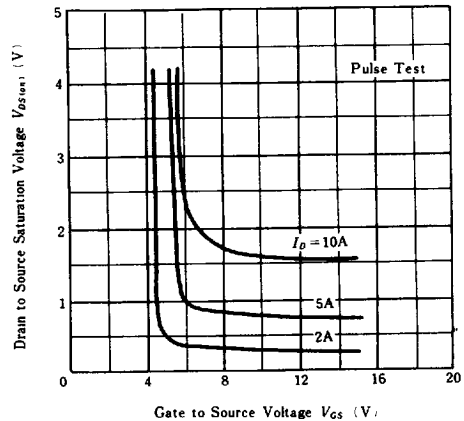
**TYPICAL OUTPUT CHARACTERISTICS**



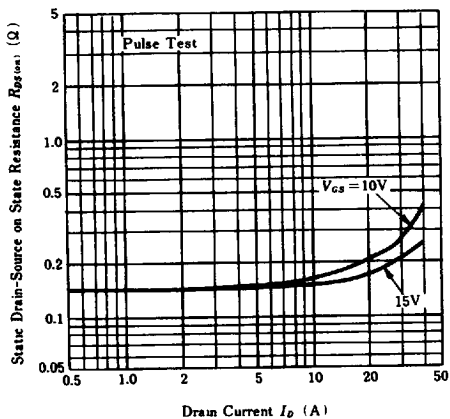
**TYPICAL TRANSFER CHARACTERISTICS**



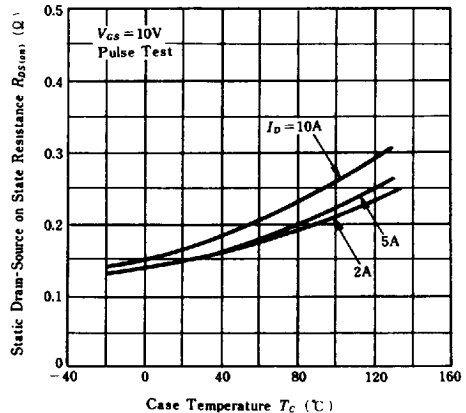
**DRAIN-SOURCE SATURATION VOLTAGE VS. GATE-SOURCE VOLTAGE**



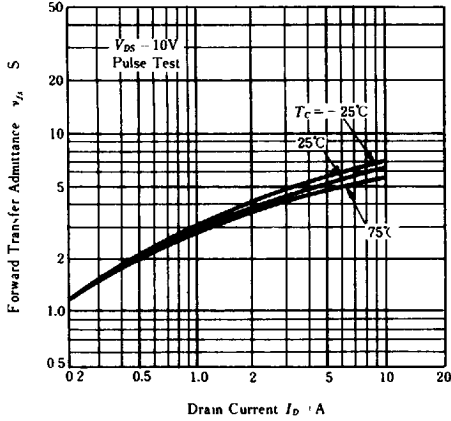
**STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. DRAIN CURRENT**



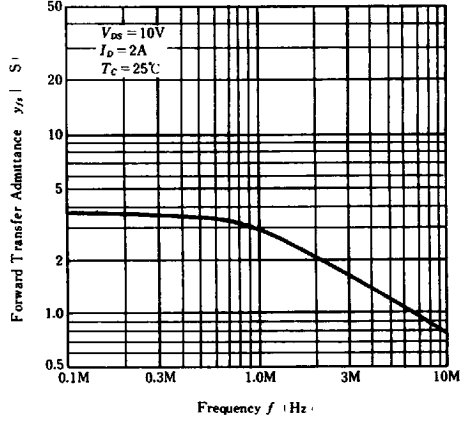
**STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. TEMPERATURE**



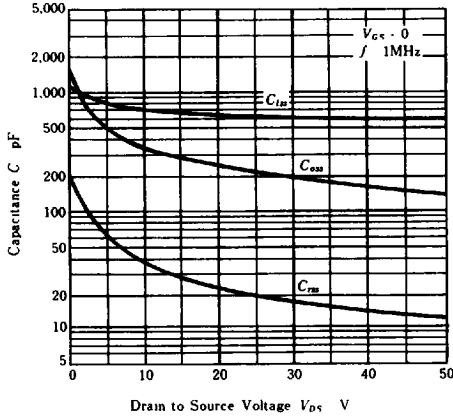
**FORWARD TRANSFER ADMITTANCE VS. DRAIN CURRENT**



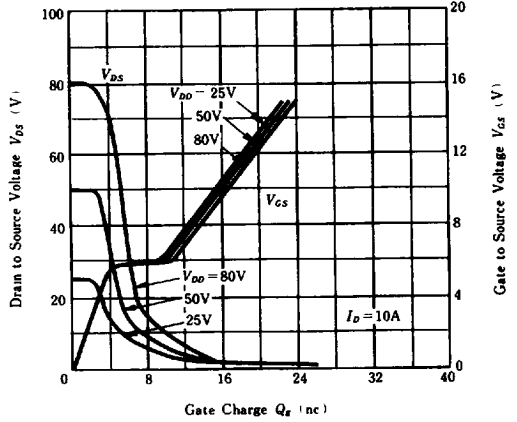
**FORWARD TRANSFER ADMITTANCE VS. FREQUENCY**



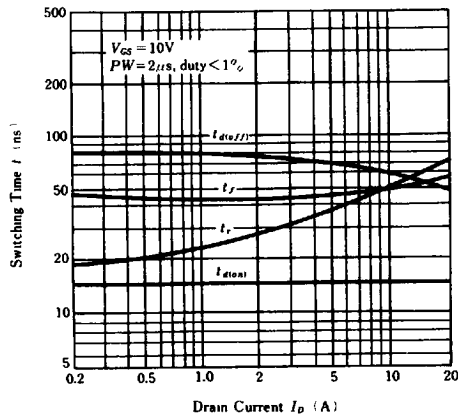
**TYPICAL CAPACITANCE VS. DRAIN-SOURCE VOLTAGE**



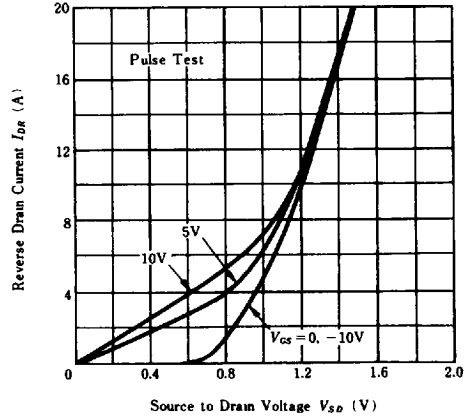
**DYNAMIC INPUT CHARACTERISTICS**



**SWITCHING CHARACTERISTICS**

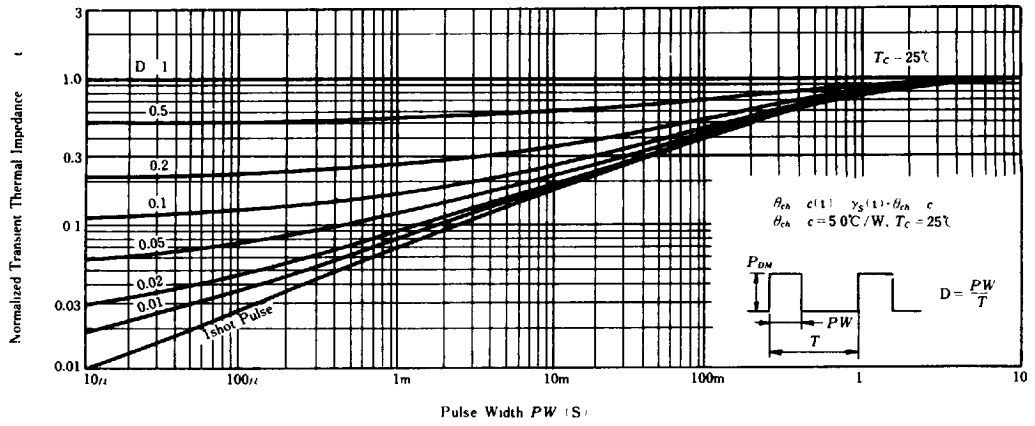


**REVERSE DRAIN CURRENT VS. SOURCE TO DRAIN VOLTAGE**

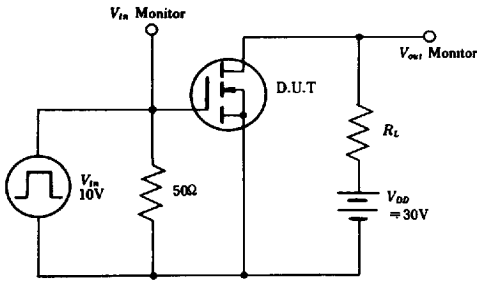


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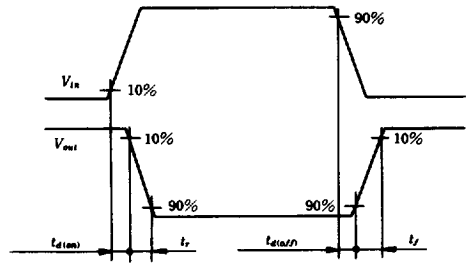
NORMALIZED TRANSIENT THERMAL IMPEDANCE VS. PULSE WIDTH



SWITCHING TIME TEST CIRCUIT



WAVEFORMS



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