

2SK970

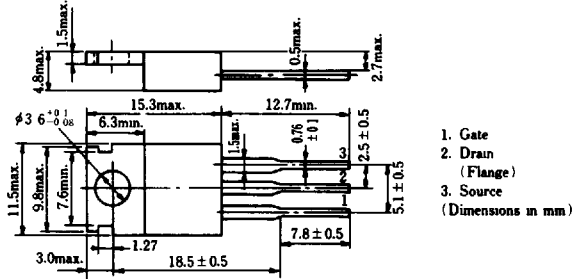
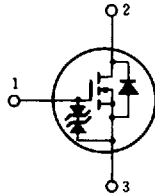
HITACHI/(OPTOELECTRONICS)

SILICON N-CHANNEL MOS FET

HIGH SPEED POWER SWITCHING

■ FEATURES

- Low On-Resistance
- High Speed Switching
- Low Drive Current
- 4 V Gate Drive Device
 - Can be driven from 5 V source
- Suitable for Motor Drive, DC-DC Converter, Power Switch and Solenoid Drive



(JEDEC TO-220AB)

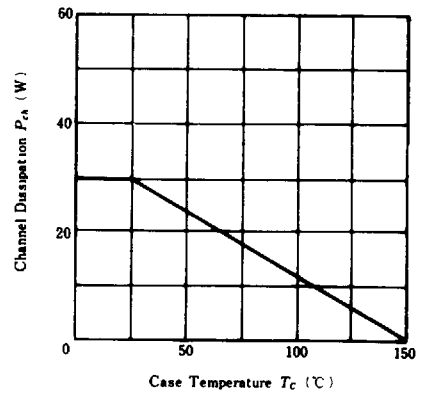
■ ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

Item	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current	I_D	10	A
Drain Peak Current	$I_{D(\text{pulse})}^*$	40	A
Body-Drain Diode Reverse Drain Current	I_{DR}	10	A
Channel Dissipation	P_{ca}^{**}	30	W
Channel Temperature	T_{ca}	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

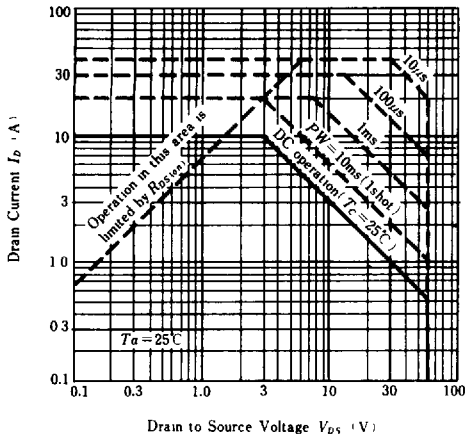


■ ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

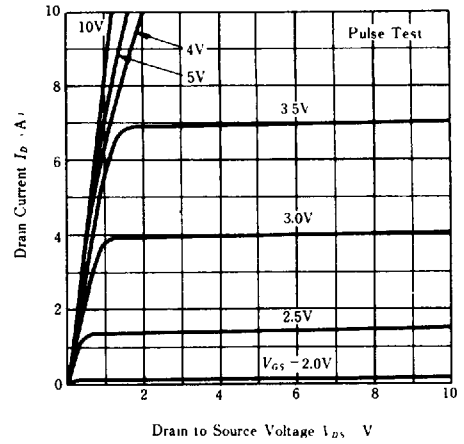
Item	Symbol	Test Condition	min.	typ.	max.	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DS}$	$I_D = 10\text{mA}$, $V_{GS} = 0$	60	—	—	V
Gate-Source Breakdown Voltage	$V_{(BR)GS}$	$I_G = \pm 100\mu\text{A}$, $V_{DS} = 0$	± 20	—	—	V
Gate-Source Leak Current	I_{GSS}	$V_{GS} = \pm 16\text{V}$, $V_{DS} = 0$	—	—	± 10	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 50\text{V}$, $V_{GS} = 0$	—	—	250	μA
Gate-Source Cutoff Voltage	$V_{GS(\text{off})}$	$I_D = 1\text{mA}$, $V_{DS} = 10\text{V}$	1.0	—	2.0	V
Static Drain-Source on State Resistance	$R_{DS(\text{on})}$	$I_D = 5\text{A}$, $V_{GS} = 10\text{V}^*$	—	0.12	0.15	Ω
		$I_D = 5\text{A}$, $V_{GS} = 4\text{V}^*$	—	0.17	0.22	Ω
Forward Transfer Admittance	$ y_{fs} $	$I_D = 5\text{A}$, $V_{DS} = 10\text{V}^*$	3.5	6.0	—	S
Input Capacitance	C_{iss}	$V_{DS} = 10\text{V}$, $V_{GS} = 0$ $f = 1\text{MHz}$	—	400	—	pF
Output Capacitance	C_{oss}		—	220	—	pF
Reverse Transfer Capacitance	C_{rss}		—	60	—	pF
Turn-on Delay Time	$t_{d(\text{on})}$	$I_D = 5\text{A}$, $V_{GS} = 10\text{V}$ $R_L = 6\Omega$	—	5	—	ns
Rise Time	t_r		—	55	—	ns
Turn-off Delay Time	$t_{d(\text{off})}$		—	140	—	ns
Fall Time	t_f		—	90	—	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}	$I_F = 10\text{A}$, $V_{GS} = 0$ $di_F/dt = 50\text{A}/\mu\text{s}$	—	125	—	ns

*Pulse Test

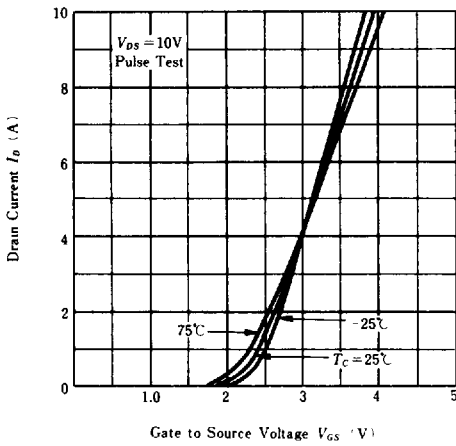
MAXIMUM SAFE OPERATION AREA



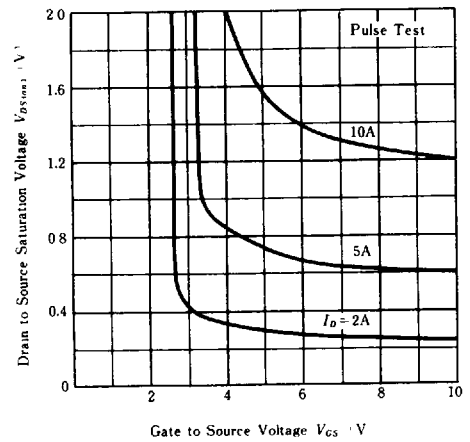
TYPICAL OUTPUT CHARACTERISTICS



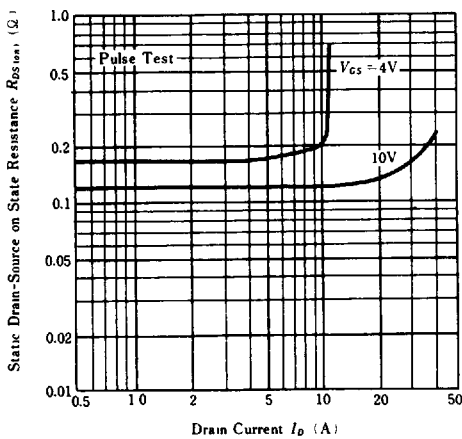
TYPICAL TRANSFER CHARACTERISTICS



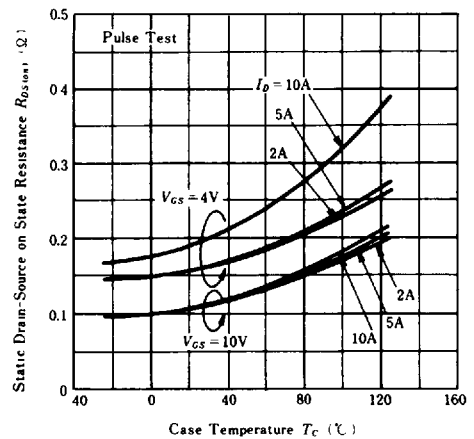
DRAIN-SOURCE SATURATION VOLTAGE VS. GATE-SOURCE VOLTAGE



STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. DRAIN CURRENT

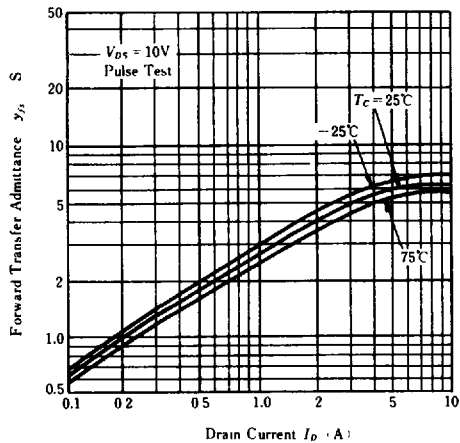


STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. TEMPERATURE

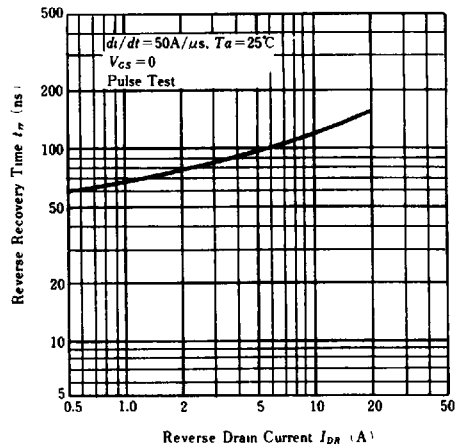


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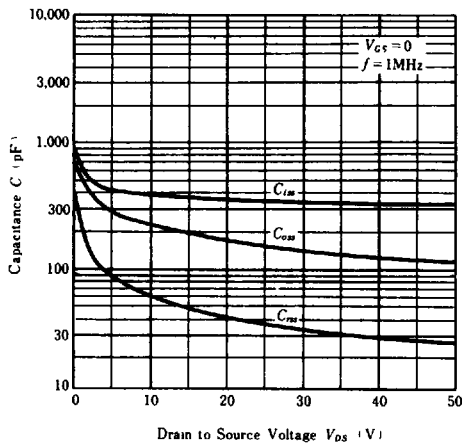
FORWARD TRANSFER ADMITTANCE VS. DRAIN CURRENT



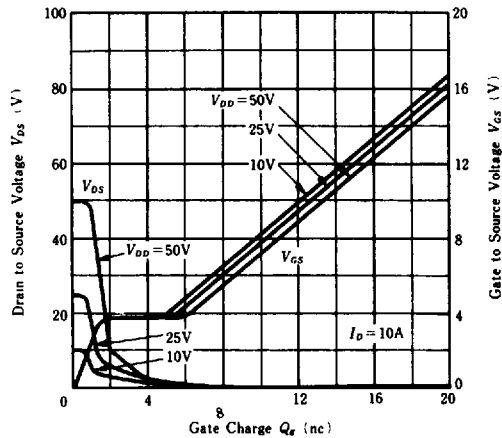
BODY-DRAIN DIODE REVERSE RECOVERY TIME



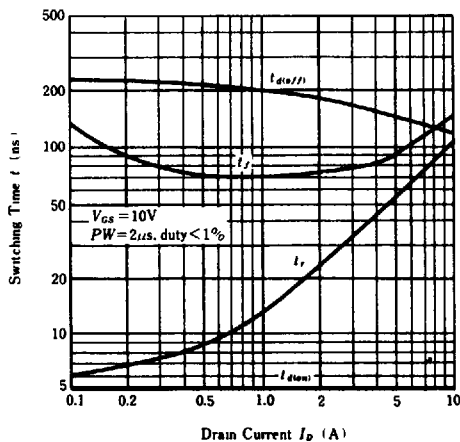
TYPICAL CAPACITANCE VS. DRAIN-SOURCE VOLTAGE



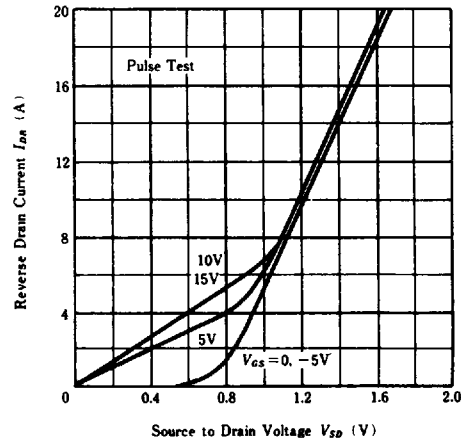
DYNAMIC INPUT CHARACTERISTICS



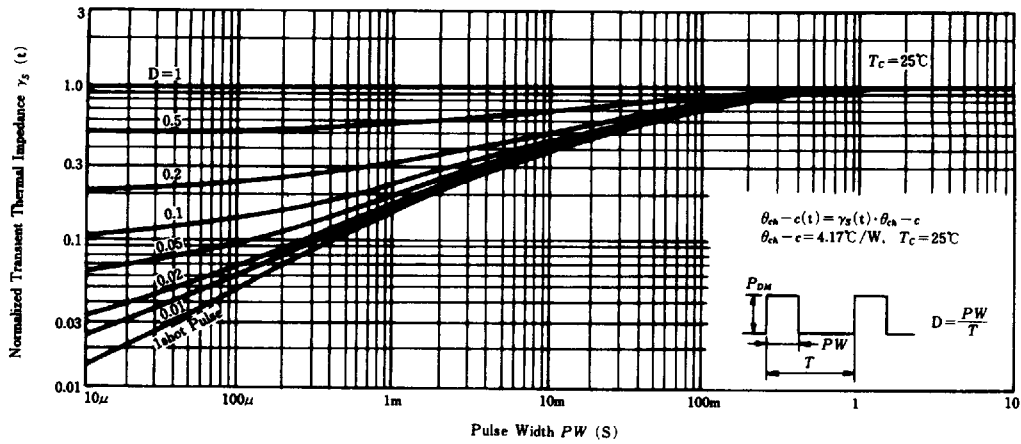
SWITCHING CHARACTERISTICS



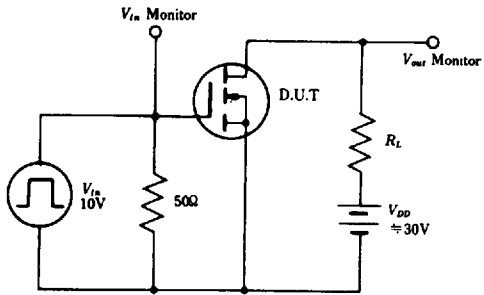
REVERSE DRAIN CURRENT VS. SOURCE TO DRAIN VOLTAGE



NORMALIZED TRANSIENT THERMAL IMPEDANCE VS. PULSE WIDTH



SWITCHING TIME TEST CIRCUIT



WAVEFORMS

