

2SK685

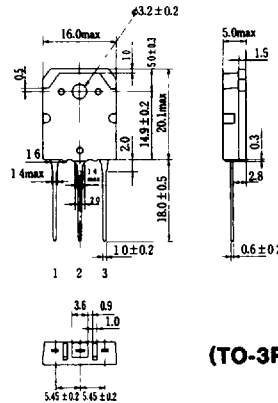
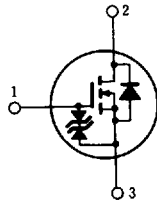
HITACHI/(OPTOELECTRONICS)

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



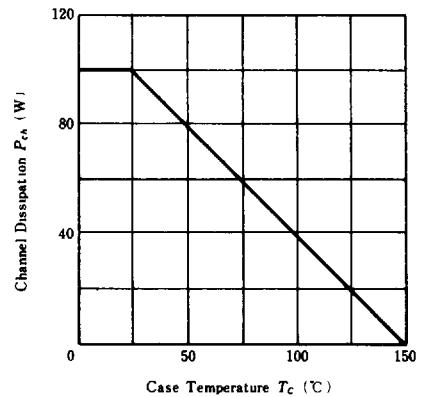
(TO-3P)

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

Item	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	1000	V
Gate-Source Voltage	V_{GSS}	± 20	V
Drain Current	I_D	5	A
Drain Peak Current	$I_{D(pulse)}$ *	15	A
Body-Drain Diode Reverse Current	I_{DR}	5	A
Channel Dissipation	P_{ch}^{**}	100	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

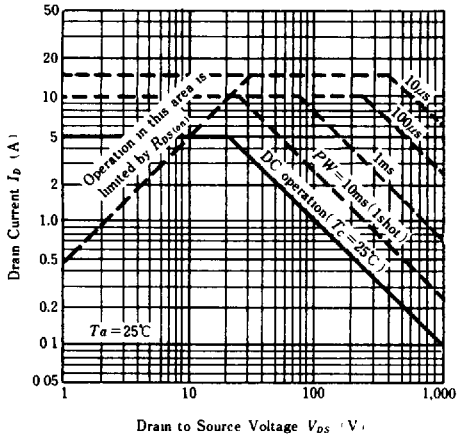


■ ELECTRICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$)

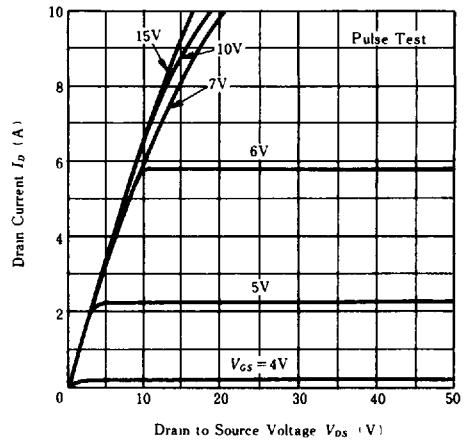
Item	Symbol	Test Condition	min.	typ.	max.	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 10\text{mA}$, $V_{GS} = 0$	1000	—	—	V
Gate-Source Breakdown Voltage	$V_{(BR)GSS}$	$I_G = \pm 100\mu\text{A}$, $V_{DS} = 0$	± 20	—	—	V
Gate-Source Leak Current	I_{GSS}	$V_{GS} = \pm 16\text{V}$, $V_{DS} = 0$	—	—	± 10	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 800\text{V}$, $V_{GS} = 0$	—	—	250	μA
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	$R_{DS(on)}$	$I_D = 3\text{A}$, $V_{GS} = 10\text{V}^*$	—	1.5	2.0	Ω
Forward Transfer Admittance	$ y_{fs} $	$I_D = 3\text{A}$, $V_{DS} = 20\text{V}^*$	2.0	3.5	—	S
Input Capacitance	C_{iss}	$V_{DS} = 10\text{V}$, $V_{GS} = 0$, $f = 1\text{MHz}$	—	1900	—	pF
Output Capacitance	C_{oss}		—	1200	—	pF
Reverse Transfer Capacitance	C_{rss}		—	760	—	pF
Turn-on Delay Time	$t_{d(on)}$		—	25	—	ns
Rise Time	t_r	$I_D = 3\text{A}$, $V_{GS} = 10\text{V}$, $R_L = 10\Omega$	—	240	—	ns
Turn-off Delay Time	$t_{d(off)}$		—	220	—	ns
Fall Time	t_f		—	230	—	ns
Body-Drain Diode Forward Voltage	V_{DF}	$I_F = 5\text{A}$, $V_{GS} = 0$	—	1.3	—	V
Body-Drain Diode Reverse Recovery Time	t_{rr}	$I_F = 5\text{A}$, $V_{GS} = 0$, $di_F/dt = 100\text{A}/\mu\text{s}$	—	150	—	ns

*Pulse Test

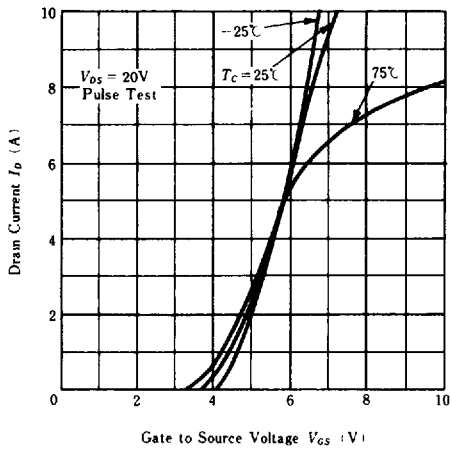
MAXIMUM SAFE OPERATION AREA



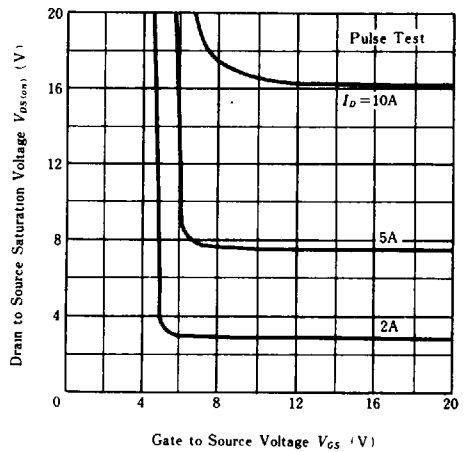
TYPICAL OUTPUT CHARACTERISTICS



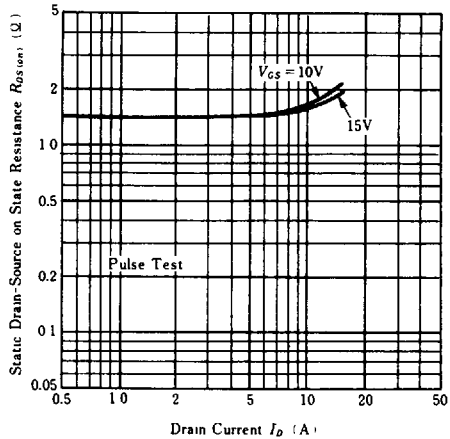
TYPICAL TRANSFER CHARACTERISTICS



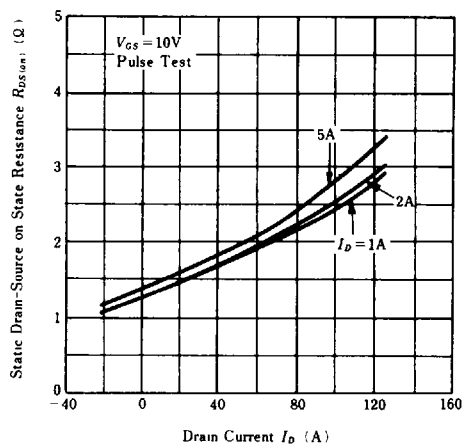
DRAIN-SOURCE SATURATION VOLTAGE VS. GATE-SOURCE VOLTAGE



STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. DRAIN CURRENT

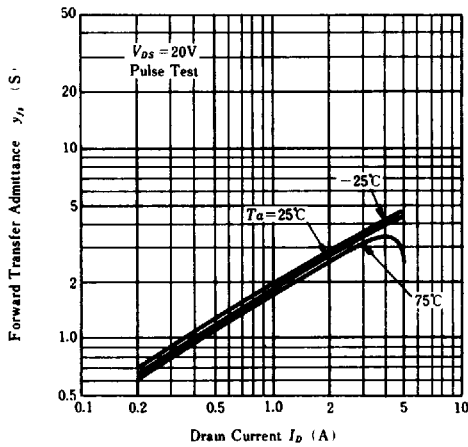


STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. TEMPERATURE

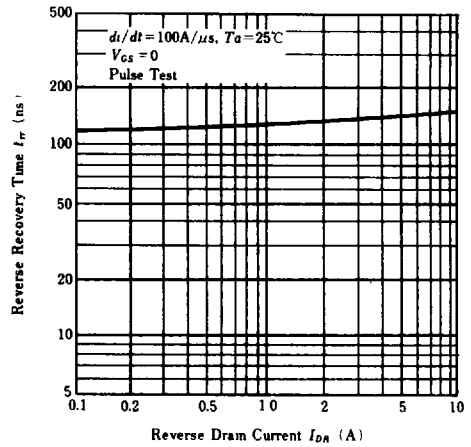


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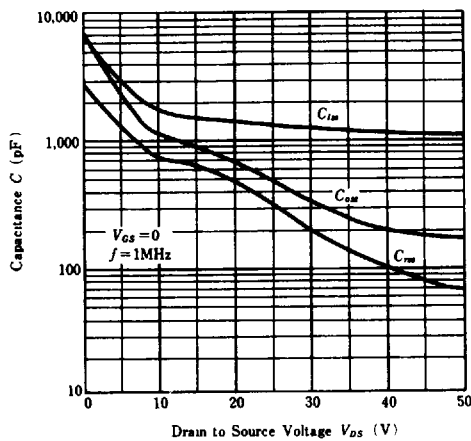
FORWARD TRANSFER ADMITTANCE VS. DRAIN CURRENT



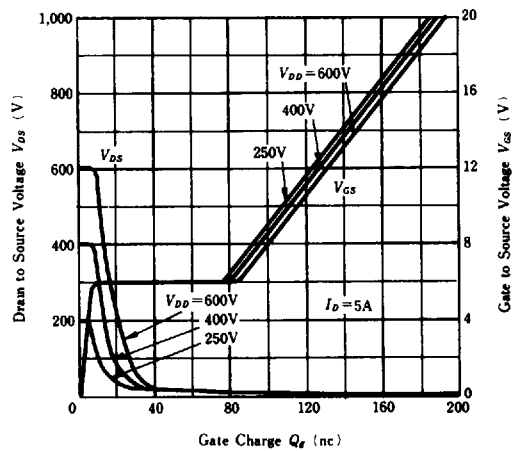
BODY DRAIN DIODE REVERSE RECOVERY TIME



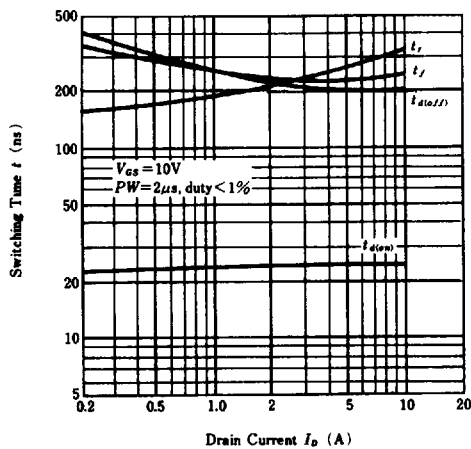
TYPICAL CAPACITANCE VS. DRAIN-SOURCE VOLTAGE



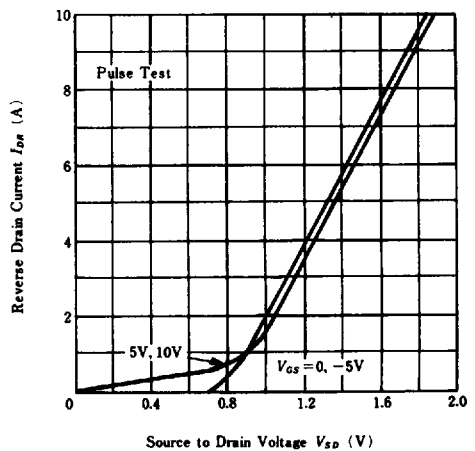
DYNAMIC INPUT CHARACTERISTICS



SWITCHING CHARACTERISTICS

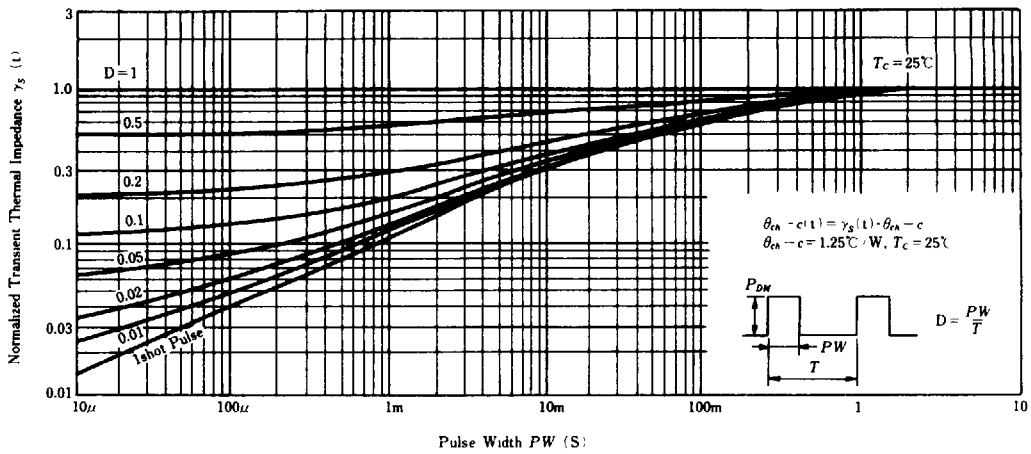


REVERSE DRAIN CURRENT VS. SOURCE TO DRAIN VOLTAGE

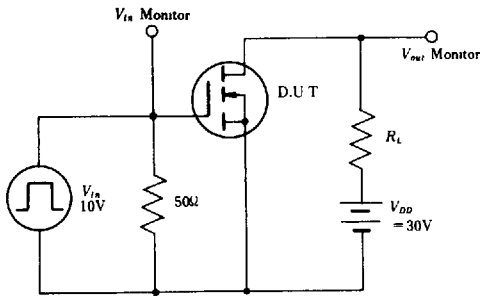


HITACHI/(OPTOELECTRONICS)

NORMALIZED TRANSIENT THERMAL IMPEDANCE VS. PULSE WIDTH



SWITCHING TIME TEST CIRCUIT



WAVEFORMS

