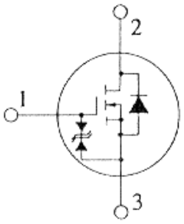
HITACHI

2SK1402,2SK1402A

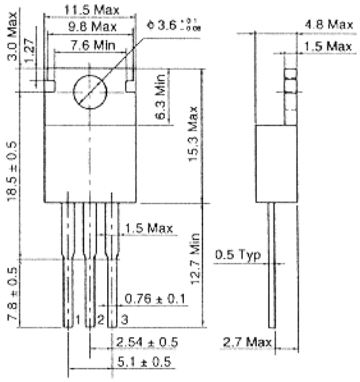
SILICON N-CHANNEL MOS FET
HIGH SPEED POWER SWITCHING

■ FEATURES

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



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



(JEDEC TO-220AB)

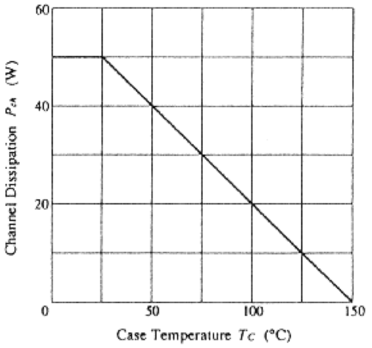
■ABSOLUTE MAXIMUM RATINGS (Ta = 25℃)

Item	Symbol	K1402	K1402A	Unit
Drain-Source Voltage	V_{DSS}	600	650	V
Gate-Source Voltage	V_{GSS}	±30		V
Drain Current	I_D	4		A
Drain Peak Current	$I_{D(pulse)}$*	16		A
Body-Drain Diode Reverse Drain Current	I_{DR}	4		A
Channel Dissipation	P_{ch}**	50		W
Channel Temperature	T_{ch}	150		℃
Storage Temperature	T_{stg}	-55～+150		℃

* PW≦10 μs, duty cycle≦1%

** Value at Tc = 25℃

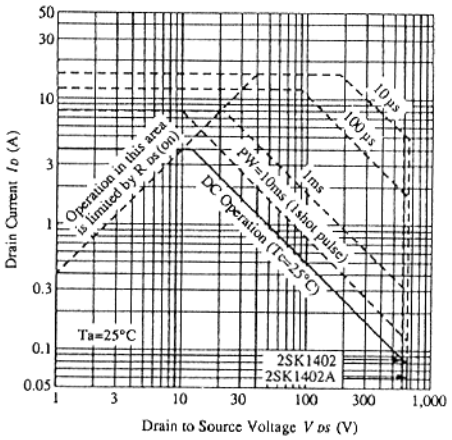
POWER VS.
TEMPERATURE DERATING



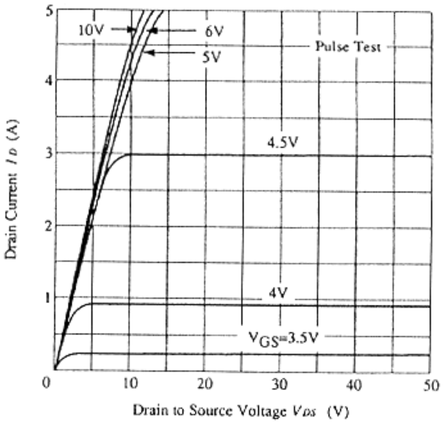
■ELECTRICAL CHARACTERISTICS (Ta = 25℃)

Item		Symbol	Test Condition	min.	typ.	max.	Unit
Drain-Source Breakdown Voltage	K1402	$V_{(BR)DSS}$	I_D = 10mA, V_{GS} = 0	600	—	—	V
	K1402A			650	—	—	
Gate-Source Breakdown Voltage		$V_{(BR)GSS}$	I_G = ±100 μA, V_{DS} = 0	±30	—	—	V
Gate-Source Leak Current		I_{GSS}	V_{GS} = ±25V, V_{DS} = 0	—	—	±10	μA
Zero Gate Voltage Drain Current	K1402	I_{DSS}	V_{DS} = 500V, V_{GS} = 0	—	—	250	μA
	K1402A		V_{DS} = 550V, V_{GS} = 0				
Gate-Source Cutoff Voltage		$V_{GS(off)}$	I_D = 1mA, V_{DS} = 10V	2.0	—	3.0	V
Static Drain-Source on State Resistance	K1402	$R_{DS(on)}$	I_D = 2A, V_{GS} = 10V *	—	1.8	2.4	Ω
	K1402A			—	2.0	2.6	
Forward Transfer Admittance		$\vert y_{fs}\vert$	I_D = 2A, V_{DS} = 10V *	2.2	3.5	—	S
Input Capacitance		Ciss	V_{DS} = 10V, V_{GS} = 0, f = 1MHz	—	600	—	pF
Output Capacitance		Coss		—	140	—	pF
Reverse Transfer Capacitance		Crss		—	25	—	pF
Turn-On Delay Time		$t_{d(on)}$	I_D = 2A, V_{GS} = 10V, R_L = 15 Ω	—	8	—	ns
Rise Time		t_r		—	30	—	ns
Turn-off Delay Time		$t_{d(off)}$		—	60	—	ns
Fall Time		t_f		—	35	—	ns
Body-Drain Diode Forward Voltage		V_{DF}	I_F = 4A, V_{GS} = 0	—	0.9	—	V
Body-Drain Diode Reverse Recovery Time		t_{rr}	I_F = 4A, V_{GS} = 0, di_F/dt = 100A/μs	—	300	—	ns

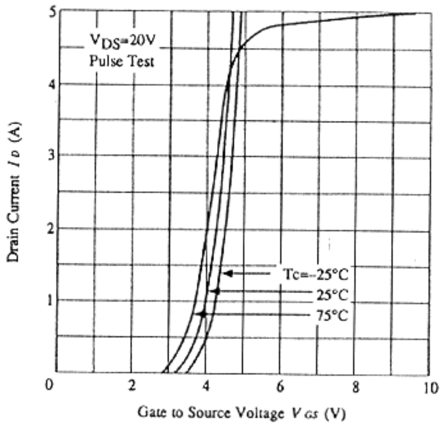
* Pulse Test



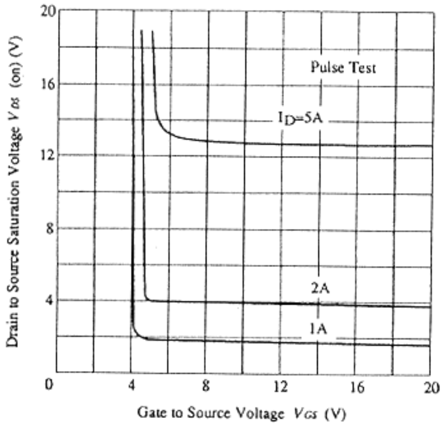
MAXIMUM SAFE OPERATION AREA



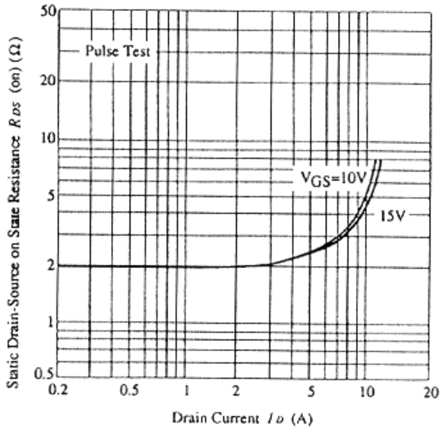
TYPICAL OUTPUT CHARACTERISTICS



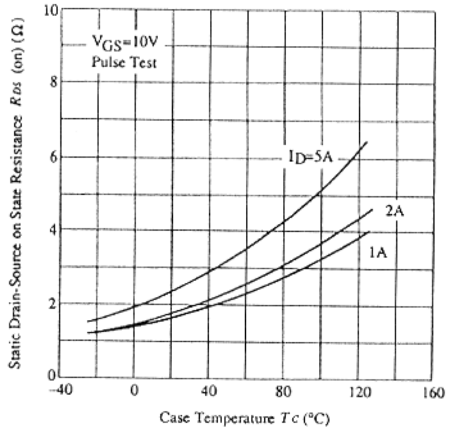
TYPICAL TRANSFER CHARACTERISTICS



DRAIN-SOURCE SATURATION VOLTAGE VS. GATE-SOURCE VOLTAGE

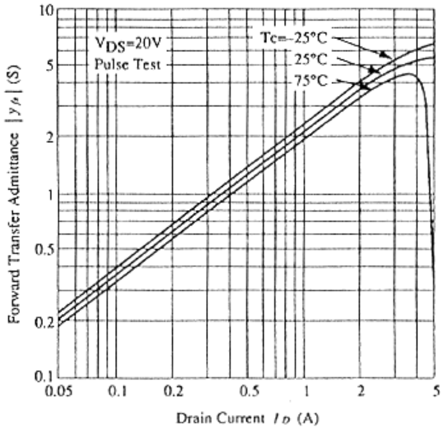


STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. DRAIN CURRENT

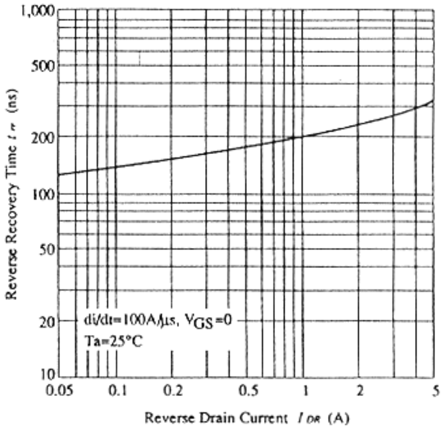


STATIC DRAIN-SOURCE ON STATE RESISTANCE VS. TEMPERATURE

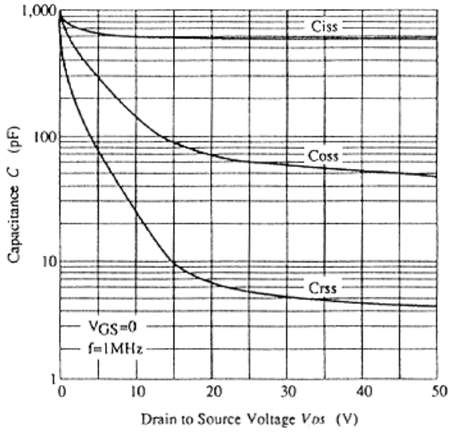
FORWARD TRANSFER ADMITTANCE VS. DRAIN CURRENT



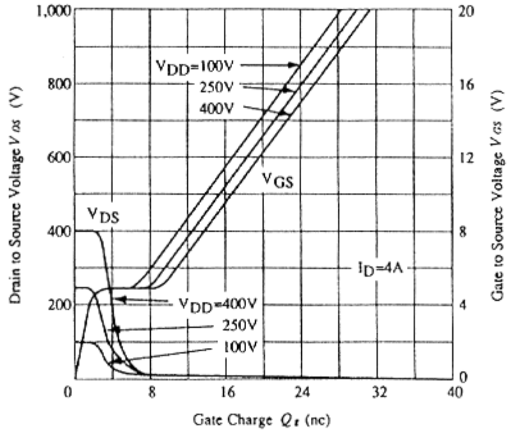
BODY-DRAIN DIODE REVERSE RECOVERY TIME



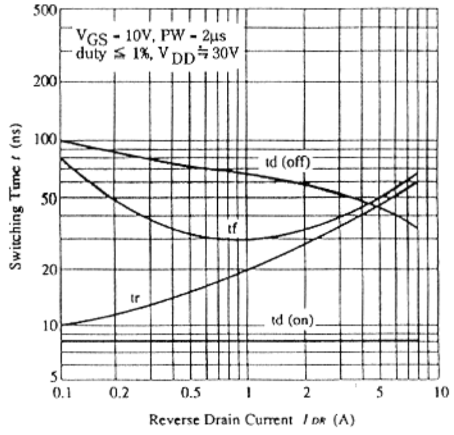
TYPICAL CAPACITANCE VS. DRAIN-SOURCE VOLTAGE



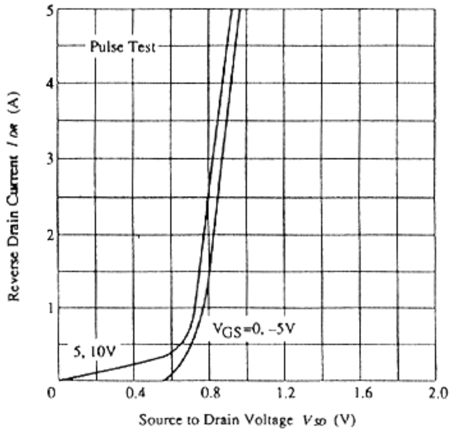
DYNAMIC INPUT CHARACTERISTICS



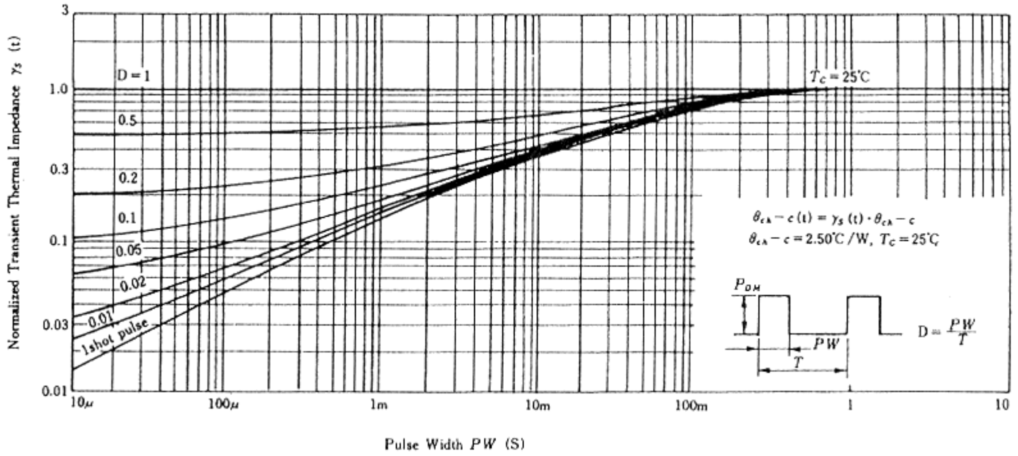
SWITCHING CHARACTERISTICS



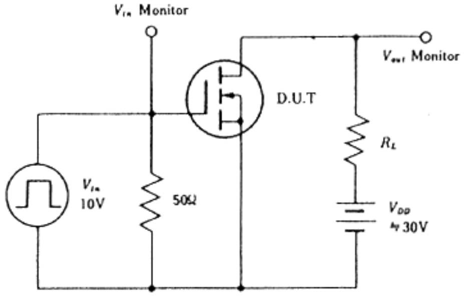
REVERSE DRAIN CURRENT VS. SORUCE TO DRAIN VOLTAGE



NORMALIZED TRANSIENT THERMAL IMPEDANCE VS. PULSE WIDTH



SWITCHING TIME TEST CIRCUIT



WAVEFORMS