TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (π-MOSII^{-5})

2SK1930

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

INDUSTRIAL APPLICATIONS

- Low Drain-Source ON Resistance : $R_{DS\,(ON)} = 3.0\ \Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 2.0$ S (Typ.)
- Low Leakage Current : $I_{DSS} = 300\ \mu$A (Max.) ($V_{DS} = 800$ V)
- Enhancement-Mode : $V_{th} = 1.5 \sim 3.5$ V ($V_{DS} = 10$ V, $I_D = 1$ mA)

MAXIMUM RATINGS (Ta = 25°C)

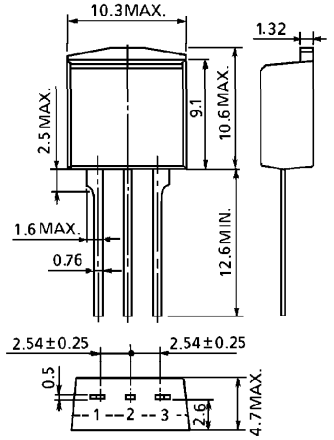
CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	1000	V
Drain-Gate Voltage ($R_{GS} = 20\ k\Omega$)		V_{DGR}	1000	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	DC	I_D	4	A
	Pulse	I_{DP}	12	
Drain Power Dissipation (Tc = 25°C)		P_D	80	W
Channel Temperature		T_{ch}	150	°C
Storage Temperature Range		T_{stg}	−55~150	°C

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th\,(ch\text{-}c)}$	1.56	°C / W
Thermal Resistance, Channel to Ambient	$R_{th\,(ch\text{-}a)}$	83.3	°C / W

This transistor is an electrostatic sensitive device.
Please handle with caution.

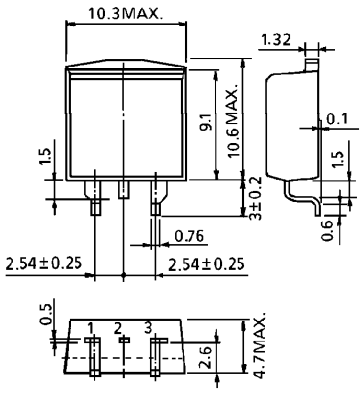
TO-220FL Unit in mm



1. GATE
2. DRAIN (HEAT SINK)
3. SOURCE

JEDEC	—
EIAJ	—
TOSHIBA	2-10S1B

TO-220SM



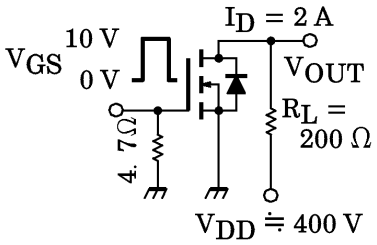
1. GATE
2. DRAIN (HEAT SINK)
3. SOURCE

JEDEC	—
EIAJ	—
TOSHIBA	2-10S2B

Weight : 1.5 g

961001EAA2

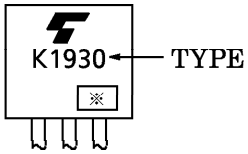
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0 V	—	—	±100	nA
Drain Cut-off Current		I_{DSS}	V_{DS} = 800 V, V_{GS} = 0 V	—	—	300	μA
Drain-Source Breakdown Voltage		$V_{(BR)\,DSS}$	I_D = 10 mA, V_{GS} = 0 V	1000	—	—	V
Gate Threshold Voltage		V_{th}	V_{DS} = 10 V, I_D = 1 mA	1.5	—	3.5	V
Drain-Source ON Resistance		$R_{DS\,(ON)}$	V_{GS} = 10 V, I_D = 2 A	—	3.0	3.8	Ω
Forward Transfer Admittance		$\|Y_{fs}\|$	V_{DS} = 20 V, I_D = 2 A	1.0	2.0	—	S
Input Capacitance		C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1MHz	—	700	—	pF
Reverse Transfer Capacitance		C_{rss}		—	55	—	
Output Capacitance		C_{oss}		—	100	—	
Switching Time	Rise Time	t_r		—	18	—	ns
	Turn-on Time	t_{on}		—	30	—	
	Fall Time	t_f		—	12	—	
	Turn-off Time	t_{off}	V_{IN} : t_r, t_f < 5 ns, Duty ≦ 1%, t_w = 10 μs	—	70	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	V_{DD} ≒ 400 V, V_{GS} = 10 V, I_D = 4 A	—	60	—	nC
Gate-Source Charge		Q_{gs}		—	35	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	25	—	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	4	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	12	A
Diode Forward Voltage	V_{DSF}	I_{DR} = 4 A, V_{GS} = 0 V	—	—	−1.9	V

MARKING

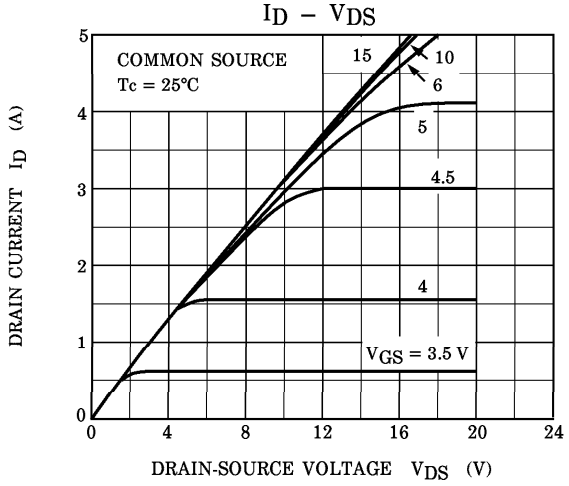


※ Lot Number

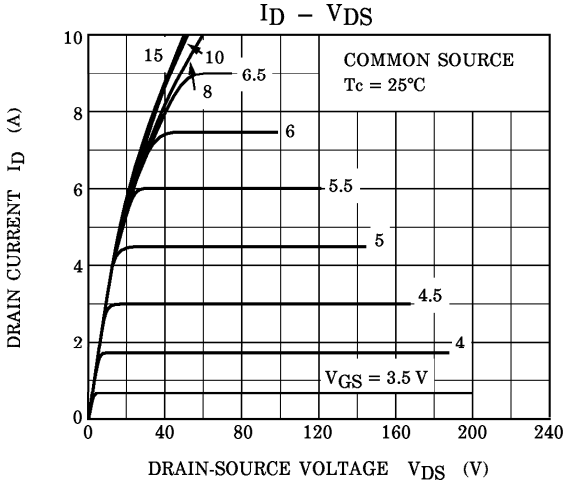
□□ Month (Starting from Alphabet A)

Year (Last Number of the Christian Era)

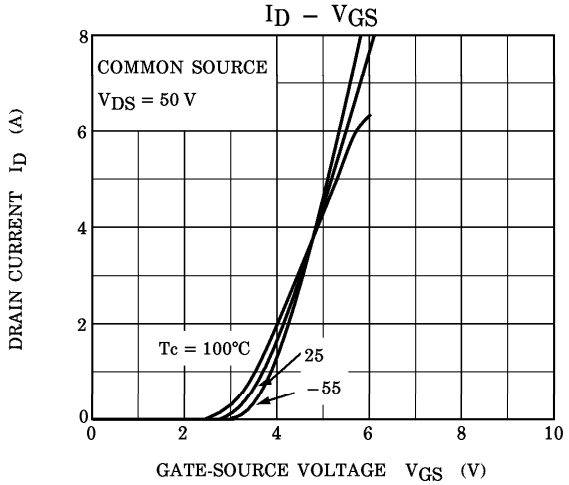
$I_D - V_{DS}$



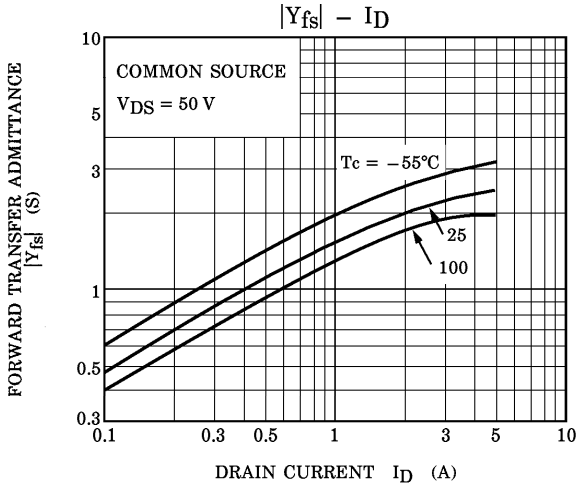
$I_D - V_{DS}$



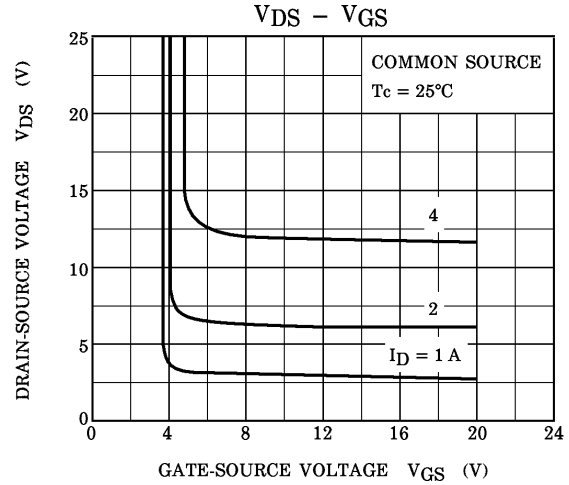
$I_D - V_{GS}$



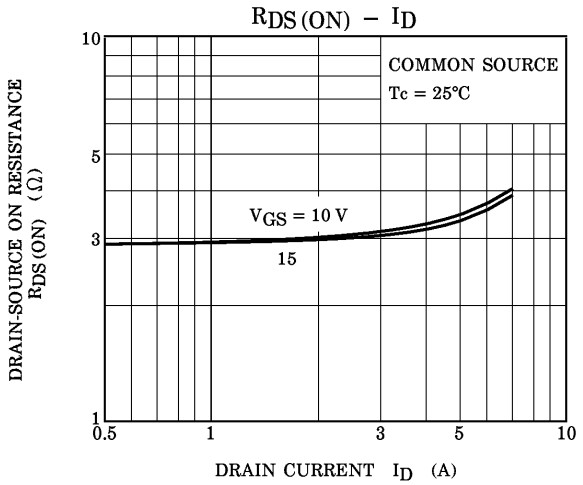
$|Y_{fs}| - I_D$



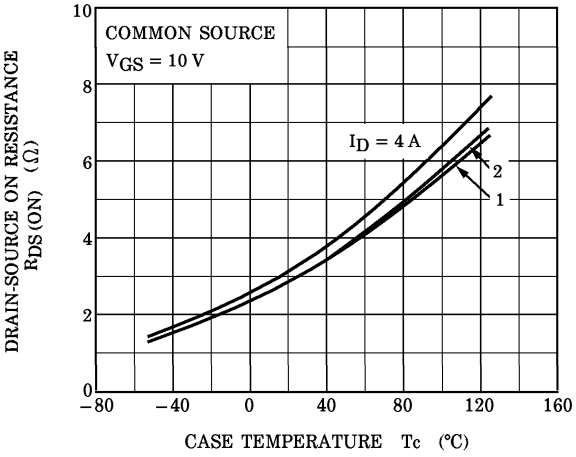
$V_{DS} - V_{GS}$



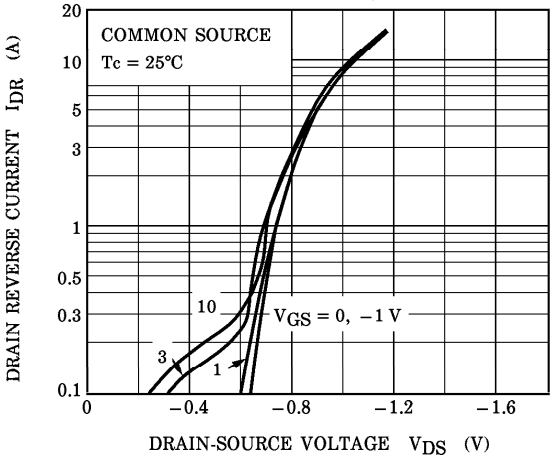
$R_{DS(ON)} - I_D$



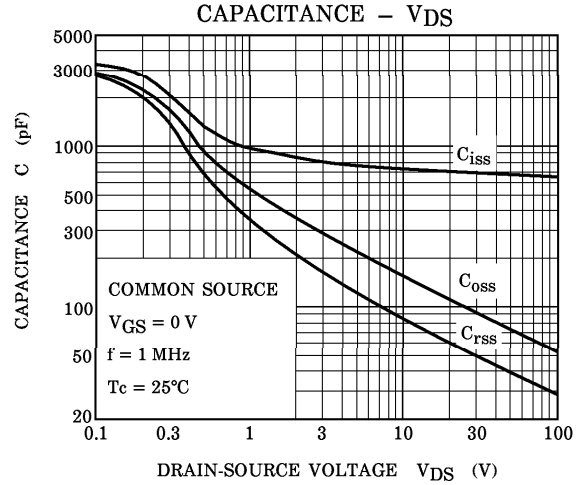
$R_{DS\,(ON)}$ – Tc



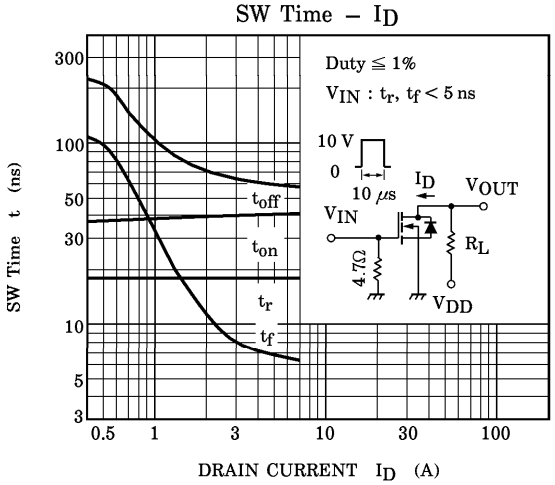
I_{DR} – V_{DS}



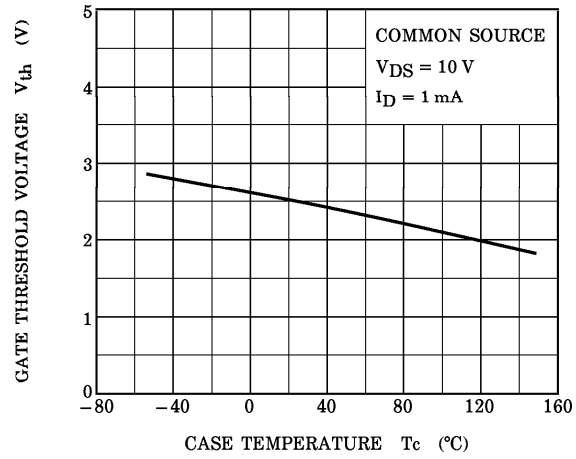
CAPACITANCE – V_{DS}



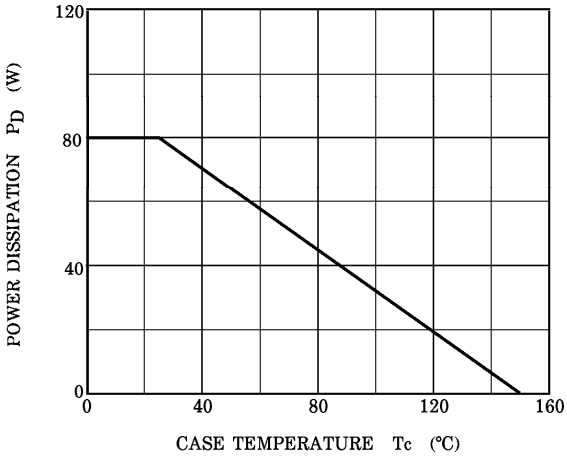
SW Time – I_D

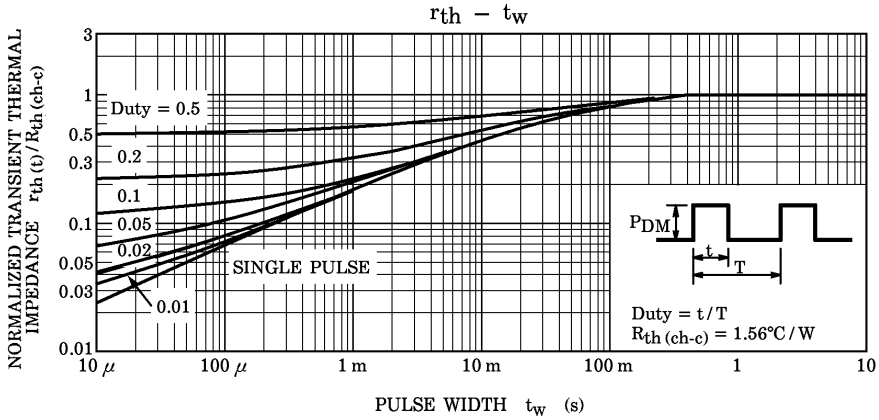


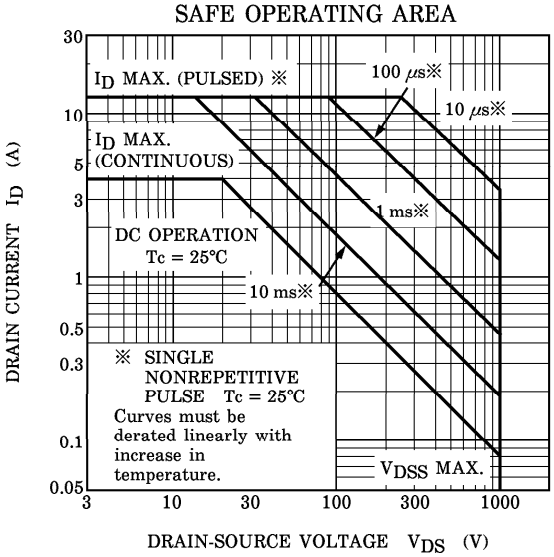
V_{th} – Tc



P_D – Tc




r_{th} – t_w
NORMALIZED TRANSIENT THERMAL IMPEDANCE r_{th} (t) / R_{th} (ch-c)
Duty = 0.5
0.2
0.1
0.05
0.02
0.01
SINGLE PULSE
P_{DM}
t
T
Duty = t / T
R_{th} (ch-c) = 1.56°C / W
PULSE WIDTH t_w (s)


SAFE OPERATING AREA
I_D MAX. (PULSED) ※
100 μs※
10 μs※
I_D MAX. (CONTINUOUS)
1 ms※
DC OPERATION
Tc = 25°C
10 ms※
※ SINGLE NONREPETITIVE PULSE Tc = 25°C
Curves must be derated linearly with increase in temperature.
V_{DSS} MAX.
DRAIN CURRENT I_D (A)
DRAIN-SOURCE VOLTAGE V_{DS} (V)