

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (π -MOS ν)

2SK3068

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS
 CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

INDUSTRIAL APPLICATIONS
 Unit in mm

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 0.4\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 9.0S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100\mu A$ (Max.) ($V_{DS} = 500V$)
- Enhancement-Mode : $V_{th} = 2.0 \sim 4.0V$ ($V_{DS} = 10V, I_D = 1mA$)

MAXIMUM RATINGS ($T_a = 25^\circ C$)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	500	V
Drain-Gate Voltage ($R_{GS} = 20k\Omega$)		V_{DGR}	500	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	DC	I_D	12	A
	Pulse	I_{DP}	48	A
Drain Power Dissipation ($T_c = 25^\circ C$)		P_D	100	W
Single Pulse Avalanche Energy**		E_{AS}	364	mJ
Avalanche Current		I_{AR}	12	A
Repetitive Avalanche Energy*		E_{AR}	10	mJ
Channel Temperature		T_{ch}	150	$^\circ C$
Storage Temperature Range		T_{stg}	$-55 \sim 150$	$^\circ C$

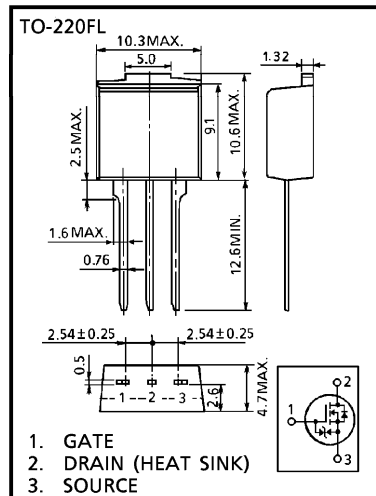
THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	1.25	$^\circ C/W$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	83.3	$^\circ C/W$

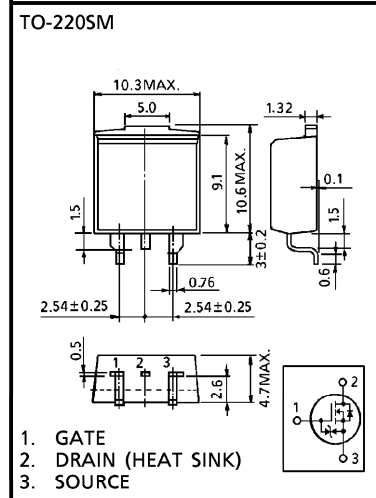
Note ;

- * Repetitive rating ; Pulse Width Limited by Max. junction temperature.
- ** $V_{DD} = 90V$, Starting $T_{ch} = 25^\circ C$, $L = 4.3mH$, $R_G = 25\Omega$, $I_{AR} = 12A$

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



JEDEC	—
EIAJ	—
TOSHIBA	2-10S1B



JEDEC	—
EIAJ	—
TOSHIBA	2-10S2B

Weight : 1.5g

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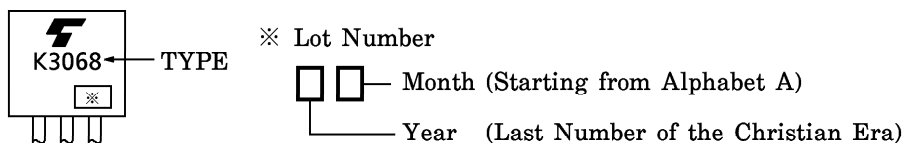
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

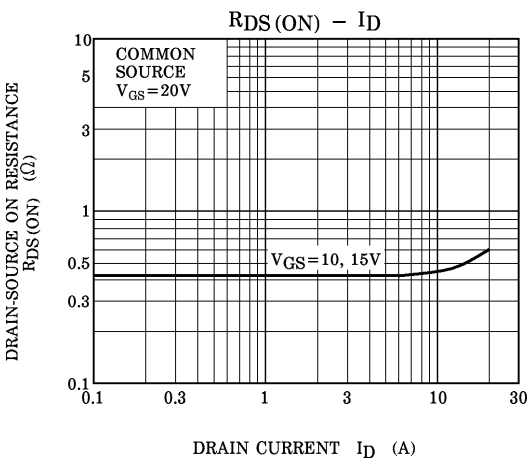
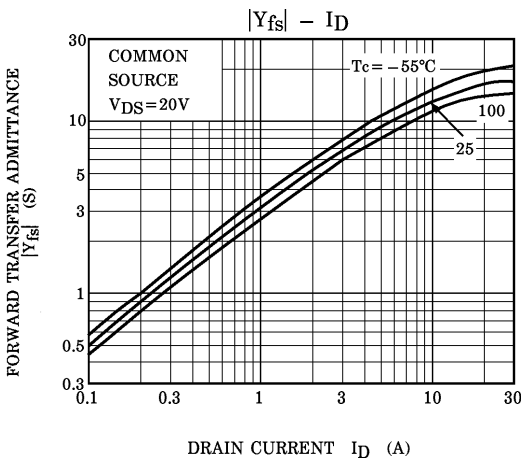
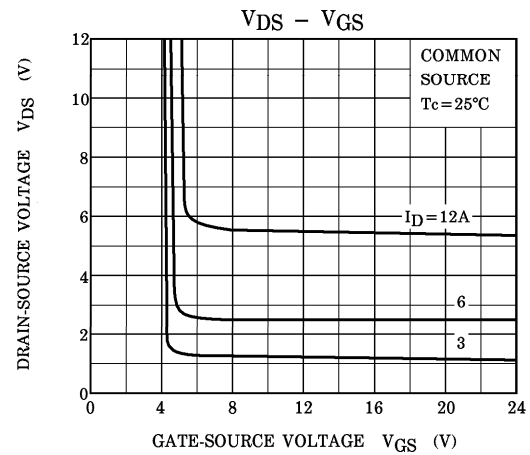
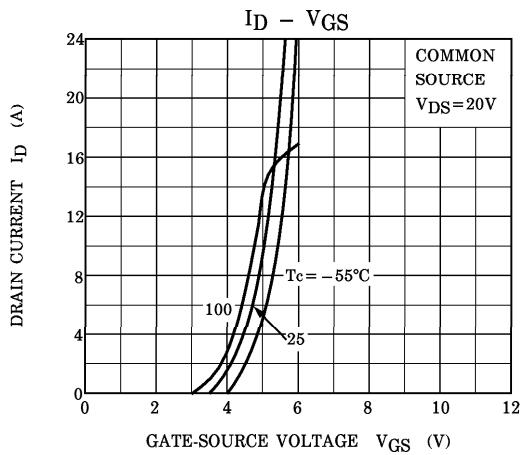
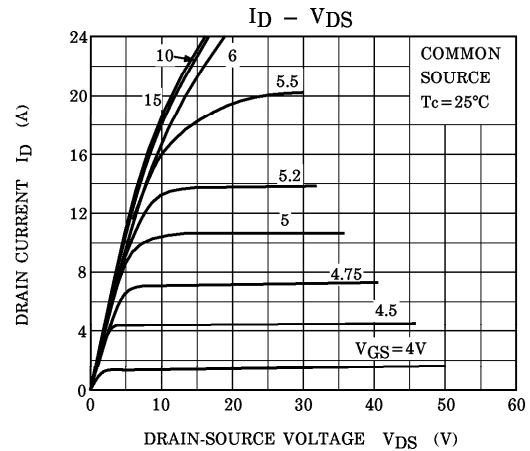
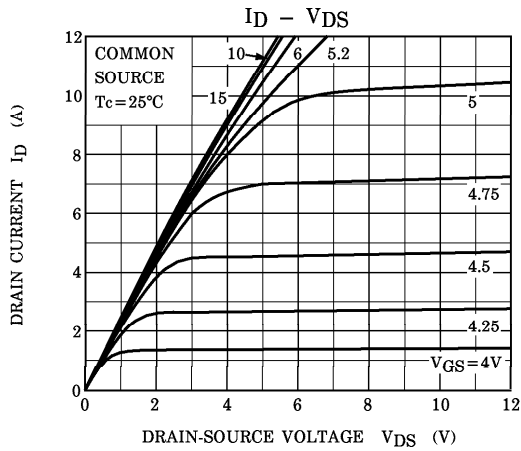
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Gate Leakage Current	I _{GSS}	V _{GS} = ±25V, V _{DS} = 0V	—	—	±10	μA	
Gate-Source Breakdown Voltage	V (BR) GSS	I _G = ±10μA, V _{DS} = 0V	±30	—	—	V	
Drain Cut-off Current	I _{DSS}	V _{DS} = 500V, V _{GS} = 0V	—	—	100	μA	
Drain-Source Breakdown Voltage	V (BR) DSS	I _D = 10mA, V _{GS} = 0V	500	—	—	V	
Gate Threshold Voltage	V _{th}	V _{DS} = 10V, I _D = 1mA	2.0	—	4.0	V	
Drain-Source ON Resistance	R _{D(S) ON}	V _{GS} = 10V, I _D = 6A	—	0.4	0.52	Ω	
Forward Transfer Admittance	Y _{fs}	V _{DS} = 10V, I _D = 6A	4.0	9.0	—	S	
Input Capacitance	C _{iss}	V _{DS} = 10V, V _{GS} = 0V, f = 1MHz	—	2040	—	pF	
Reverse Transfer Capacitance	C _{rss}		—	200	—		
Output Capacitance	C _{oss}		—	640	—		
Switching Time	Rise Time	t _r		—	22	—	ns
	Turn-on Time	t _{on}		—	58	—	
	Fall Time	t _f		—	36	—	
	Turn-off Time	t _{off}		V _{IN} : t _r , t _f < 5ns, Duty ≤ 1%, t _w = 10μs, V _{DD} ≐ 200V	—	180	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Q _g	V _{DD} ≐ 400V, V _{GS} = 10V, I _D = 10A	—	45	—	nC	
Gate-Source Charge	Q _{gs}		—	25	—		
Gate-Drain ("Miller") Charge	Q _{gd}		—	20	—		

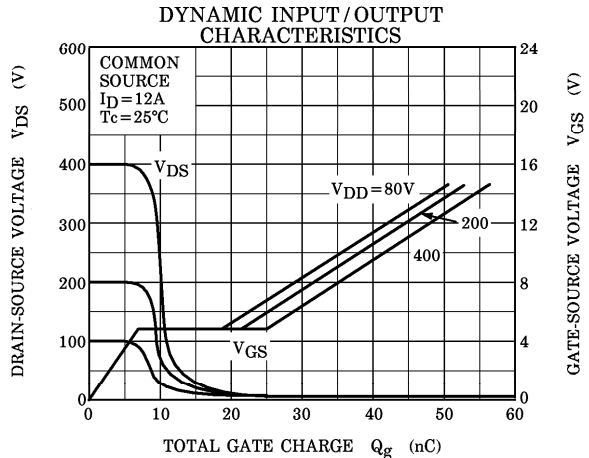
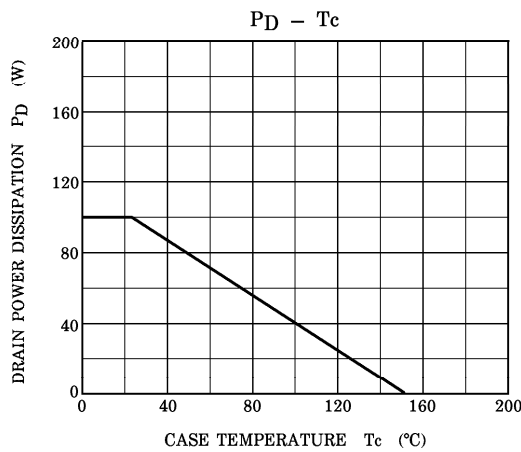
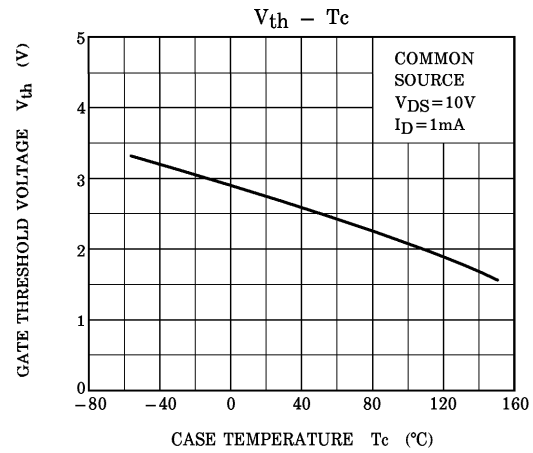
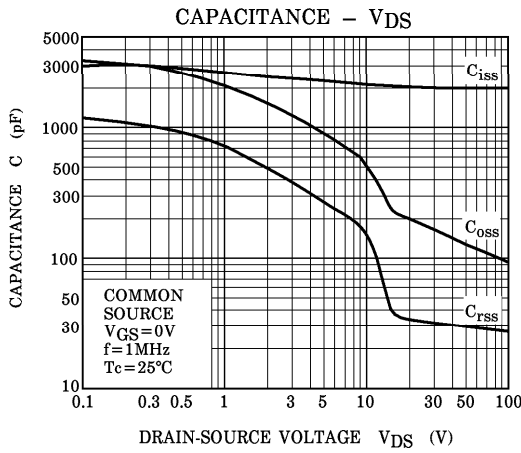
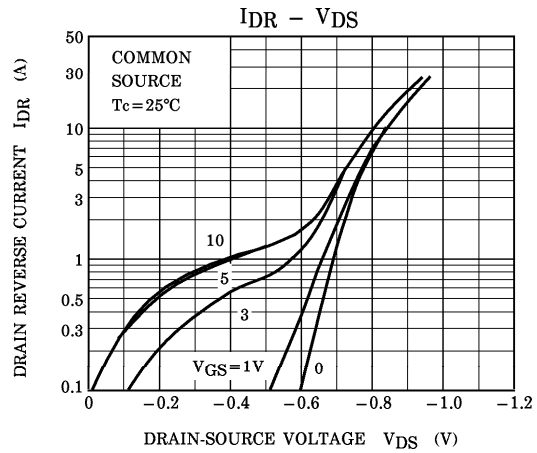
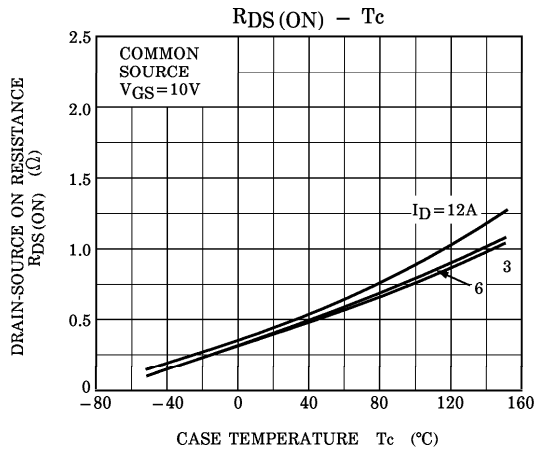
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

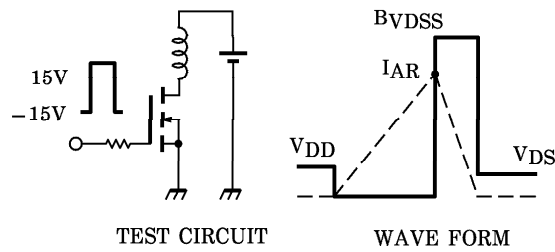
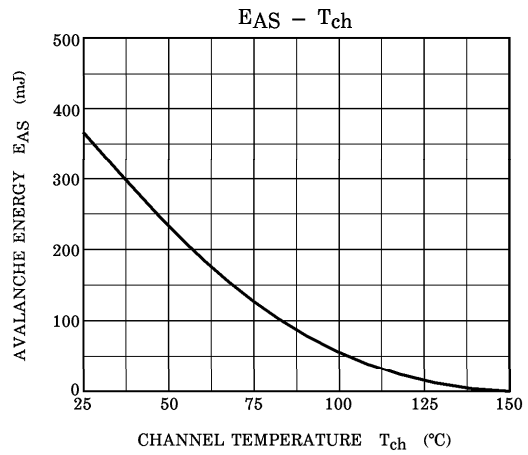
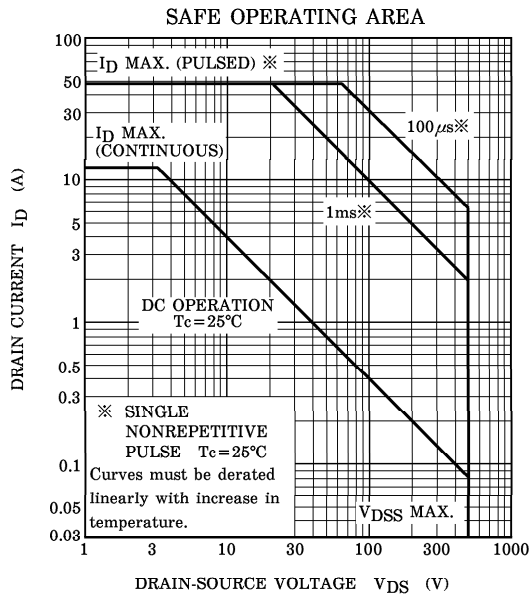
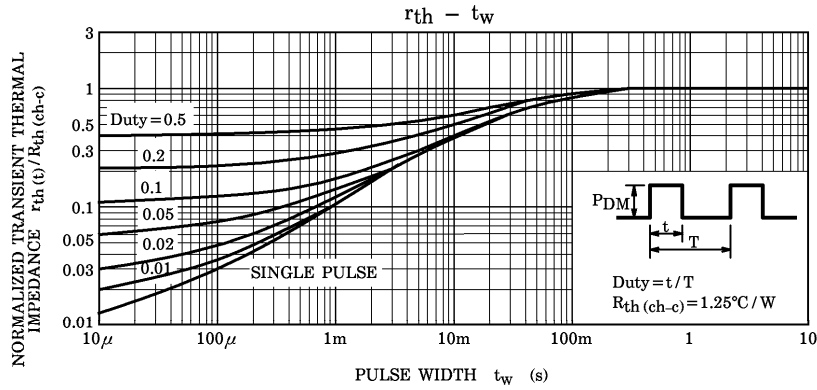
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I _{DR}	—	—	—	12	A
Pulse Drain Reverse Current	I _{DRP}	—	—	—	48	A
Diode Forward Voltage	V _{DSF}	I _{DR} = 12A, V _{GS} = 0V	—	—	-1.7	V
Reverse Recovery Time	t _{rr}	I _{DR} = 12A, V _{GS} = 0V	—	370	—	ns
Reverse Recovery Charge	Q _{rr}	dI _{DR} / dt = 100A / μs	—	3.5	—	μC

MARKING









Peak $I_{AR} = 12A$, $R_G = 25\Omega$
 $V_{DD} = 90V$, $L = 4.3mH$

$$E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{B_{VDSS}}{B_{VDSS} - V_{DD}} \right)$$