

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

2SK2884

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS
 CHOPPER REGULATOR, DC-DC CONVERTER APPLICATIONS

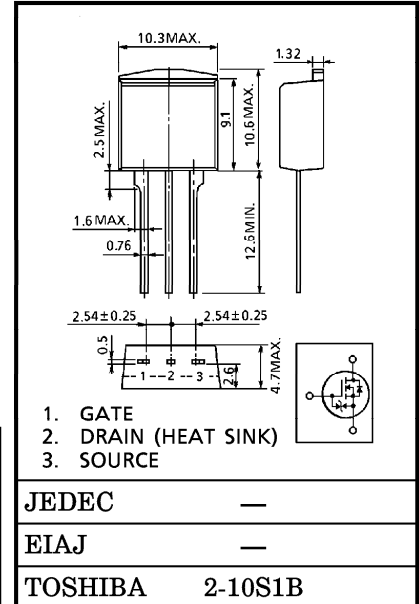
INDUSTRIAL APPLICATIONS

TO-220FL Unit in mm

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 1.9 \Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 3.8 S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100 \mu A$ (Max.)
($V_{DS} = 640 V$)
- Enhancement-Mode : $V_{th} = 2.0 \sim 4.0 V$
($V_{DS} = 10 V, I_D = 1 mA$)

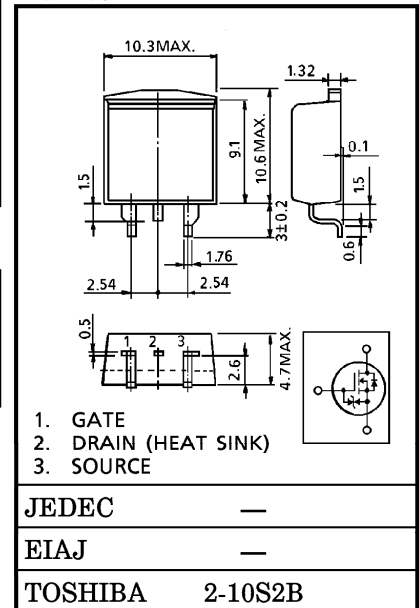
MAXIMUM RATINGS ($T_a = 25^\circ C$)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	V_{DSS}	800	V
Drain-Gate Voltage ($R_{GS} = 20 k\Omega$)	V_{DGR}	800	V
Gate-Source Voltage	V_{GSS}	± 30	V
Drain Current	DC	I_D	5 A
	Pulse	I_{DP}	15 A
Drain Power Dissipation ($T_c = 25^\circ C$)	P_D	100	W
Single Pulse Avalanche Energy**	E_{AS}	370	mJ
Avalanche Current	I_{AR}	5	A
Repetitive Avalanche Energy*	E_{AR}	10	mJ
Channel Temperature	T_{ch}	150	$^\circ C$
Storage Temperature Range	T_{stg}	$-55 \sim 150$	$^\circ C$



Weight : 1.5 g (Typ.)

TO-220SM



Weight : 1.5 g (Typ.)

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.
- ** $V_{DD} = 90 V$, Starting $T_{ch} = 25^\circ C$, $L = 27 mH$,
 $R_G = 25 \Omega$, $I_{AR} = 5 A$

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

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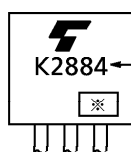
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		IGSS	VGS = ±30 V, VDS = 0 V	—	—	±10	μA
Gate-Source Breakdown Voltage		V(BR)GSS	IG = ±10 μA, VDS = 0 V	±30	—	—	V
Drain Cut-Off Current		IDSS	VDS = 640 V, VGS = 0 V	—	—	100	μA
Drain-Source Breakdown Voltage		V(BR)DSS	ID = 10 mA, VGS = 0 V	800	—	—	V
Gate Threshold Voltage		Vth	VDS = 10 V, ID = 1 mA	2.0	—	4.0	V
Drain-Source ON Resistance		RDS(ON)	VGS = 10 V, ID = 3 A	—	1.9	2.2	Ω
Forward Transfer Admittance		Yfs	VDS = 15 V, ID = 3 A	1.0	3.8	—	S
Input Capacitance		Ciss	VDS = 25 V, VGS = 0 V, f = 1 MHz	—	1080	—	pF
Reverse Transfer Capacitance		Crss		—	16	—	
Output Capacitance		Coss		—	105	—	
Switching Time	Rise Time	tr	<p>VGS 10 V 0 V</p> <p>ID = 3 A</p> <p>VOUT</p> <p>RL = 66.7 Ω</p> <p>VDD ≐ 200 V</p> <p>VIN : tr, tf < 5 ns, Duty ≤ 1%, tw = 10 μs</p>	—	40	—	ns
	Turn-On Time	ton		—	80	—	
	Fall Time	tf		—	40	—	
	Turn-Off Time	toff		—	140	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Qg	VDD ≐ 400 V, VGS = 10 V, ID = 5 A	—	34	—	nC
Gate-Source Charge		Qgs		—	16	—	
Gate-Drain (“Miller”) Charge		Qgd		—	18	—	

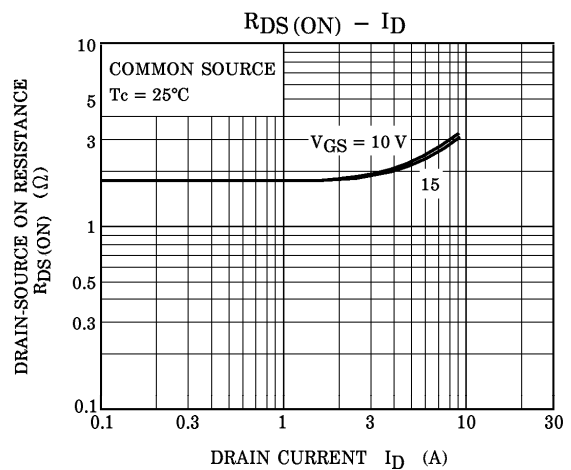
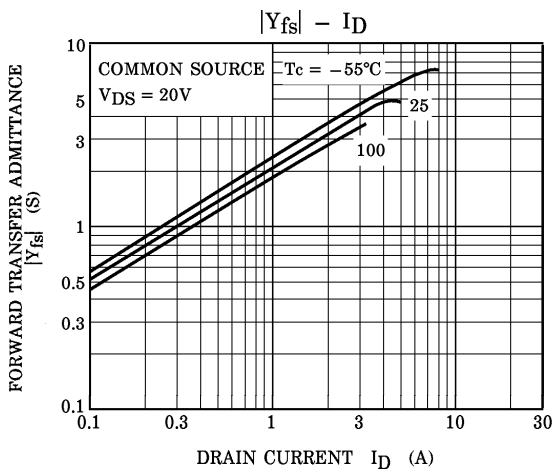
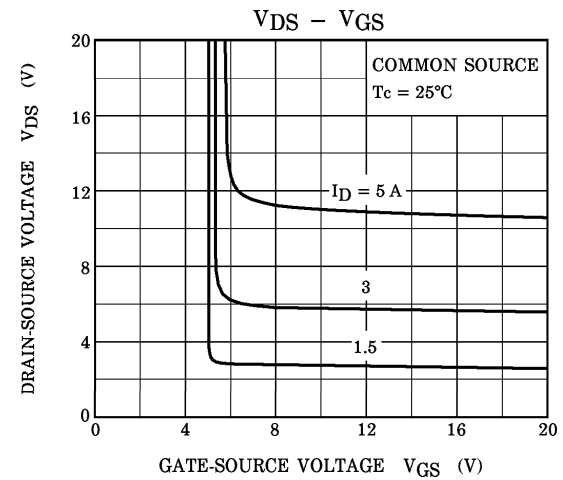
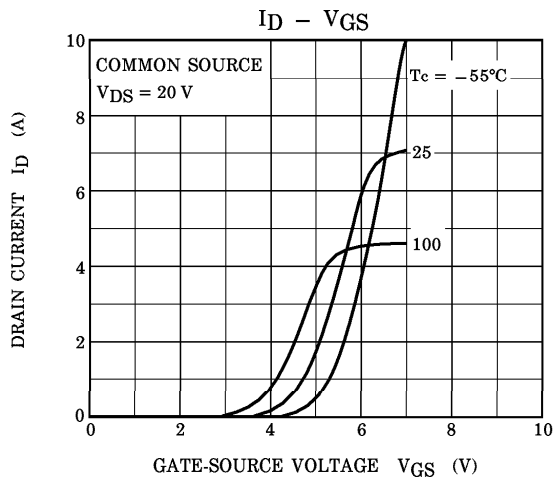
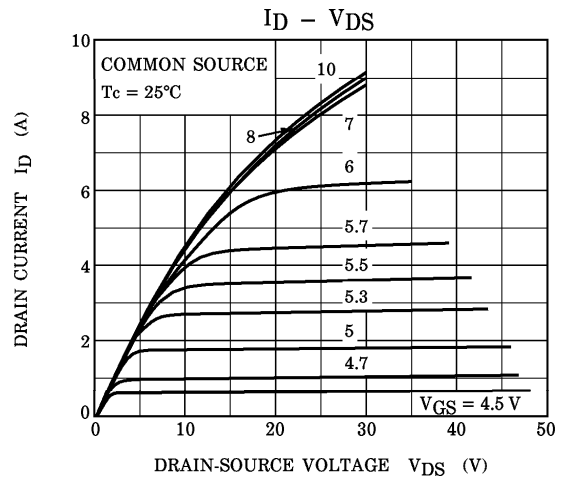
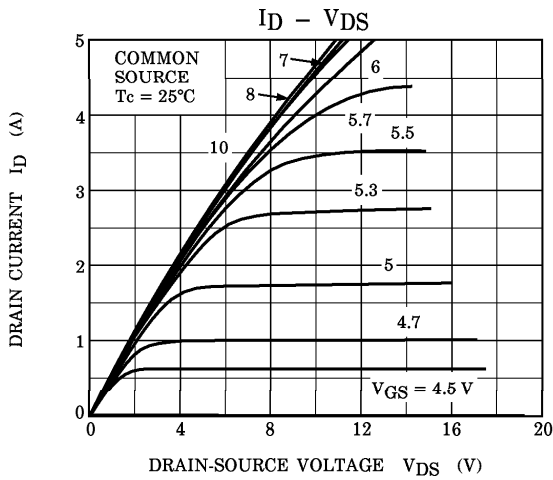
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

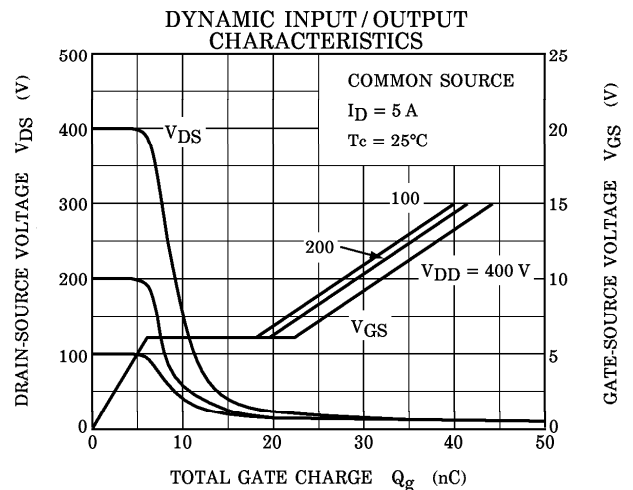
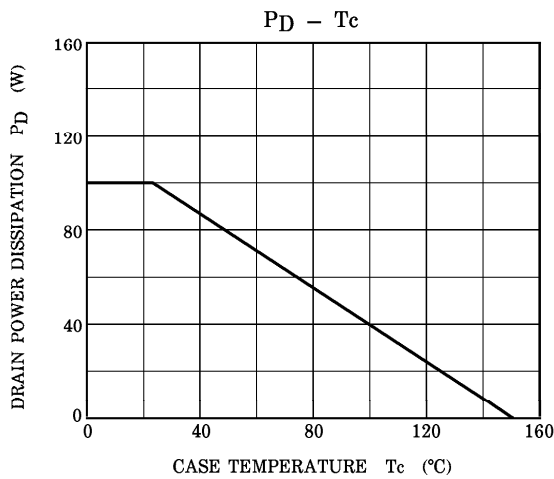
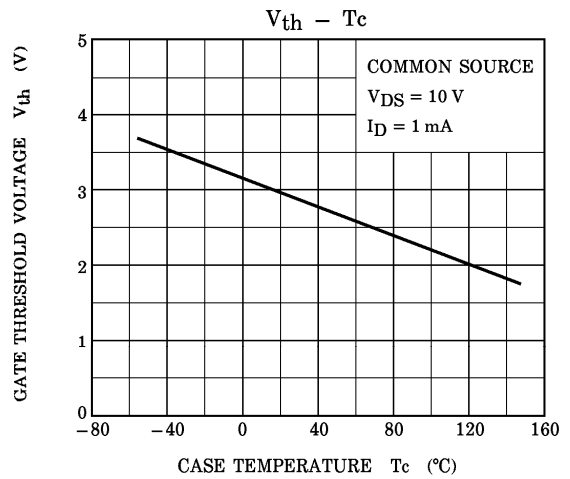
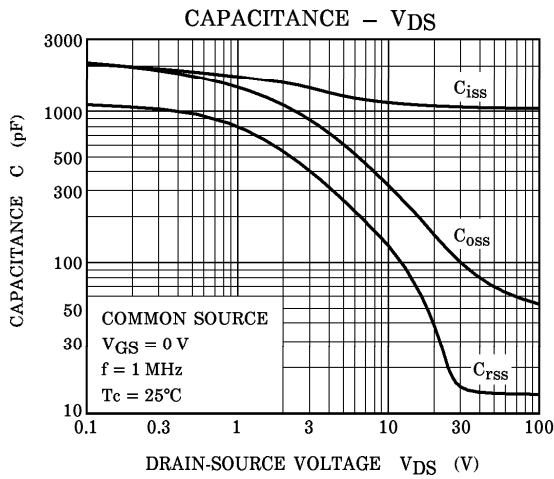
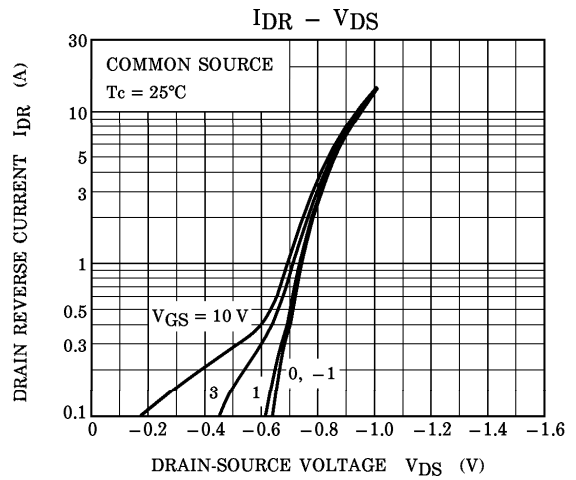
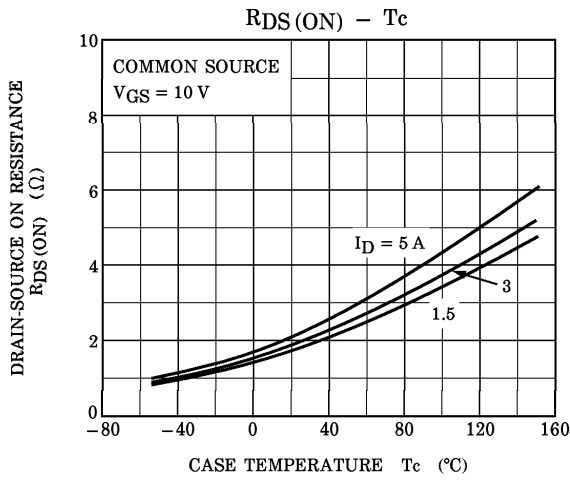
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	IDR	—	—	—	5	A
Pulse Drain Reverse Current	IDRP	—	—	—	15	A
Diode Forward Voltage	VDSF	IDR = 5 A, VGS = 0 V	—	—	-1.9	V
Reverse Recovery Time	trr	IDR = 5 A, VGS = 0 V	—	1000	—	ns
Reverse Recovery Charge	Qrr	dIDR/dt = 100 A/μs	—	7.5	—	μC

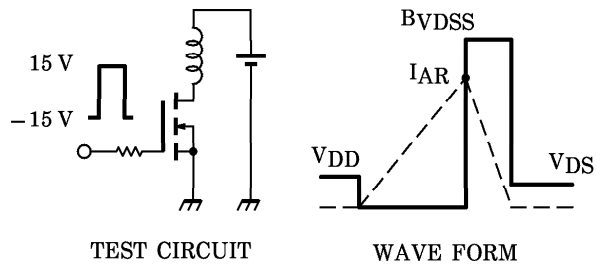
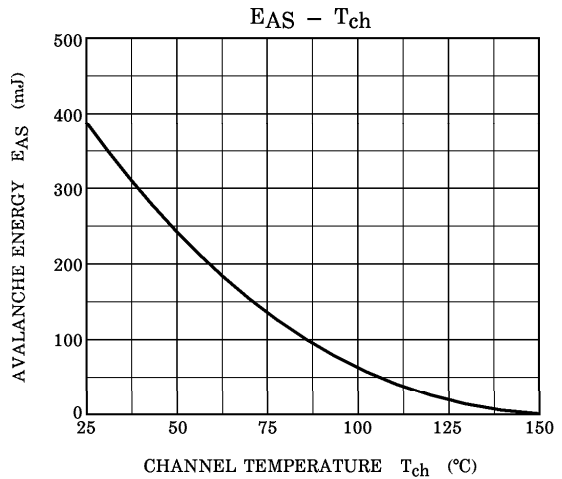
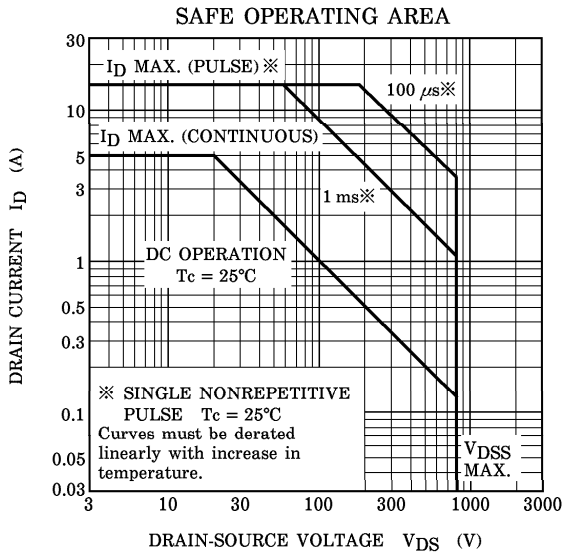
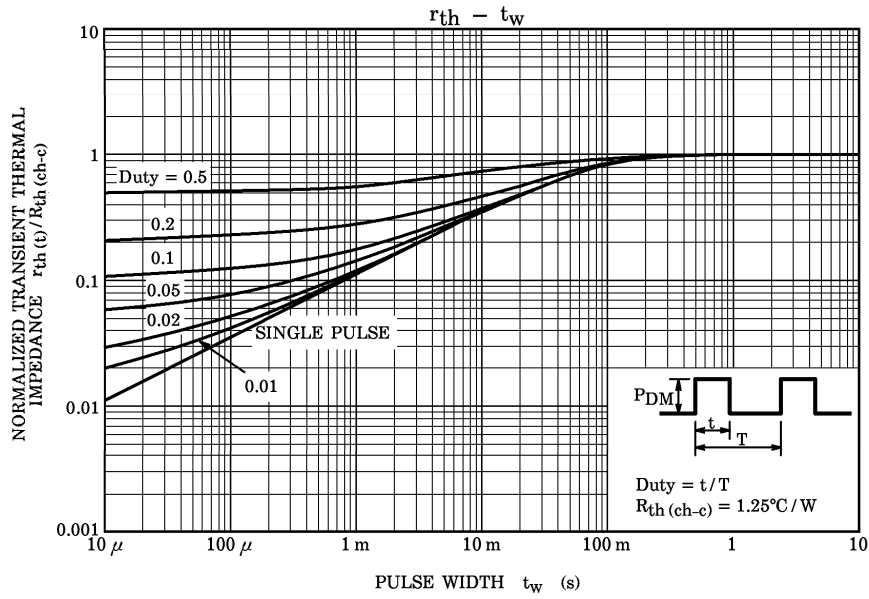
MARKING



TYPE → K2884
 ※ Lot Number
 □ □ → Month (Starting from Alphabet A)
 ———→ Year (Last Number of the Christian Era)







Peak $I_{AR} = 5\text{ A}$, $R_G = 25\ \Omega$
 $V_{DD} = 90\text{ V}$, $L = 27\text{ mH}$

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