

TOSHIBA SEMICONDUCTOR
TECHNICAL DATA

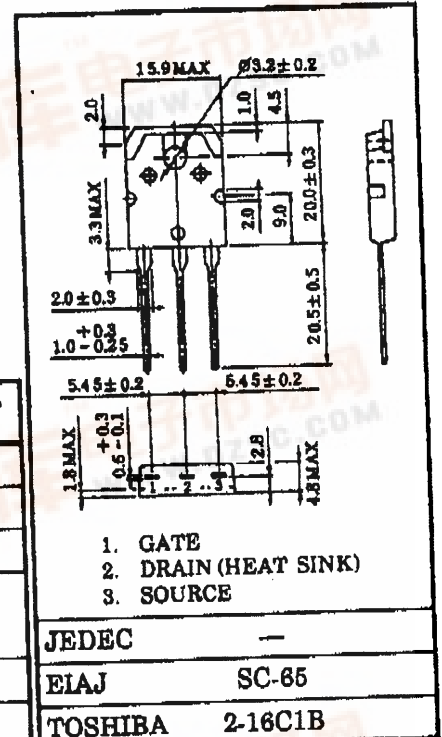
TOSHIBA FIELD EFFECT TRANSISTOR
2SK2039
SILICON N CHANNEL MOS TYPE
(π -MOS II.5)

317-5431

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

INDUSTRIAL APPLICATIONS
Unit in mm

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 1.9\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 1.7S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 300\mu A$ (Max.) @ $V_{DS} = 720V$
- Enhancement-Mode : $V_{th} = 1.5\sim 3.5V$ @ $V_{DS} = 10V, I_D = 1mA$



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

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	900	V
Drain-Gate Voltage ($R_{GS} = 20k\Omega$)		V_{DGR}	900	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	DC	I_D	5	A
	Pulse	I_{DP}	15	
Drain Power Dissipation ($T_c = 25^\circ C$)		P_D	150	W
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	$R_{th(ch-c)}$	0.833	$^\circ C/W$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	50	$^\circ C/W$

THIS TRANSISTOR IS AN ELECTROSTATIC SENSITIVE DEVICE. PLEASE HANDLE WITH CAUTION.

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TOSHIBA CORPORATION



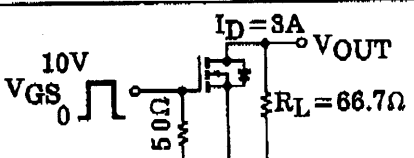
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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

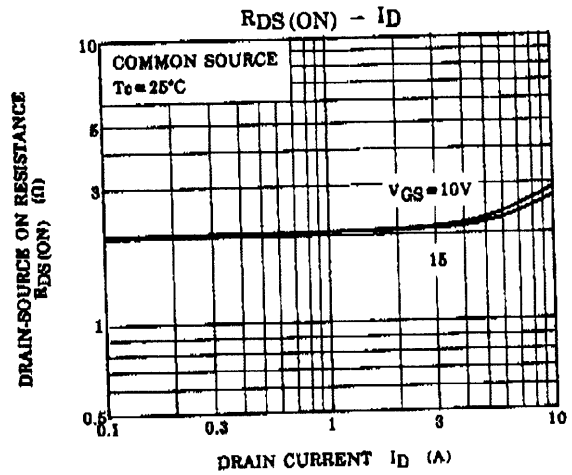
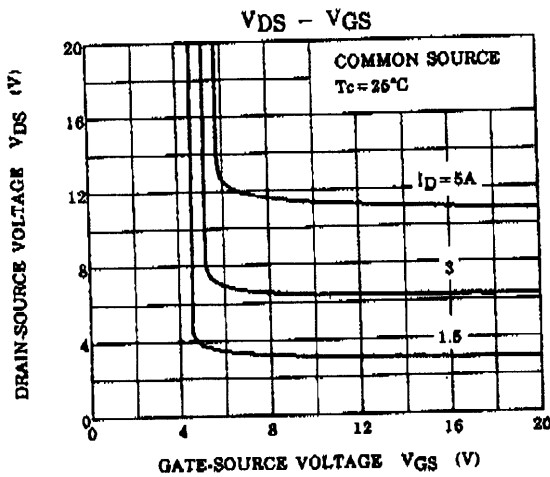
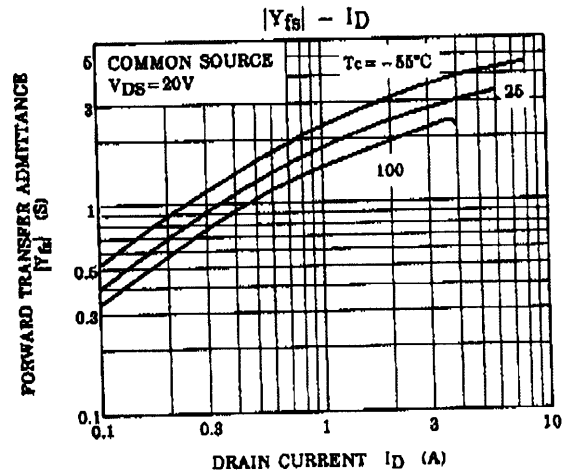
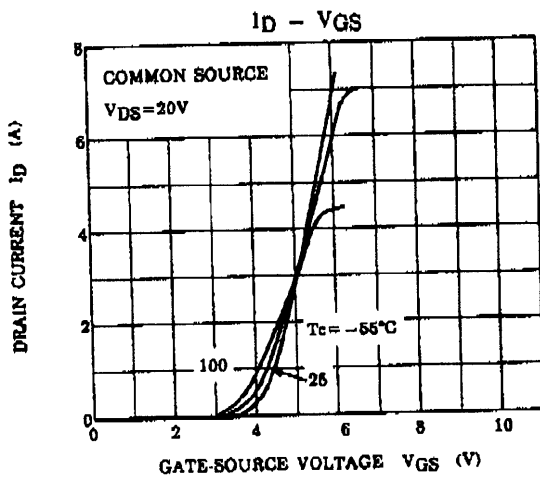
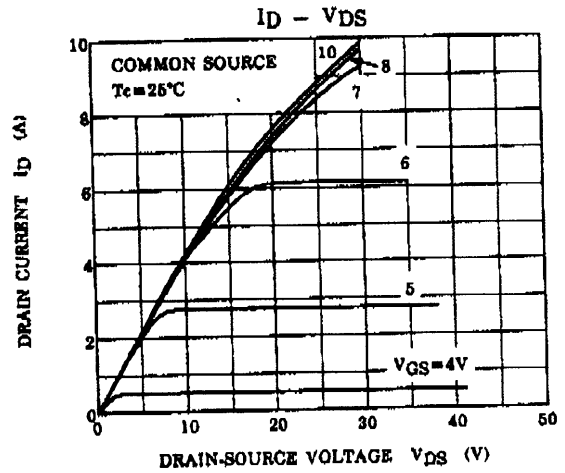
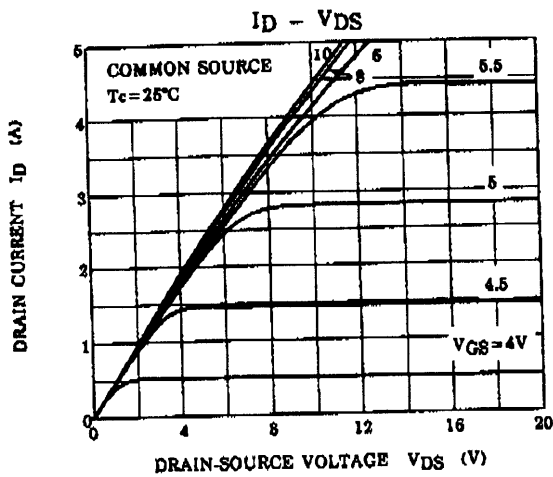
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		IGSS	VGS = ±30V, VDS = 0V	—	—	±100	nA
Drain Cut-off Current		IDSS	VDS = 720V, VGS = 0V	—	—	300	μA
Drain-Source Breakdown Voltage		V(BR)DSS	ID = 10mA, VGS = 0V	900	—	—	V
Gate Threshold Voltage		Vth	VDS = 10V, ID = 1mA	1.5	—	3.5	V
Drain-Source ON Resistance		RDS(ON)	VGS = 10V, ID = 3A	—	1.9	2.5	Ω
Forward Transfer Admittance		Yfs	VDS = 20V, ID = 3A	1.0	3.0	—	S
Input Capacitance		Ciss	VDS = 25V, VGS = 0V, f = 1MHz	—	690	980	pF
Reverse Transfer Capacitance		Crss		—	65	110	
Output Capacitance		Coss		—	120	180	
Switching Time	Rise Time	tr	 <p> V_{IN}: $t_r, t_f < 5\text{ns}$, $V_{DD} \approx 200\text{V}$ Duty $\leq 1\%$, $t_w = 10\mu\text{s}$ </p>	—	30	60	ns
	Turn-on Time	ton		—	70	140	
	Fall Time	tf		—	40	80	
	Turn-off Time	toff		—	210	420	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Qg	VDD ≈ 400V, VGS = 10V, ID = 5A	—	55	110	nC
Gate-Source Charge		Qgs		—	25	—	
Gate-Drain ("Miller") Charge		Qgd		—	30	—	

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 = 5A, VGS = 0V	—	—	-1.9	V
Reverse Recovery Time	trr	IDR = 5A, VGS = 0V	—	1450	—	ns
Reverse Recovered Charge	Qrr	dIDR / dt = 100A / μs	—	20	—	μC

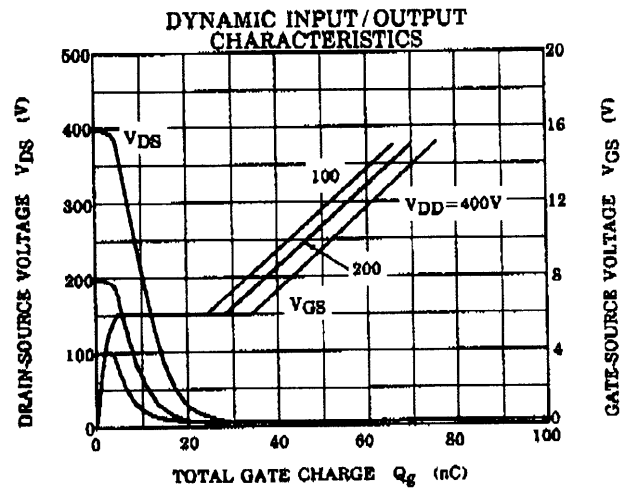
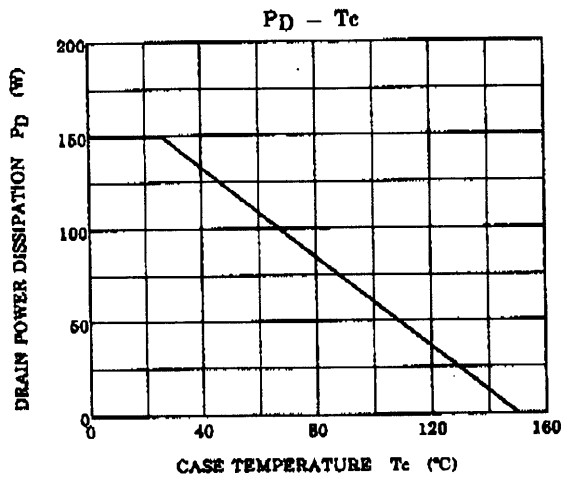
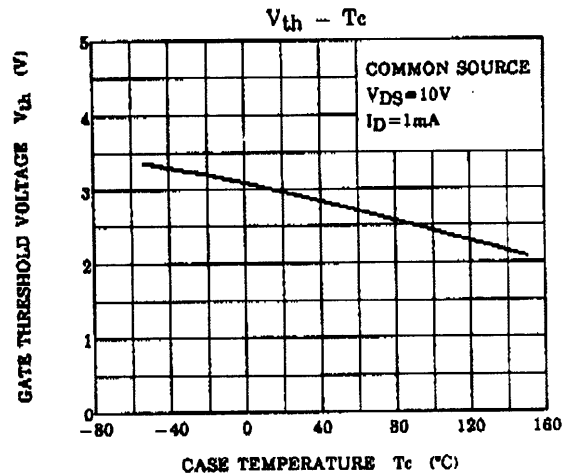
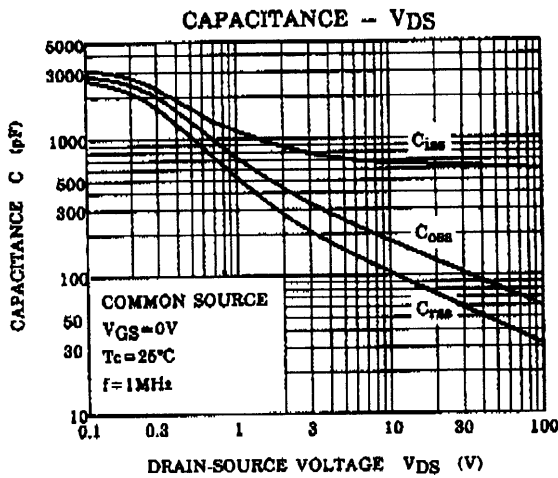
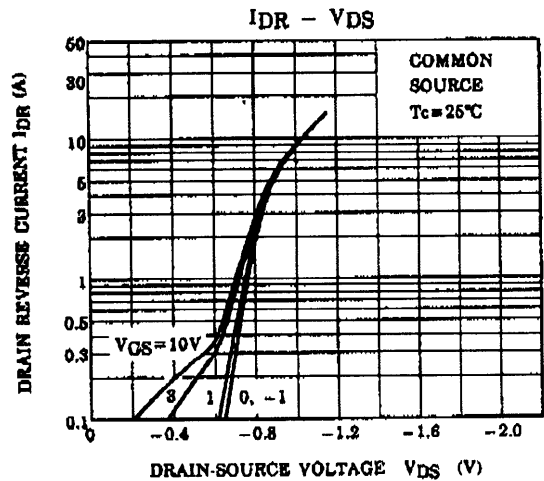
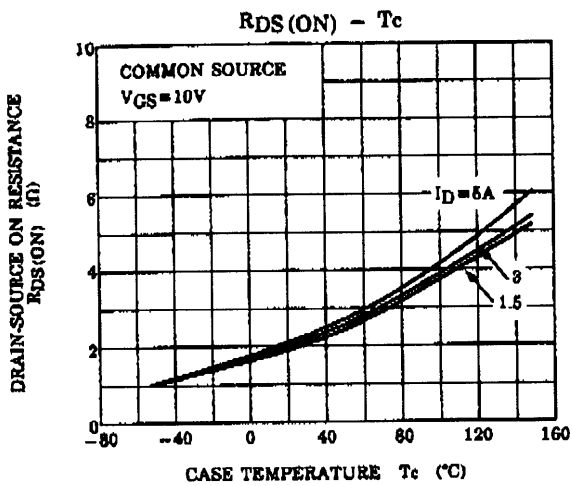
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