TOSHIBA SEMICONDUCTOR
TECHNICAL DATA

TOSHIBA FIELD EFFECT TRANSISTOR

2 S K 7 8 8

SILICON N CHANNEL MOS TYPE
(π-MOS II)

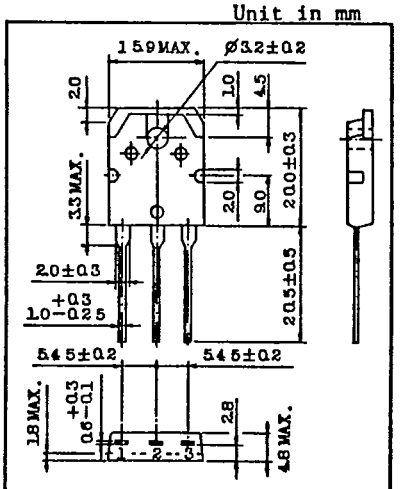
INDUSTRIAL APPLICATIONS

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

FEATURES:

- Low Drain-Source ON Resistance : $R_{DS(ON)}$= 0.38Ω (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}|$=8.0S (Typ.)
- Low Leakage Current : I_{GSS}=100nA (Max.) @ V_{GS}=±20V
  I_{DSS}=300nA (Max.) @ V_{DS}=500V
- Enhancement-Mode : V_{th}=2.0~4.0S @ V_{DS}=10V, I_D=1mA

Unit in mm



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

JEDEC	—
EIAJ	—
TOSHIBA	2-16C1B

Weight : 4.6g

MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSX}	500	V
Drain-Gate Voltage (R_{GS}=20kΩ)		V_{DGR}	500	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	DC	I_D	13	A
	Pulse	I_{DP}	52	
Drain Power Dissipation (Tc=25°C)		P_D	150	W
Channel Temperature		Tch	150	°C
Storage Temperature Range		T_{stg}	-55~150	°C

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Junction to Case	$R_{th(j-c)}$	0.83	°C/W
Thermal Resistance, Junction to Ambient	$R_{th(j-a)}$	50	°C/W
Muximum Lead Temperature for Soldering Purposes (1.6mm from case for 10 seconds)	T_L	300	°C

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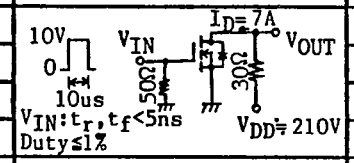
TECHNICAL DATA

2SK788

ELECTRICAL CHARACTERISTICS (Ta=25°C)

CARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Drain Cut-off Current		I_{DSS}	V_{DS}=500V, V_{GS}=0V	-	-	300	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
Forward Transfer Admittance		$\|Y_{fs}\|$	V_{DS}=10V, I_D=7A	6.0	8.0	-	S
Drain-Source ON Resistance		$R_{DS(ON)}$	I_D=7A, V_{GS}=10V	-	0.38	0.50	Ω
Input Capacitance		C_{iss}	V_{DS}=10V, V_{GS}=0V, f=1MHz	-	2300	3600	pF
Reverse Transfer Capacitance		C_{rss}		-	570	680	
Output Capacitance		C_{oss}		-	1000	1400	
Swiching Time	Rise Time	t_r		-	70	140	ns
	Turn-on Time	t_{on}		-	100	200	
	Fall Time	t_f		-	75	150	
	Turn-off Time	t_{off}		-	350	700	
Total Gate charge (Gate-Source Plus Gate-Drain)		Q_g	I_D=15A, V_{GS}=10V, V_{DD}≒400V	-	87	110	nC
Gate-Source Charge		Q_{gs}		-	35	-	
Gate-Drain ("Miller") Charge		Q_{gd}		-	52	-	

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

CHARACTERISTICS	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	--	-	-	13	A
Rulse Drain Reverse Current	I_{DRP}	--	-	-	52	A
Diode Foward Voltage	V_{DSF}	I_{DR}=13A, V_{GS}=0V	-	-	1.9	V
Reverse Recovery Time	t_{rr}	I_{DR}=13A, dI_{DR}/dt=100A/us	-	400	-	ns
Reverse Recovered Charge	Q_{rr}		-	4.0	-	μC

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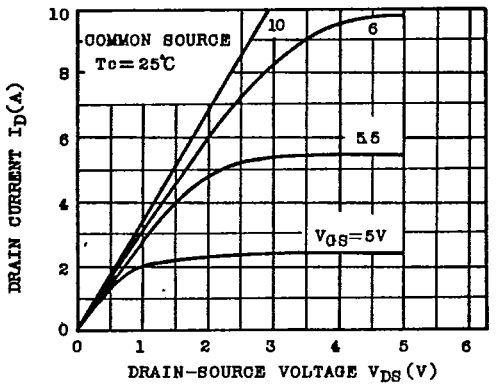
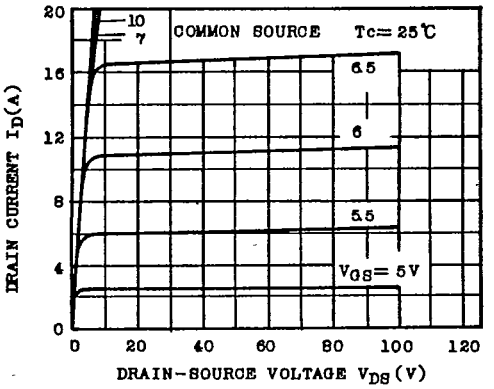
2SK788

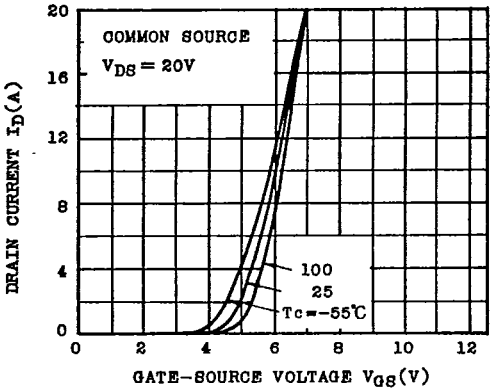
$I_D - V_{DS}$



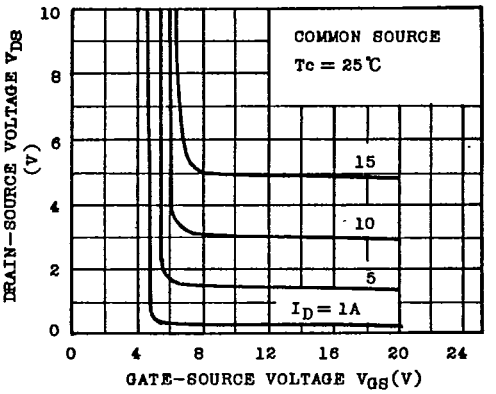
$I_D - V_{DS}$



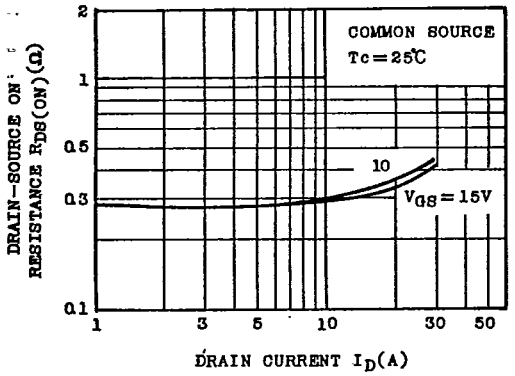
$I_D - V_{GS}$



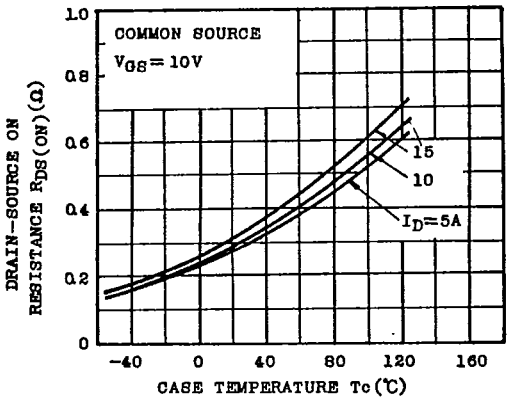
$V_{DS} - V_{GS}$



$R_{DS(ON)} - I_D$



$R_{DS(ON)} - T_C$



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TOSHIBA CORPORATION

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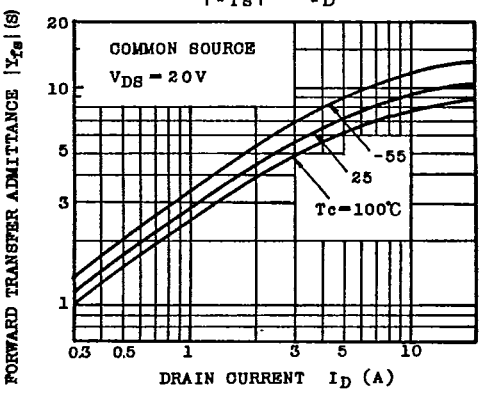
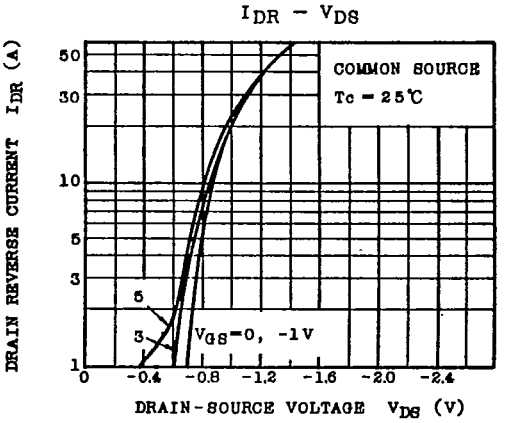
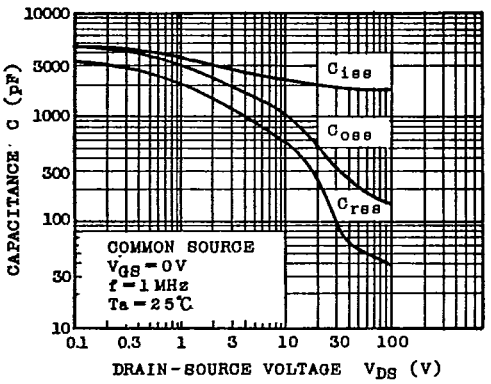
$|Y_{fs}| - I_D$



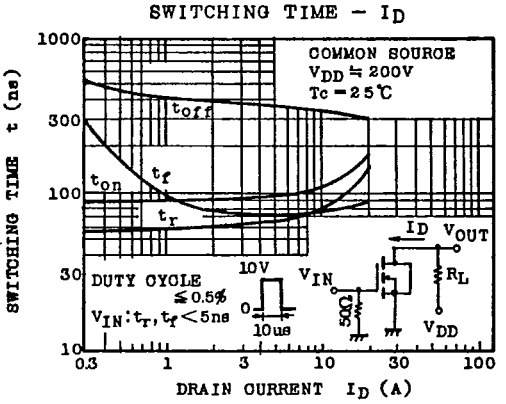
$I_{DR} - V_{DS}$



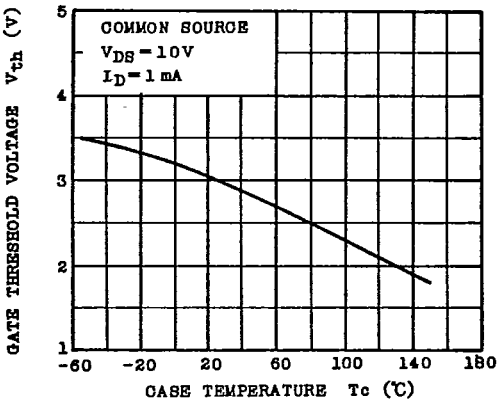
CAPACITANCE $- V_{DS}$



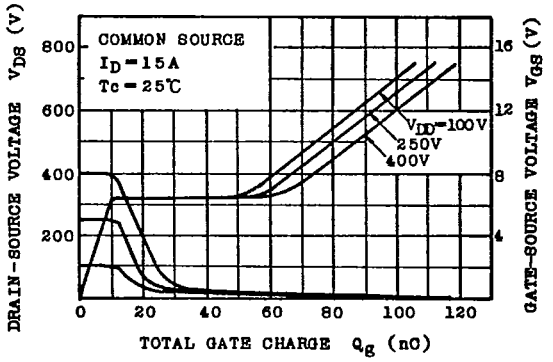
SWITCHING TIME $- I_D$



$V_{th} - Tc$



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



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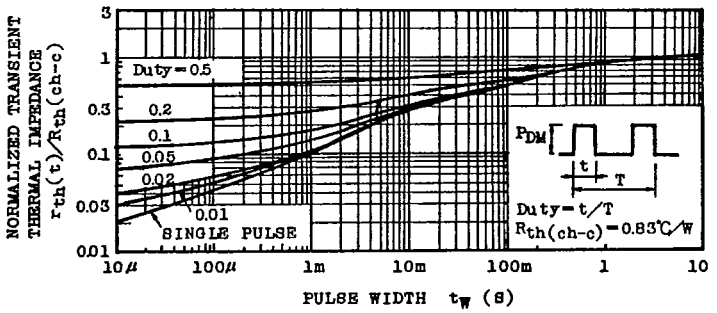
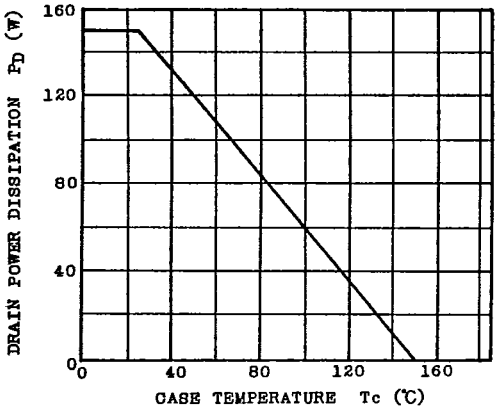
2SK788

$r_{th} - t_W$



$P_D - T_C$



SAFE OPERATING AREA