TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (π-MOSII·5)

2SK1602

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

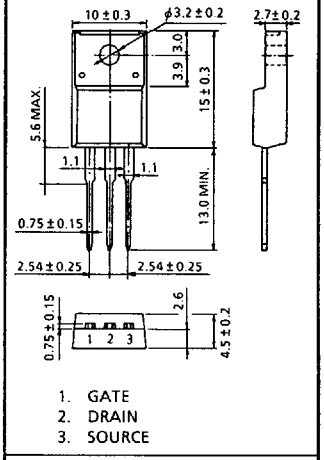
INDUSTRIAL APPLICATIONS

- Low Drain-Source ON Resistance : $R_{DS\,(ON)}$ = 4.3Ω (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}|$ = 1.7S (Typ.)
- Low Leakage Current : I_{DSS} = 100μA (Max.) @V_{DS} = 640V
- Enhancement-Mode : V_{th} = 1.5~3.5V @V_{DS} = 10V, I_D = 1mA

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	800	V
Drain-Gate Voltage (R_{GS} = 20kΩ)		V_{DGR}	800	V
Gate-Source Voltage		V_{GSS}	±30	V
Drain Current	DC	I_D	2.8	A
	Pulse	I_{DP}	8.4	
Drain Power Dissipation (Tc = 25°C)		P_D	40	W
Channel Temperature		T_{ch}	150	°C
Storage Temperature Range		T_{stg}	−55~150	°C

Unit in mm



1. GATE
2. DRAIN
3. SOURCE

JEDEC	—
EIAJ	SC-67
TOSHIBA	2-10R1B

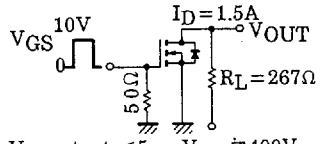
Weight : 1.9g

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th\,(ch-c)}$	3.125	°C/W
Thermal Resistance, Channel to Ambient	$R_{th\,(ch-a)}$	62.5	°C/W

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

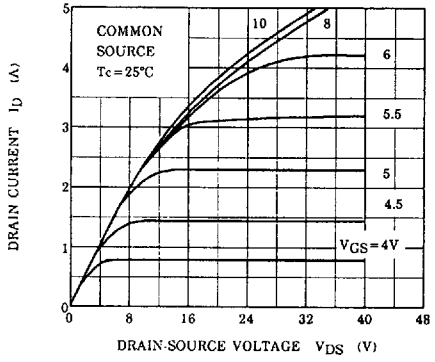
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	$V_{GS}=\pm25V$, $V_{DS}=0V$	—	—	±100	nA
Drain Cut-off Current		I_{DSS}	$V_{DS}=640V$, $V_{GS}=0V$	—	—	100	μA
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	$I_D=10mA$, $V_{GS}=0V$	800	—	—	V
Gate Threshold Voltage		V_{th}	$V_{DS}=10V$, $I_D=1mA$	1.5	—	3.5	V
Drain-Source ON Resistance		$R_{DS(ON)}$	$I_D=1.5A$, $V_{GS}=10V$	—	4.3	5.0	Ω
Forward Transfer Admittance		$\|Y_{fs}\|$	$V_{DS}=20V$, $I_D=1.5A$	1.0	1.7	—	S
Input Capacitance		C_{iss}	$V_{DS}=25V$, $V_{GS}=0V$, f=1MHz	—	360	700	pF
Reverse Transfer Capacitance		C_{rss}		—	30	50	
Output Capacitance		C_{oss}		—	60	90	
Switching Time	Rise Time	t_r	 V_{IN} : t_r, $t_f<5ns$, $V_{DD}\fallingdotseq400V$ Duty≦1%, $t_w=10\mu s$	—	25	50	ns
	Turn-on Time	t_{on}		—	40	60	
	Fall Time	t_f		—	40	80	
	Turn-off Time	t_{off}		—	150	300	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	$V_{DD}\fallingdotseq400V$, $V_{GS}=10V$, $I_D=2.8A$	—	26	50	nC
Gate-Source Charge		Q_{gs}		—	16	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	10	—	

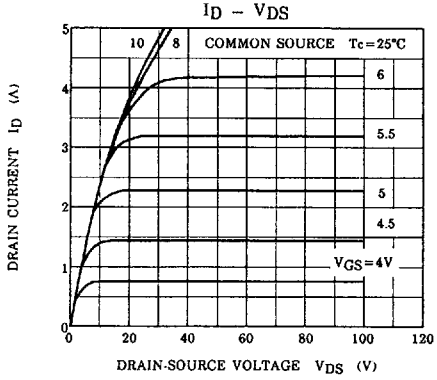
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	2.8	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	8.4	A
Diode Forward Voltage	V_{DSF}	$I_{DR}=2.8A$, $V_{GS}=0V$	—	—	−2.0	V
Reverse Recovery Time	t_{rr}	$I_{DR}=2.8A$, $V_{GS}=0V$ $dI_{DR}/dt=100A/\mu s$	—	600	—	ns
Reverse Recovery Charge	Q_{rr}		—	12	—	μC

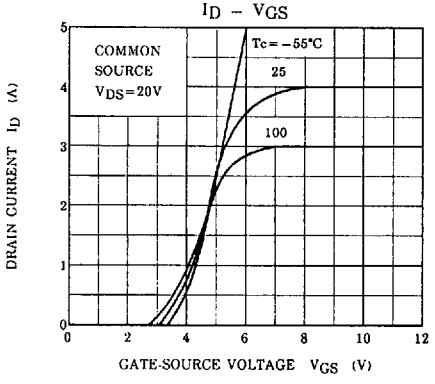
I_D – V_{DS}



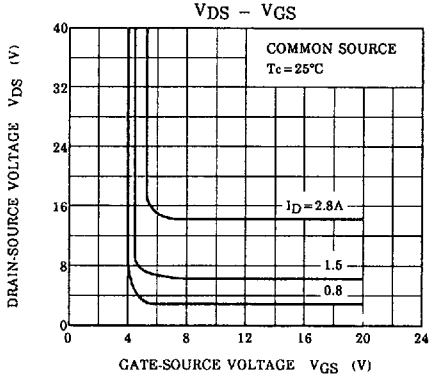
I_D – V_{DS}



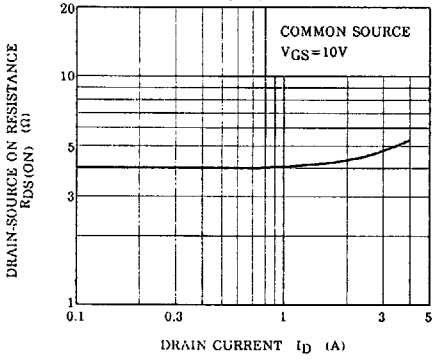
I_D – V_{GS}



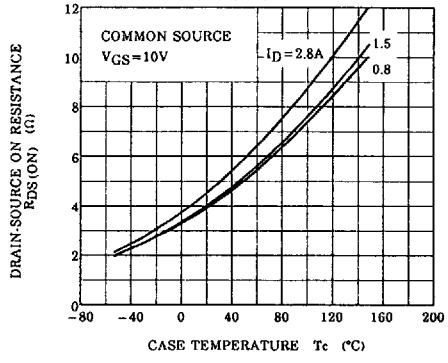
V_{DS} – V_{GS}



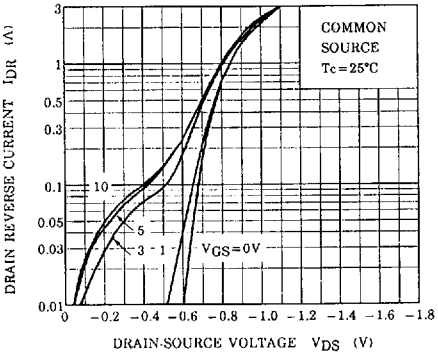
$R_{DS(ON)}$ – I_D



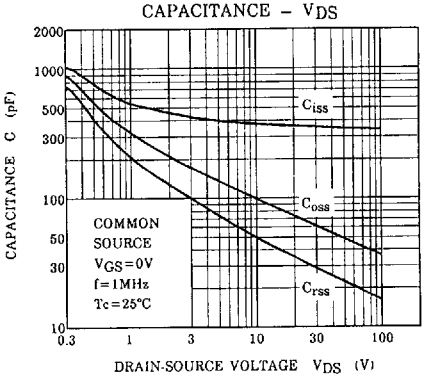
$R_{DS(ON)}$ – Tc



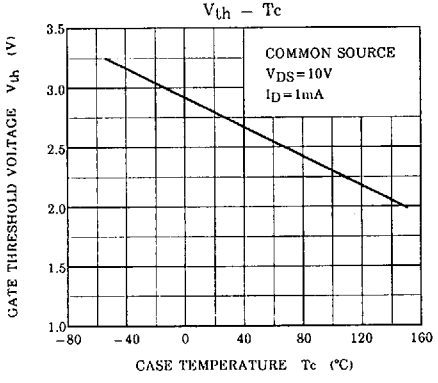
I_{DR} – V_{DS}



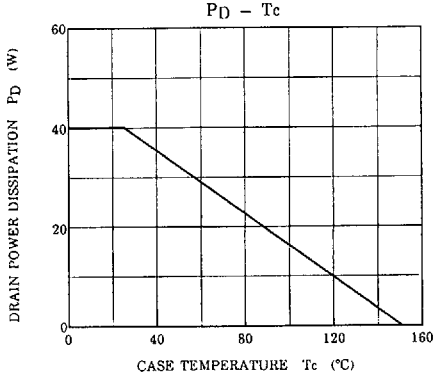
CAPACITANCE – V_{DS}



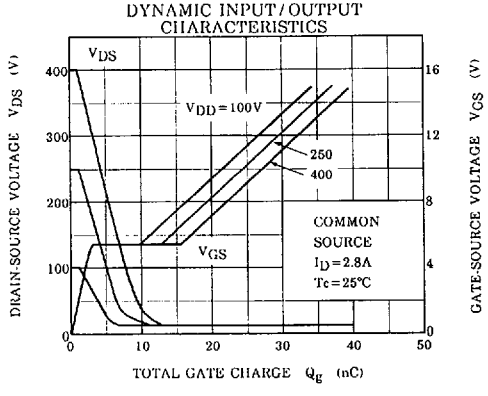
V_{th} – Tc



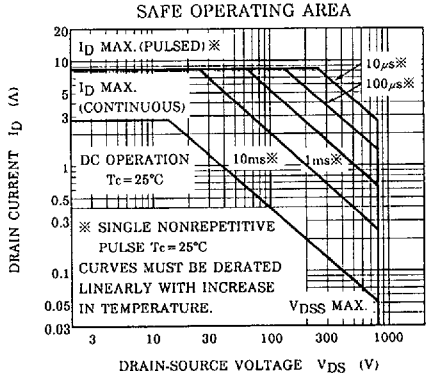
P_D – Tc



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SAFE OPERATING AREA



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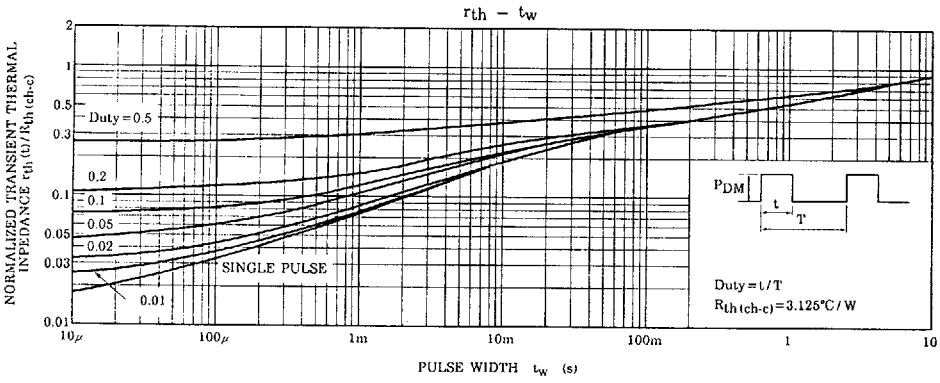

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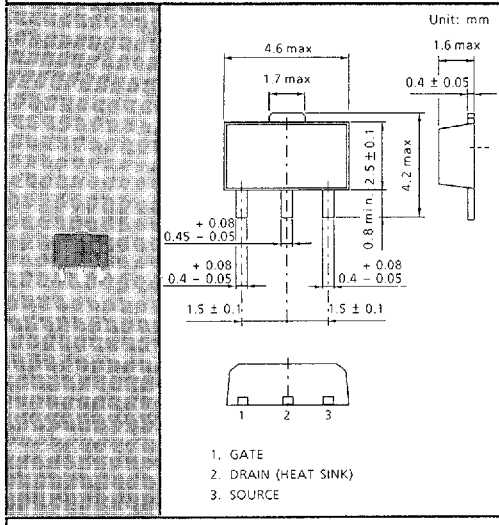
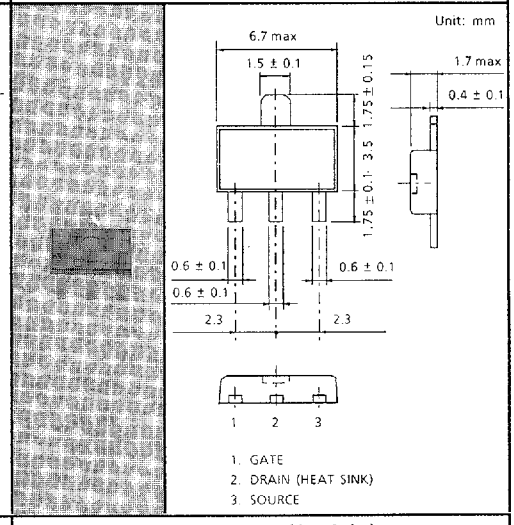
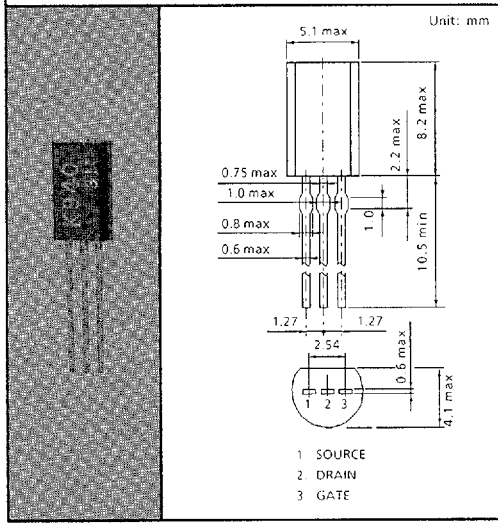
POWER-MINI (SOT-89)



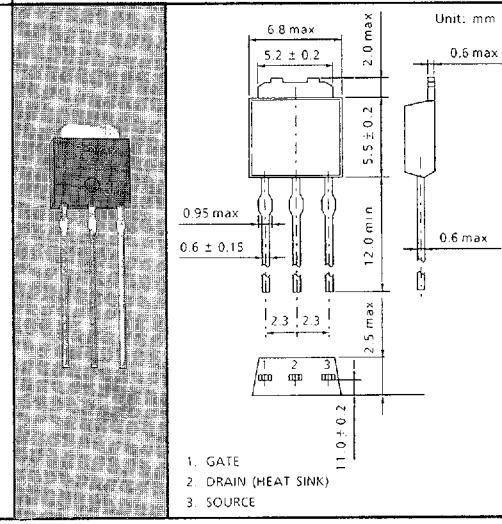
SP (SOT-223)



TO92-MOD



POWER-MOLD (Straight)



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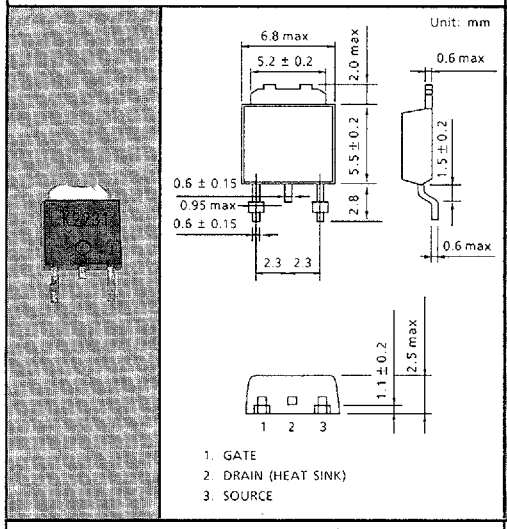
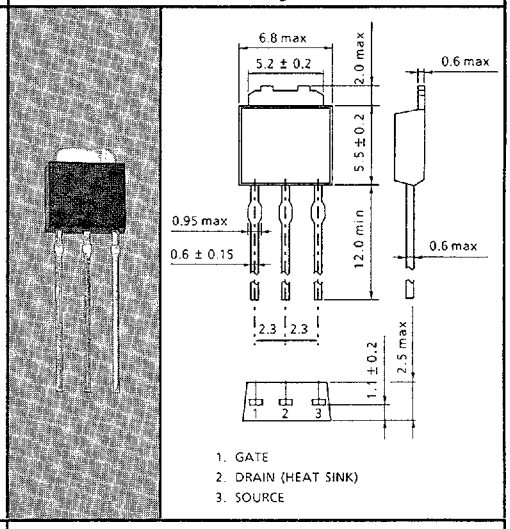
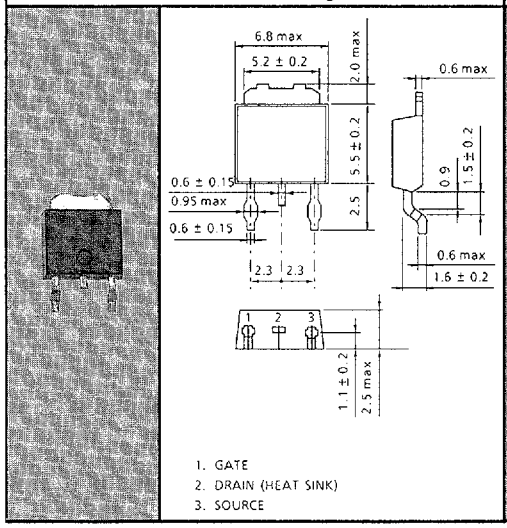
POWER-MOLD (Lead Formed)



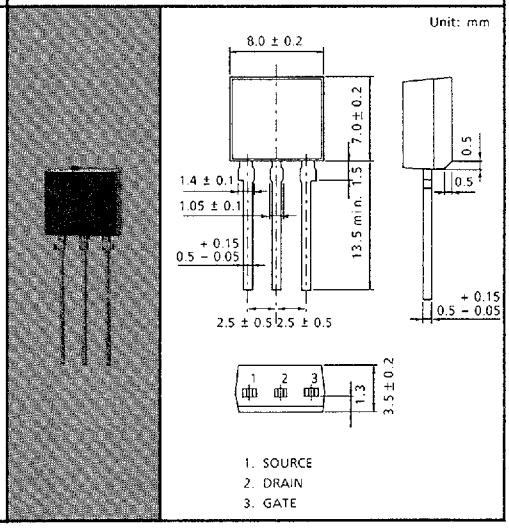
DP (Straight)



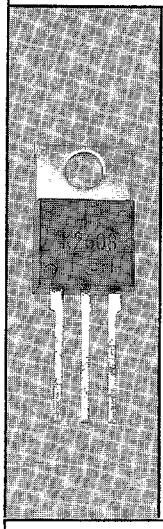
DP (Lead Forming)



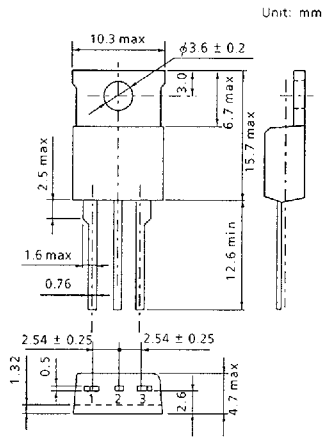
TPS



TO-220AB

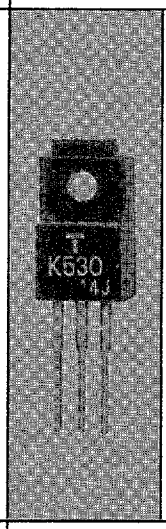


Unit: mm

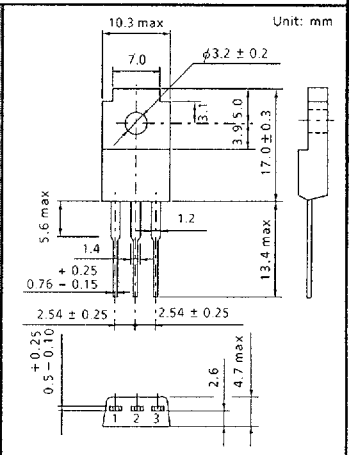


1. GATE
2. DRAIN (HEAT SINK)
3. SOURCE

TO-220 (IS)

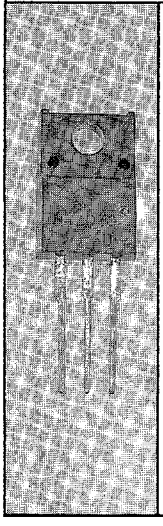


Unit: mm

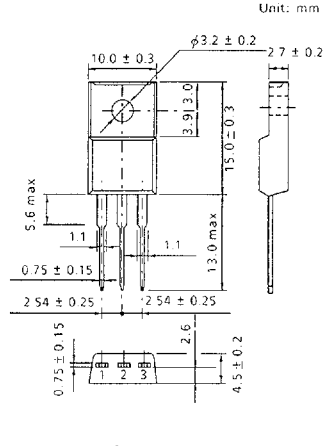


1. GATE
2. DRAIN
3. SOURCE

TO-220 (NIS)

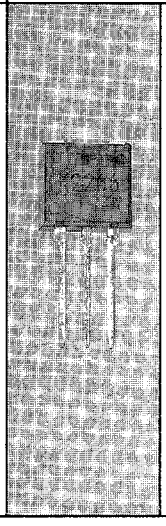


Unit: mm



1. GATE
2. DRAIN
3. SOURCE

TO-220FL



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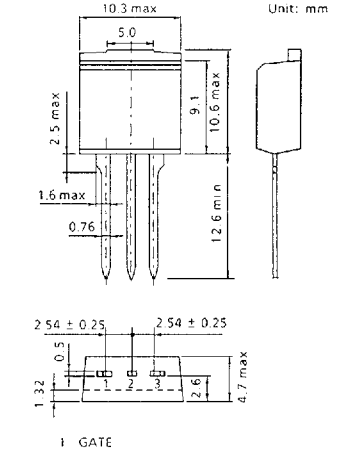

1. GATE
2. DRAIN (HEAT SINK)
3. SOURCE

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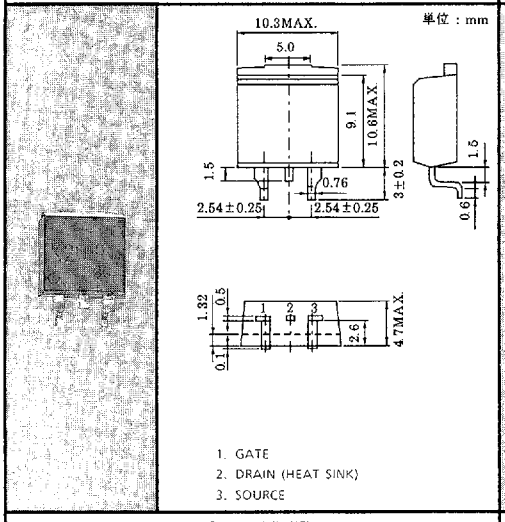
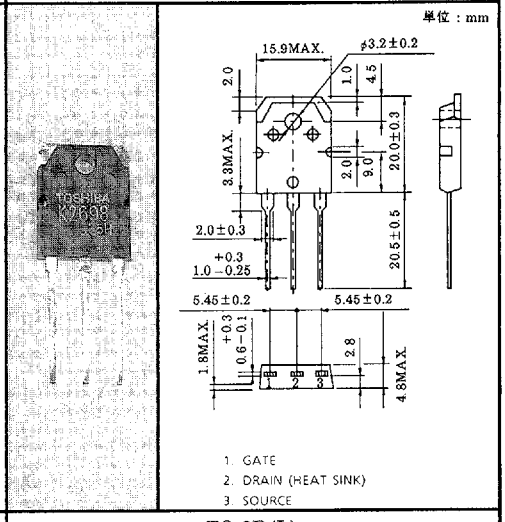
TO-220SM



TO-3P (N)



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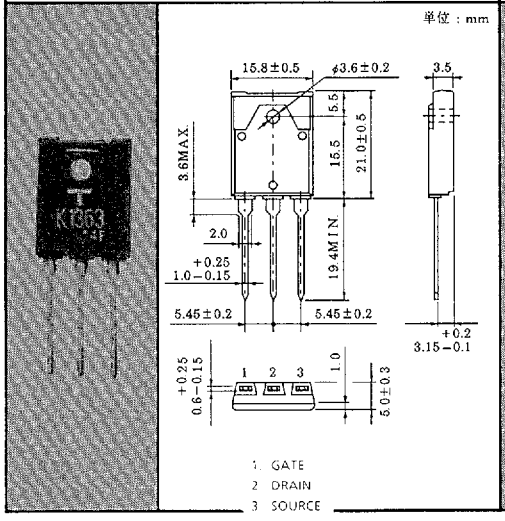

TO-3P (L)