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

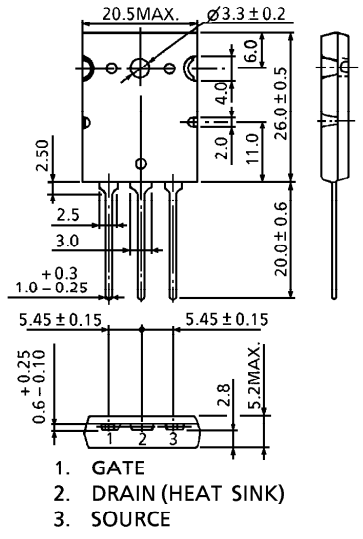
2SK1489

CHOPPER REGULATOR APPLICATIONS
HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance : $R_{DS\,(ON)} = 0.8\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 6.0S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 300\mu A$ (Max.) @$V_{DS} = 800V$
- Enhancement-Mode : $V_{th} = 1.5 \sim 3.5V$ @$V_{DS} = 10V$, $I_D = 1mA$



JEDEC	—
EIAJ	—
TOSHIBA	2-21F1B

Weight : 9.75g

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	1000	V
Drain-Gate Voltage ($R_{GS} = 20k\Omega$)		V_{DGR}	1000	V
Gate-Source Voltage		V_{GSS}	±30	V
Drain Current	DC	I_D	12	A
	Pulse	I_{DP}	48	
Drain Power Dissipation (Tc = 25°C)		P_D	200	W
Channel Temperature		T_{ch}	150	°C
Storage Temperature Range		T_{stg}	−55~150	°C

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th\,(ch\text{-}c)}$	0.625	°C / W
Thermal Resistance, Channel to Ambient	$R_{th\,(ch\text{-}a)}$	35.7	°C / W

This transistor is an electrostatic sensitive device.
Plese handle with caution.

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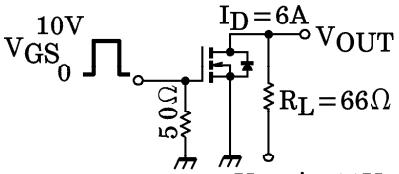
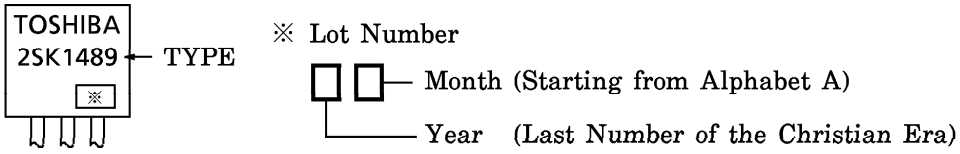
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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}	$V_{DS}=800V$, $V_{GS}=0V$	—	—	300	μA
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	$I_D=10mA$, $V_{GS}=0V$	1000	—	—	V
Gate Threshold Voltage		V_{th}	$V_{DS}=10V$, $I_D=1mA$	1.5	—	3.5	V
Drain-Source ON Resistance		$R_{DS(ON)}$	$I_D=6A$, $V_{GS}=10V$	—	0.8	1.0	Ω
Forward Transfer Admittance		$\|Y_{fs}\|$	$V_{DS}=20V$, $I_D=6A$	4.0	6.0	—	S
Input Capacitance		C_{iss}	$V_{DS}=25V$, $V_{GS}=0V$, f=1MHz	—	2000	2400	pF
Reverse Transfer Capacitance		C_{rss}		—	220	330	
Output Capacitance		C_{oss}		—	360	520	
Switching Time	Rise Time	t_r	 V_{IN} : t_r, $t_f<5ns$, Duty≦1%, $t_w=10\mu s$	—	100	200	ns
	Turn-on Time	t_{on}		—	140	280	
	Fall Time	t_f		—	150	300	
	Turn-off Time	t_{off}		—	500	1000	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	$V_{DD}\fallingdotseq400V$, $V_{GS}=10V$, $I_D=12A$	—	110	200	nC
Gate-Source Charge		Q_{gs}		—	50	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	60	—	

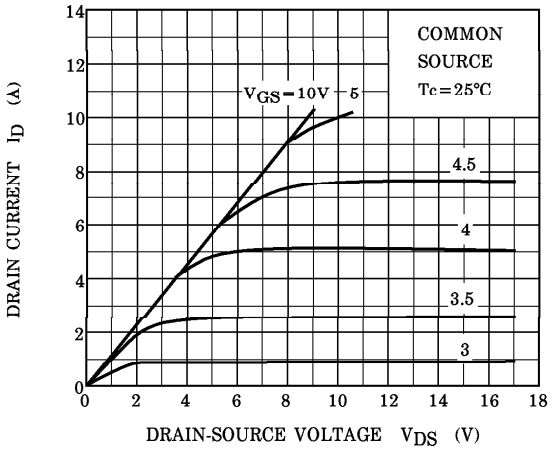
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

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}	$I_{DR}=12A$, $V_{GS}=0V$	—	—	−1.6	V

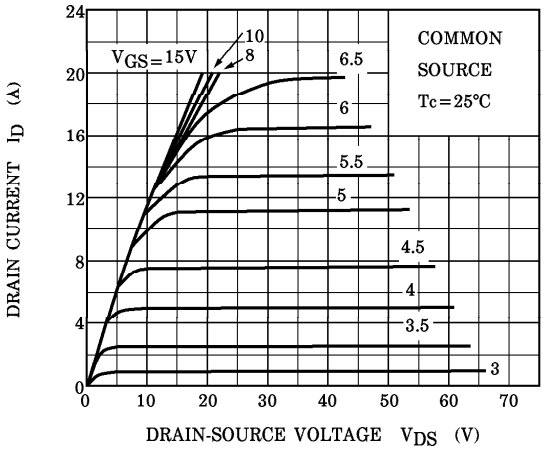
MARKING



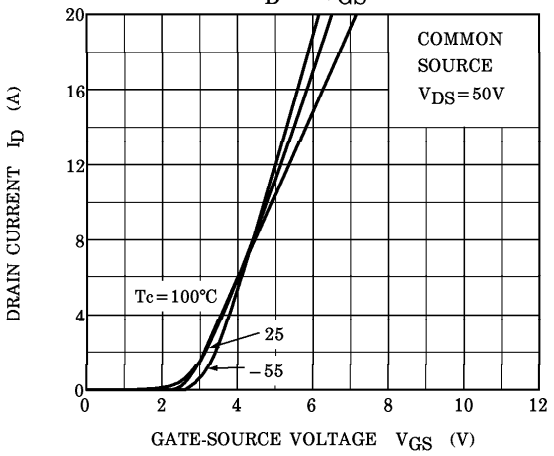
$I_D - V_{DS}$



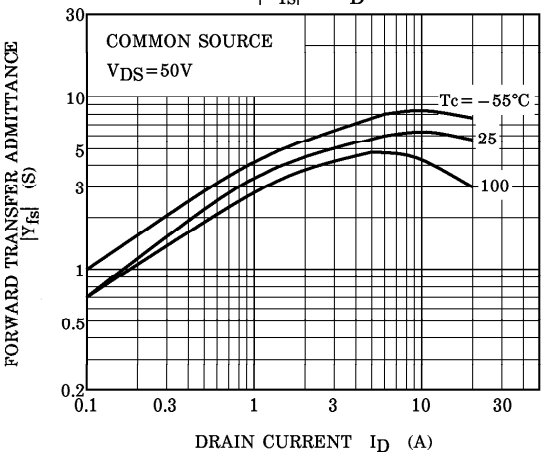
$I_D - V_{DS}$



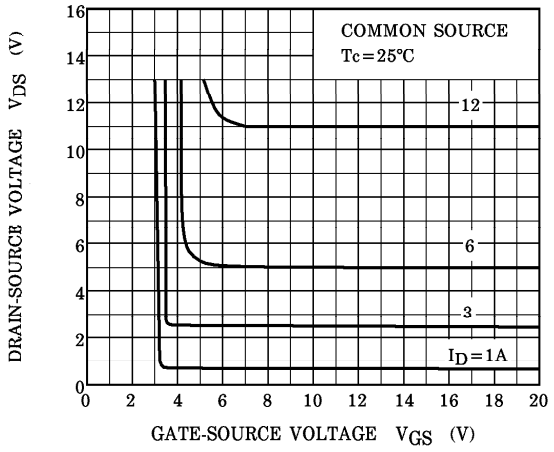
$I_D - V_{GS}$



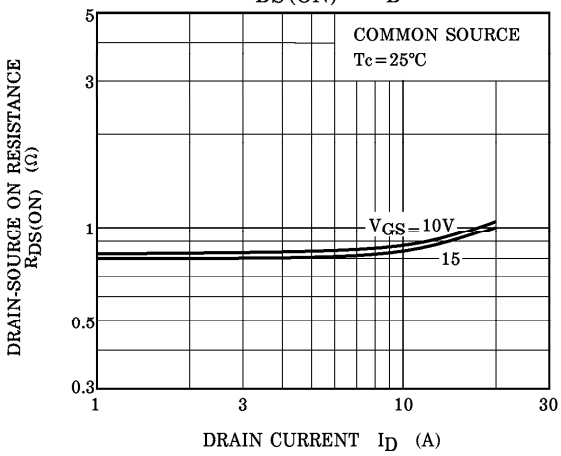
$|Y_{fs}| - I_D$



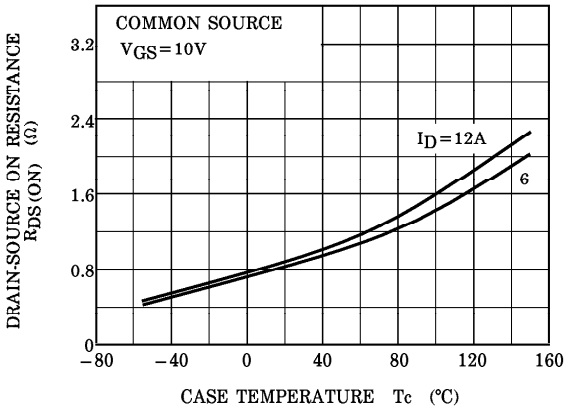
$V_{DS} - V_{GS}$



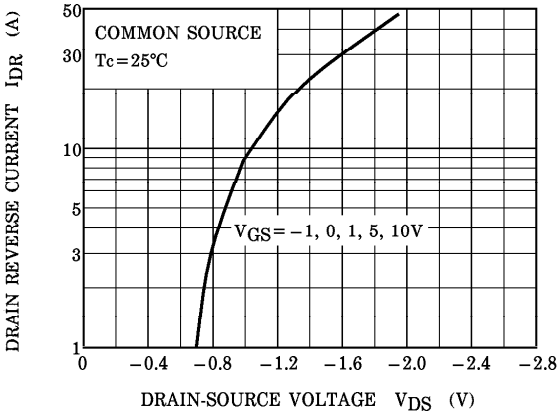
$R_{DS(ON)} - I_D$



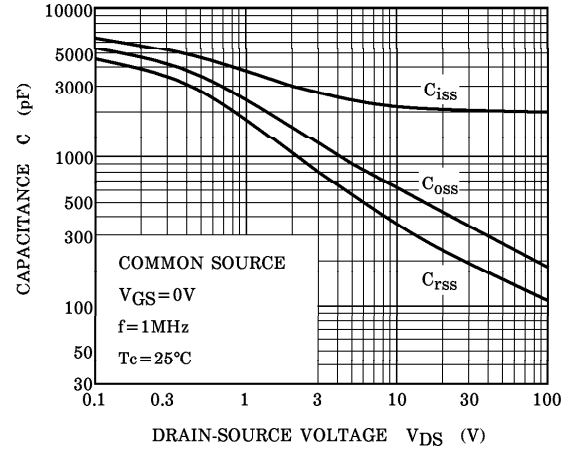
$R_{DS(ON)}$ – Tc



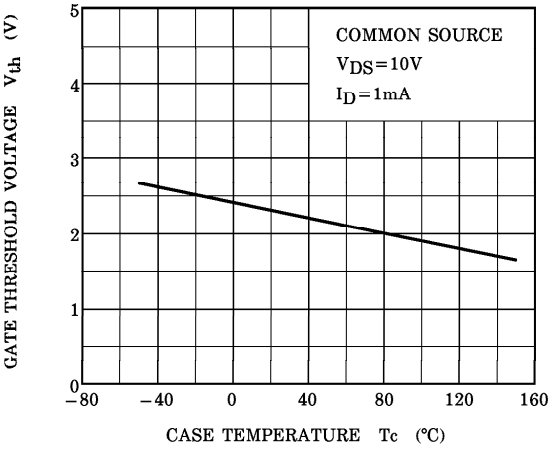
I_{DR} – V_{DS}



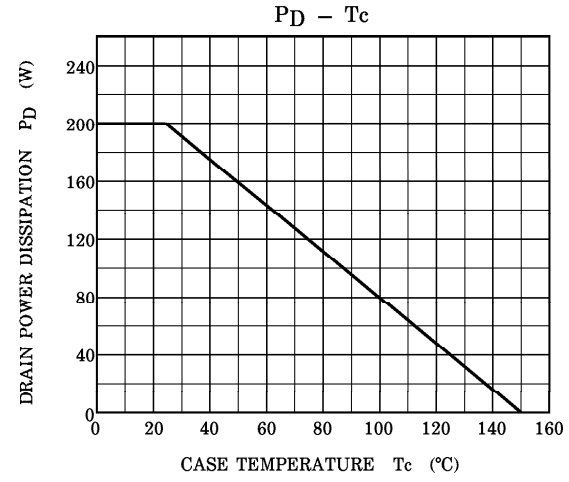
CAPACITANCE – V_{DS}



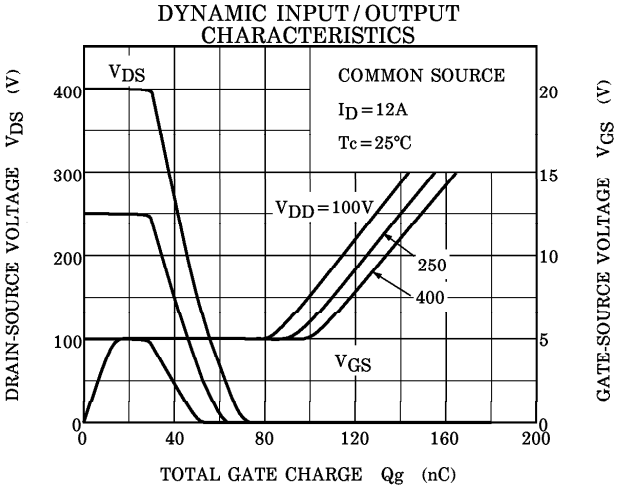
V_{th} – Tc

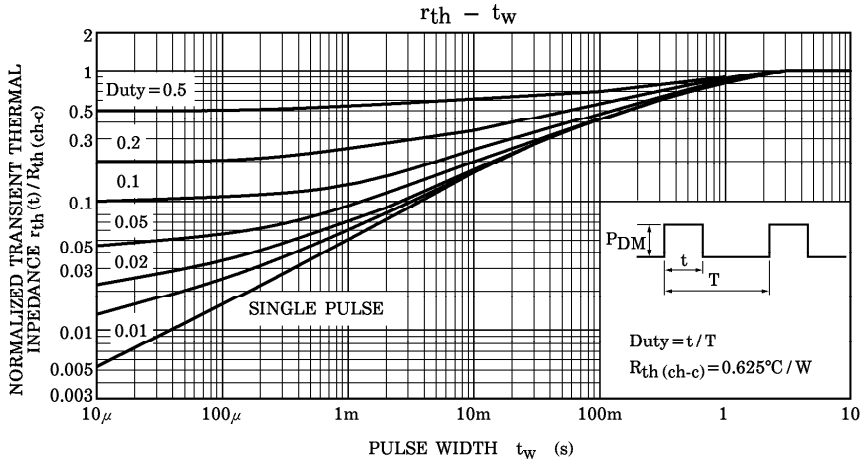


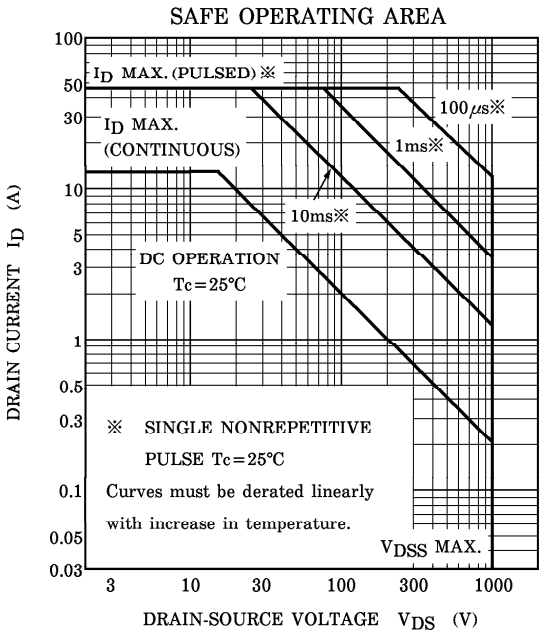
P_D – Tc



DYNAMIC INPUT / OUTPUT CHARACTERISTICS




r_{th} – t_w
NORMALIZED TRANSIENT THERMAL INPEDANCE r_{th} (t)/R_{th} (ch-c)
2
1
0.5
0.3
0.1
0.05
0.03
0.01
0.005
0.003
Duty = 0.5
0.2
0.1
0.05
0.02
0.01
SINGLE PULSE
P_{DM}
t
T
Duty = t / T
$R_{th\ (ch-c)}$ = 0.625°C / W
10μ
100μ
1m
10m
100m
1
10
PULSE WIDTH t_w (s)


SAFE OPERATING AREA
DRAIN CURRENT I_D (A)
100
50
30
10
5
3
1
0.5
0.3
0.1
0.05
0.03
I_D MAX. (PULSED) ※
I_D MAX. (CONTINUOUS)
100μs※
1ms※
10ms※
DC OPERATION
Tc = 25°C
※ SINGLE NONREPETITIVE PULSE Tc = 25°C
Curves must be derated linearly with increase in temperature.
V_{DSS} MAX.
3
10
30
100
300
1000
DRAIN-SOURCE VOLTAGE V_{DS} (V)