TOSHIBA POWER MOS FET MODULE SILICON N CHANNEL MOS TYPE (L^2-π-MOSIII 4 IN 1)

MP4201

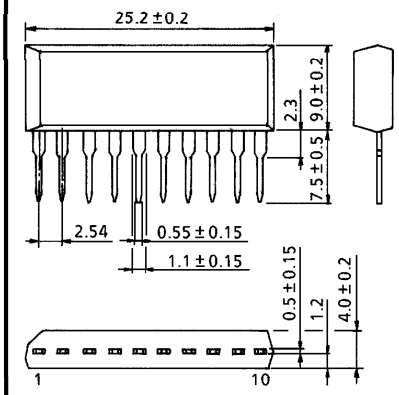
HIGH POWER, HIGH SPEED SWITCHING APPLICATIONS

HAMMER DRIVE, PULSE MOTOR DRIVE AND INDUCTIVE LOAD SWITCHING

INDUSTRIAL APPLICATIONS

- 4V Gate Drive Available
- Small Package by Full Molding (SIP 10 Pin)
- High Drain Power Dissipation (4 Devices Operation)
  : $P_T = 4W$ (Ta = 25°C)
- Low Drain-Source ON Resistance : $R_{DS\,(ON)} = 0.33\Omega$ (Typ.)
- Low Leakage Current : $I_{GSS} = \pm 5\mu A$ (Max.) ($V_{GS} = \pm 16V$)
  $I_{DSS} = 100\mu A$ (Max.) ($V_{DS} = 120V$)
- Enhancement-Mode : $V_{th} = 0.8 \sim 2.0V$ ($I_D = 1mA$)

Unit in mm



1, 10 SOURCE
2, 4, 6, 8 GATE
3, 5, 7, 9 DRAIN
(PIN 1 AND PIN 10 IS DISCONNECTED INTERNALLY)

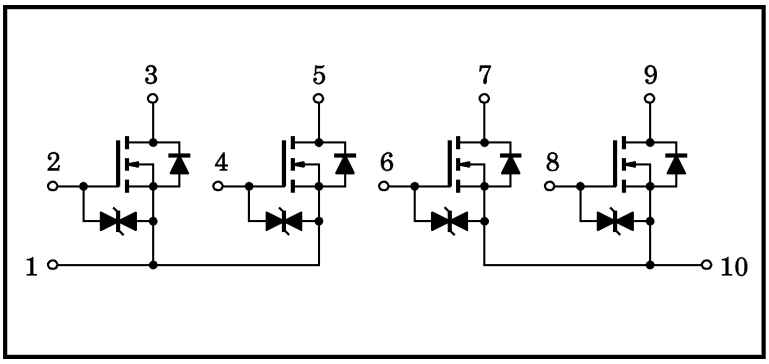
JEDEC	—
EIAJ	—
TOSHIBA	2-25A1C

Weight : 2.1g (Typ.)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	V_{DSS}	120	V
Gate-Source Voltage	V_{GSS}	±20	V
Drain Current	I_D	3	A
Peak Drain Current	I_{DP}	6	A
Drain Power Dissipation (1 Device Operation)	P_D	2.0	W
Drain Power Dissipation (4 Devices Operation)	P_{DT}	4.0	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature Range	T_{stg}	−55~150	°C

ARRAY CONFIGURATION

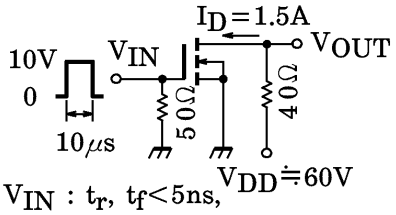


THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance of Channel to Ambient (4 Devices Operation, Ta = 25°C)	$\Sigma R_{th\,(ch\text{-}a)}$	31.2	°C / W
Maximum Lead Temperature for Soldering Purposes (3.2mm from Case for 10s)	T_L	260	°C

This Transistor is an Electrostatic Sensitive Device. Please Handle with Caution.

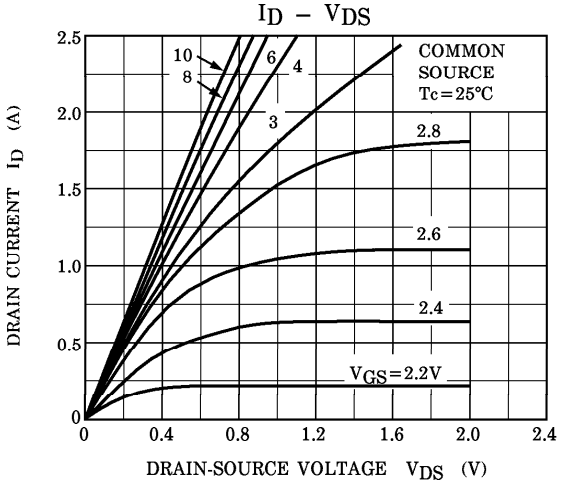
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	$V_{GS} = \pm 16V$, $V_{DS} = 0$	—	—	±5	μA
Drain Cut-off Current		I_{DSS}	$V_{DS} = 120V$, $V_{GS} = 0$	—	—	100	μA
Drain-Source Breakdown Voltage		$V_{(BR)\,DSS}$	$I_D = 10mA$, $V_{GS} = 0$	120	—	—	V
Gate Threshold Voltage		V_{th}	$V_{DS} = 10V$, $I_D = 1mA$	0.8	—	2.0	V
Forward Transfer Admittance		$\|Y_{fs}\|$	$V_{DS} = 10V$, $I_D = 1.5A$	1.5	3.2	—	S
Drain-Source ON Resistance		$R_{DS\,(ON)}$	$I_D = 1.5A$, $V_{GS} = 4V$	—	0.42	0.74	Ω
		$R_{DS\,(ON)}$	$I_D = 1.5A$, $V_{GS} = 10V$	—	0.33	0.45	
Input Capacitance		C_{iss}	$V_{DS} = 10V$, $V_{GS} = 0$, f = 1MHz	—	350	—	pF
Reverse Transfer Capacitance		C_{rss}		—	35	—	
Output Capacitance		Coss		—	155	—	
Switching Time	Rise Time	t_r	 V_{IN} : t_r, $t_f < 5ns$, Du. ≦ 1%	—	6	—	ns
	Turn-on Time	t_{on}		—	12	—	
	Fall Time	t_f		—	40	—	
	Turn-off Time	t_{off}		—	100	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	$I_D = 3A$, $V_{GS} = 10V$, $V_{DD} = 96V$	—	11	—	nC
Gate-Source Charge		Q_{gs}		—	7	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	4	—	

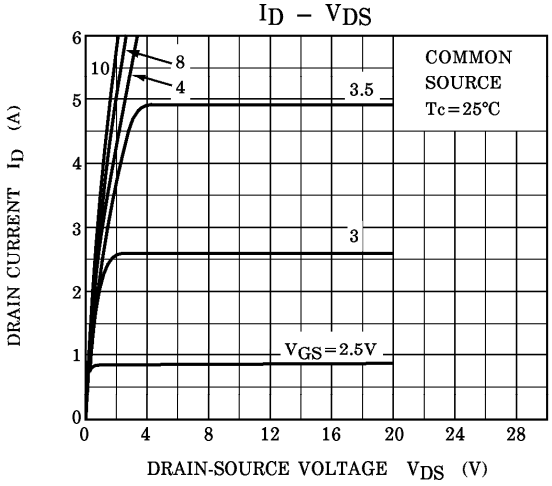
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Drain Reverse Current	I_{DR}	—	—	—	3	A
Peak Drain Reverse Current	I_{DRP}	—	—	—	6	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = 3A$, $V_{GS} = 0$	—	−0.9	−1.5	V
Reverse Recovery Time	t_{rr}	$I_{DR} = 3A$, $V_{GS} = 0$, $dI_{DR} / dt = -20A / \mu s$	—	130	—	ns
Reverse Recovery Charge	Q_{rr}		—	0.14	—	μC

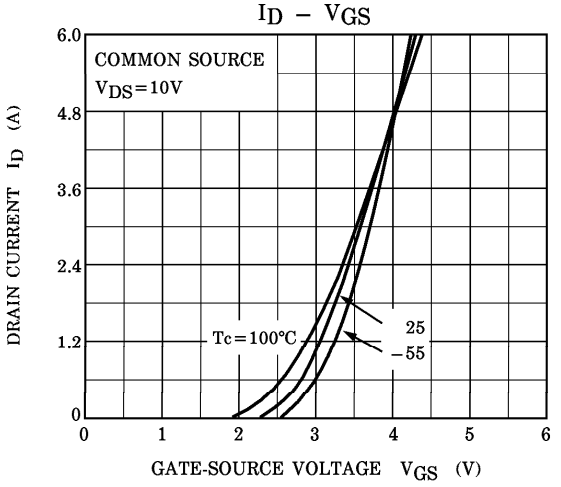
I_D – V_{DS}



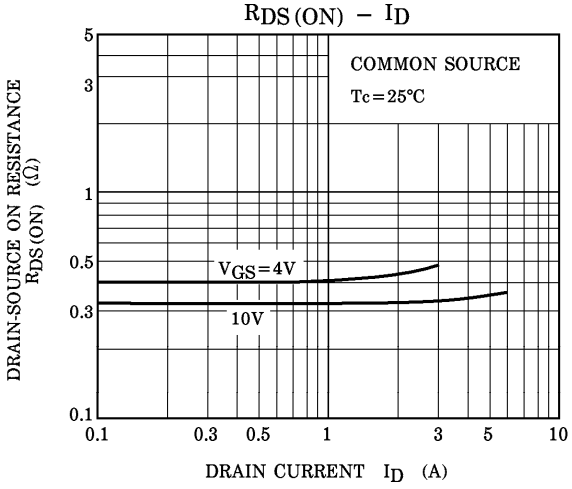
I_D – V_{DS}



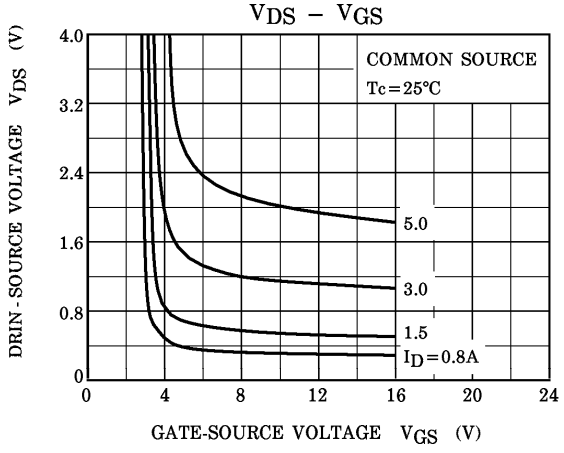
I_D – V_{GS}



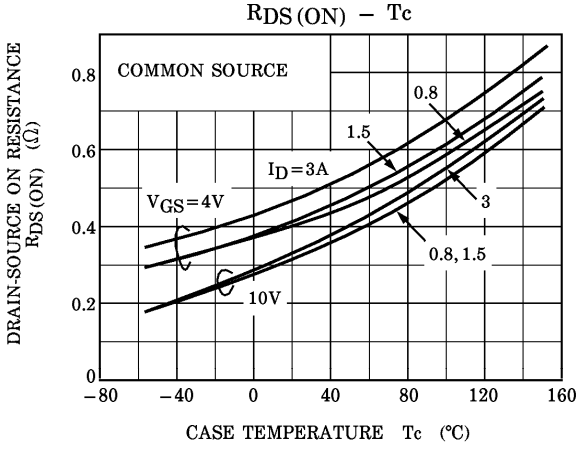
$R_{DS(ON)}$ – I_D



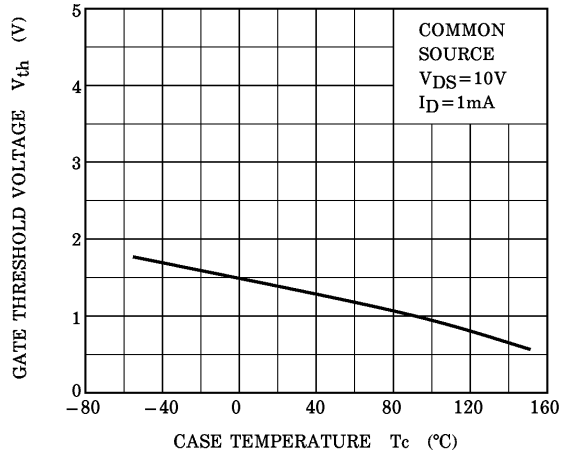
V_{DS} – V_{GS}



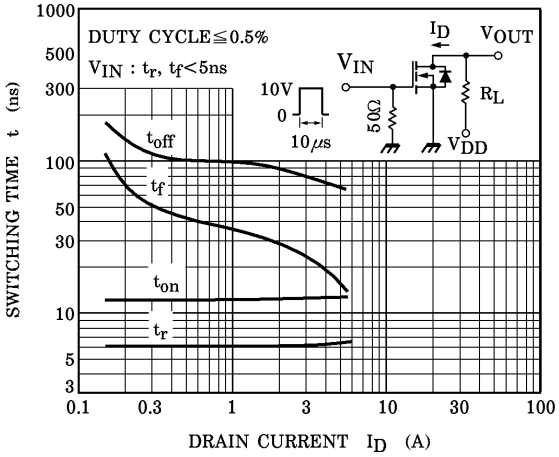
$R_{DS(ON)}$ – Tc



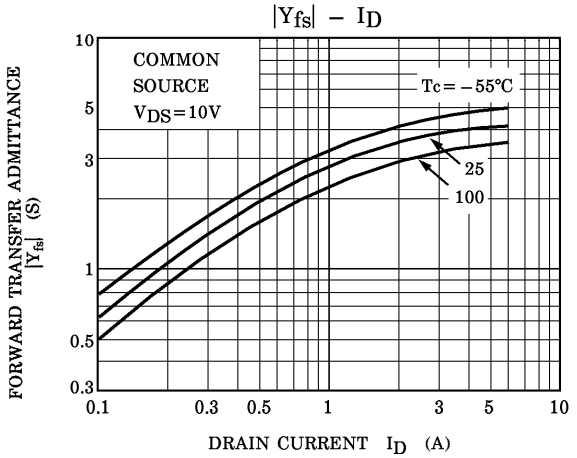
V_{th} – Tc



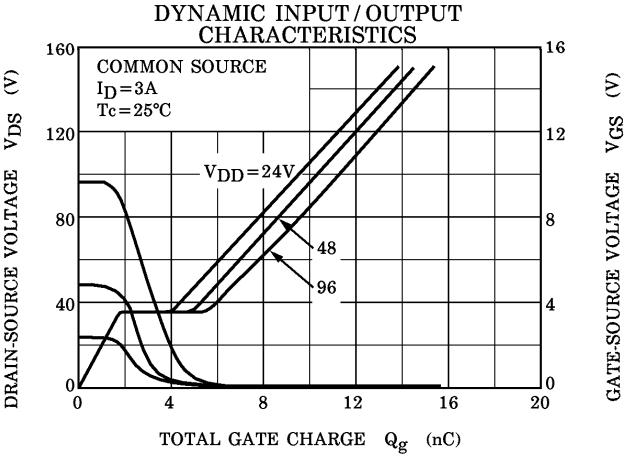
SWITCHING TIME – I_D



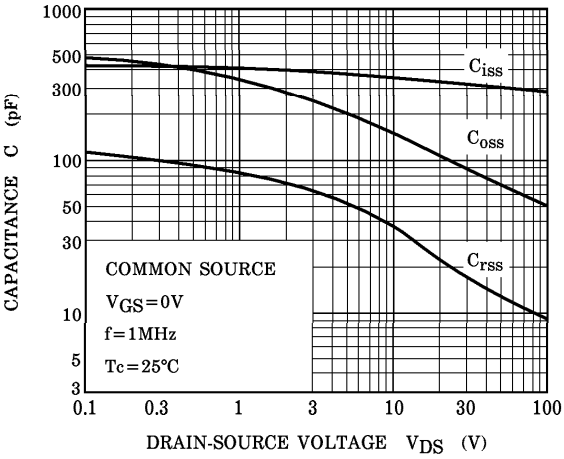
$|Y_{fs}|$ – I_D



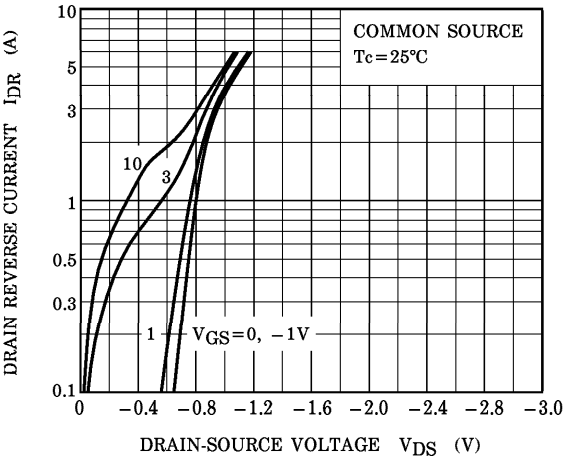
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



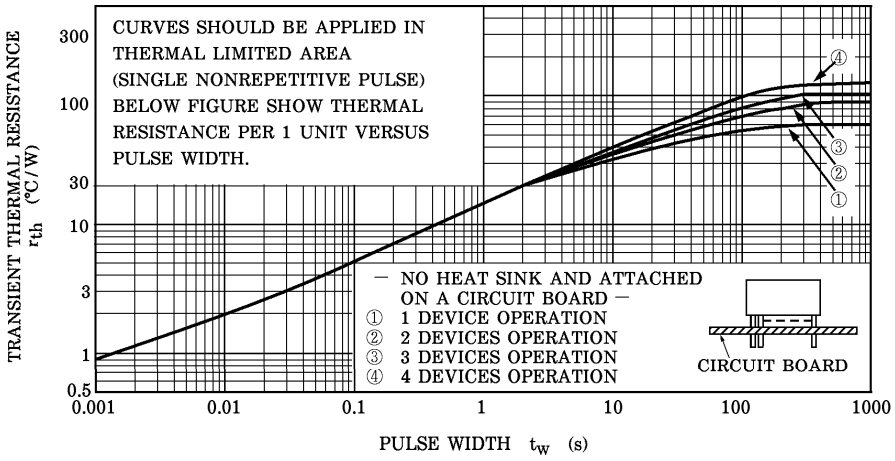
CAPACITANCE – V_{DS}



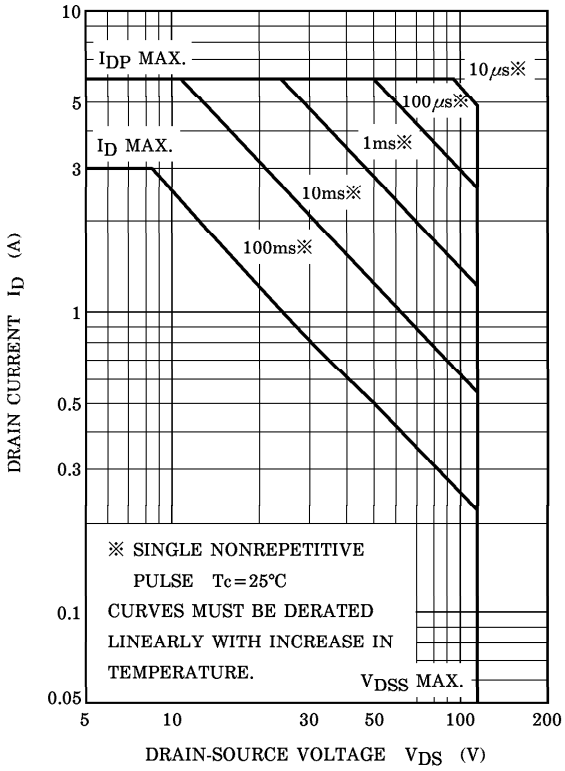
I_{DR} – V_{DS}



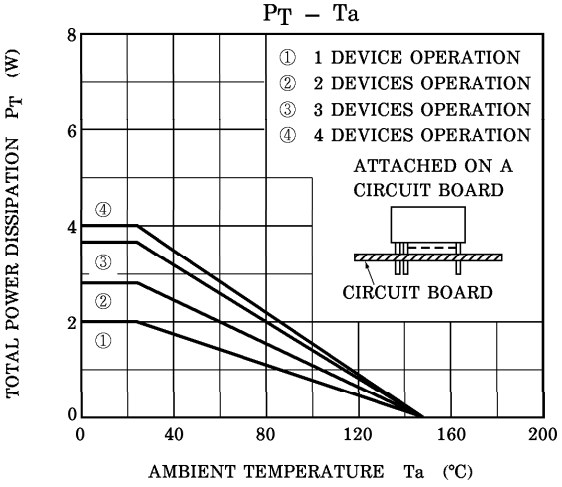
r_{th} – t_w



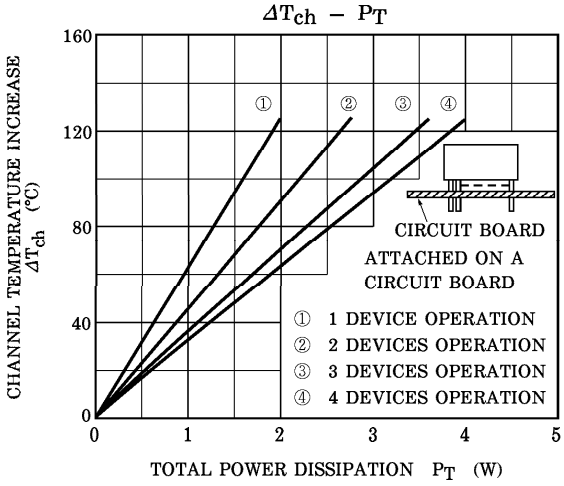
SAFE OPERATING AREA



P_T – Ta



ΔT_{ch} – P_T



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