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

MP4208

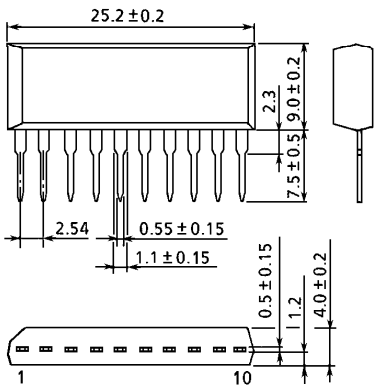
HIGH POWER HIGH SPEED SWITCHING APPLICATIONS

HAMMER DRIVE, PULSE MOTOR DRIVE AND INDUCTIVE LOAD SWITCHING

INDUSTRIAL APPLICATIONS

- −4-Volt 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 : $R_{DS\,(ON)} = 0.2\Omega$ (Typ.)
- Low Leakage Current : $I_{GSS} = \mp 10\mu A$ (Max.) ($V_{GS} = \mp 16V$)
  $I_{DSS} = -100\mu A$ (Max.) ($V_{DS} = -60V$)
- 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

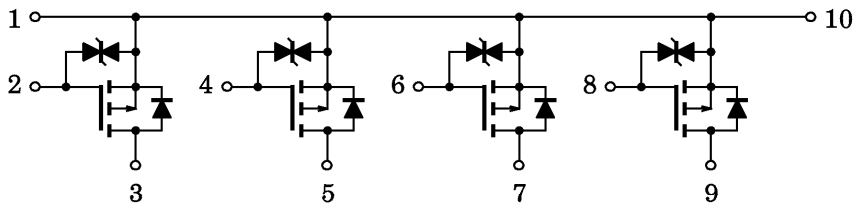
JEDEC	—
EIAJ	—
TOSHIBA	2-25A1C

Weight : 2.1g

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	V_{DSS}	−60	V
Gate-Source Voltage	V_{GSS}	∓20	V
Drain Current	I_D	−5	A
Peak Drain Current	I_{DP}	−10	A
Drain Power Dissipation (1 Device Operation, Ta = 25°C)	P_D	2.0	W
Drain Power Dissipation (4 Devices Operation, Ta = 25°C)	P_{DT}	4.0	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature Range	T_{stg}	−55~150	°C

ARRAY CONFIGURATION



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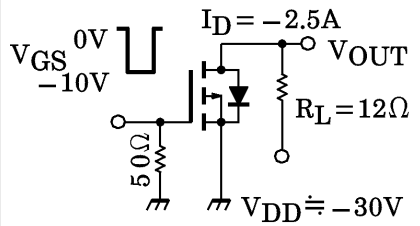
THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance of Channel to Ambient (4 Devices Operation, Ta = 25°C)	$\Sigma R_{th\ (ch\text{-}a)}$	31.3	°C / W
Maximum Lead Temperature for Soldering Purposes (3.2mm from Case for 10 Second)	T_L	260	°C

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

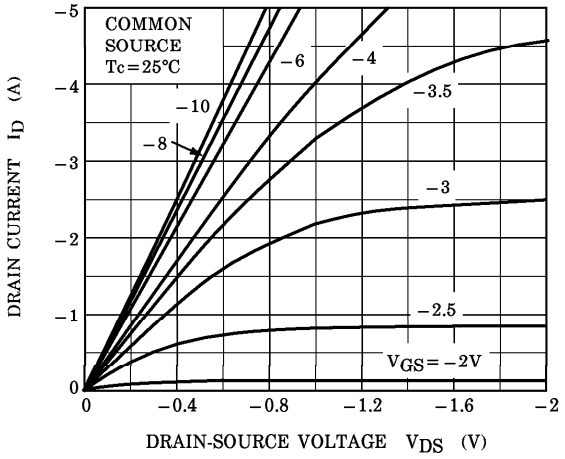
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	$V_{GS} = \mp 16V$, $V_{DS} = 0$	—	—	∓ 10	μA
Drain Cut-off Current		I_{DSS}	$V_{DS} = -60V$, $V_{GS} = 0$	—	—	−100	μA
Drain-Source Breakdown Voltage		$V_{(BR)\ DSS}$	$I_D = -10mA$, $V_{GS} = 0$	−60	—	—	V
Gate Threshold Voltage		V_{th}	$V_{DS} = -10V$, $I_D = -1mA$	−0.8	—	−2.0	V
Forward Transfer Admittance		$\|Y_{fs}\|$	$V_{DS} = -10V$, $I_D = -2.5A$	1	3	—	S
Drain-Source ON Resistance		$R_{DS\ (ON)}$	$I_D = -2.5A$, $V_{GS} = -4V$	—	0.3	0.5	Ω
		$R_{DS\ (ON)}$	$I_D = -2.5A$, $V_{GS} = -10V$	—	0.2	0.3	
Input Capacitance		C_{iss}	$V_{DS} = -10V$, $V_{GS} = 0$, f = 1MHz	—	630	—	pF
Reverse Transfer Capacitance		C_{rss}	$V_{DS} = -10V$, $V_{GS} = 0$, f = 1MHz	—	95	—	
Output Capacitance		C_{oss}	$V_{DS} = -10V$, $V_{GS} = 0$, f = 1MHz	—	290	—	
Switching Time	Rise Time	t_r		—	25	—	ns
	Turn-on Time	t_{on}		—	45	—	
	Fall Time	t_f		—	55	—	
	Turn-off Time	t_{off}	V_{IN} : t_r, $t_f < 5ns$, Duty ≦ 1%, $t_w = 10\mu s$	—	200	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	$I_D = -5A$, $V_{GS} = -10V$, $V_{DD} \fallingdotseq 48V$	—	22	—	nC
Gate-Source Charge		Q_{gs}		—	16	—	
Gate-Drain ("Miller") Charge		Q_{gd}		—	6	—	

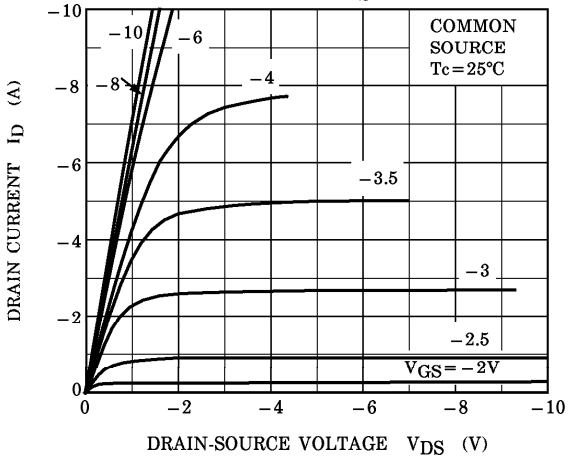
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Drain Reverse Current	I_{DR}	—	—	—	−5	A
Peak Drain Reverse Current	I_{DRP}	—	—	—	−10	A
Diode Forward Voltage	V_{DSF}	$I_{DR}=-5A$, $V_{GS}=0$	—	1.0	2.0	V
Reverse Recovery Time	t_{rr}	$I_{DR}=-5A$, $V_{GS}=0$ $dI_{DR}/dt=-50A/\mu s$	—	80	—	ns
Reverse Recovery Charge	Q_{rr}		—	0.1	—	μC

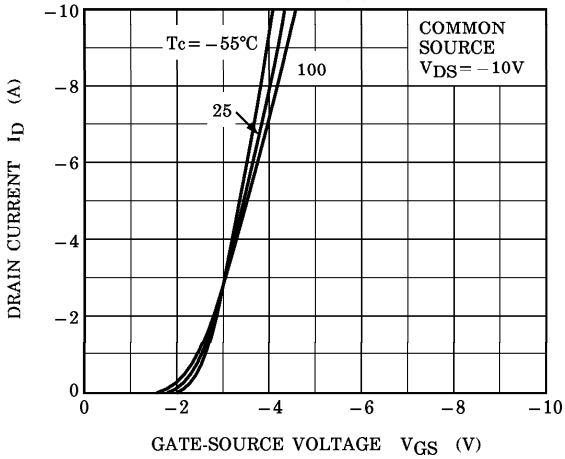
$I_D - V_{DS}$



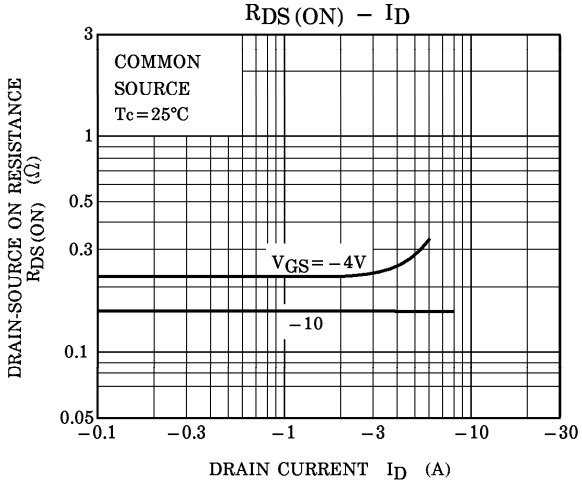
$I_D - V_{DS}$



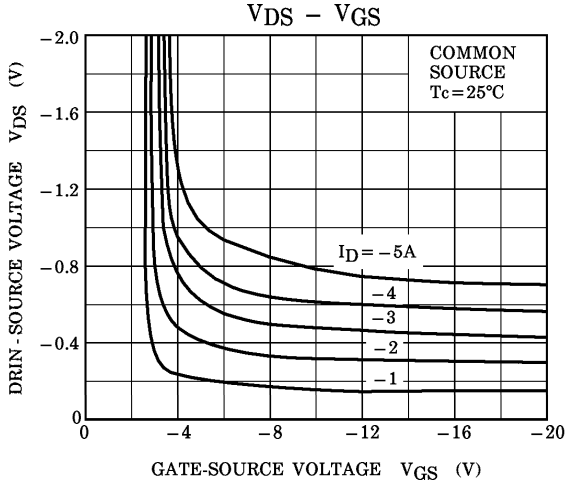
$I_D - V_{GS}$



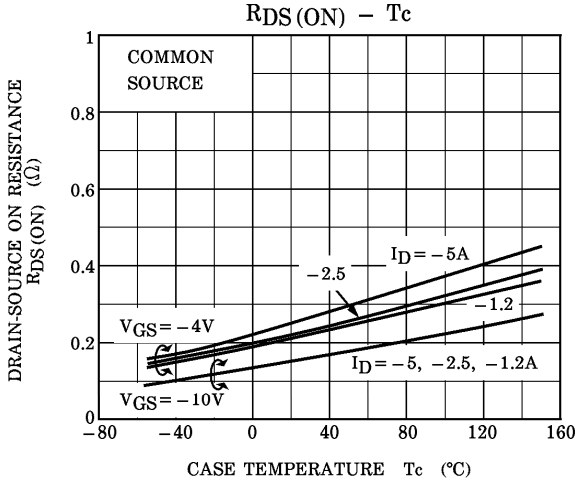
$R_{DS(ON)} - I_D$



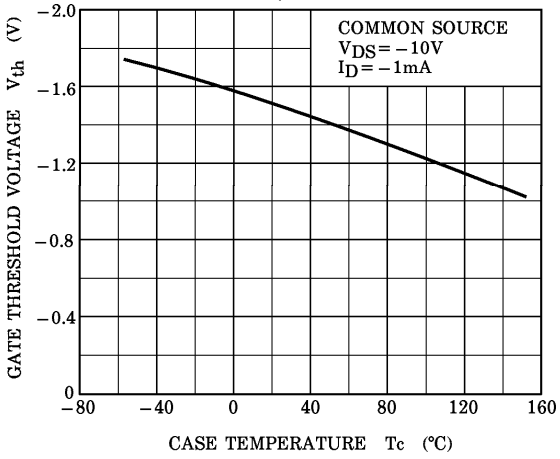
$V_{DS} - V_{GS}$



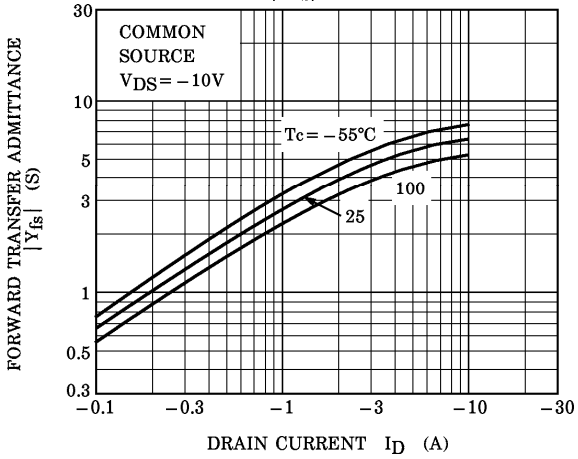
$R_{DS(ON)} - Tc$



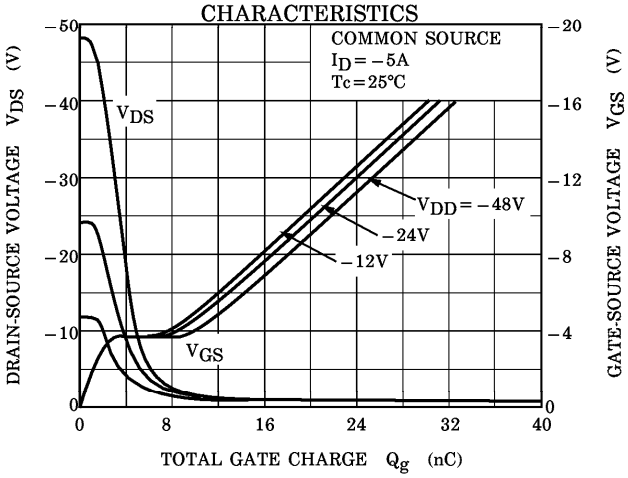
V_{th} – Tc



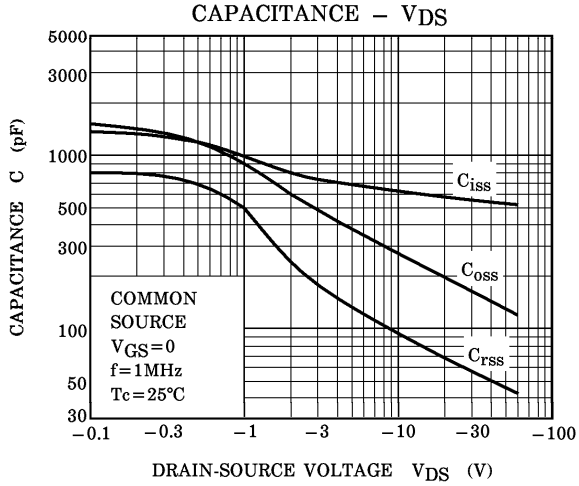
$|Y_{fs}|$ – I_D



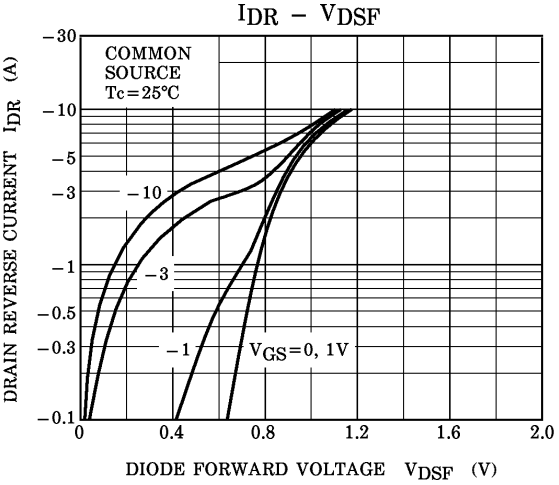
DYNAMIC INPUT / OUTPUT CHARACTERISTICS



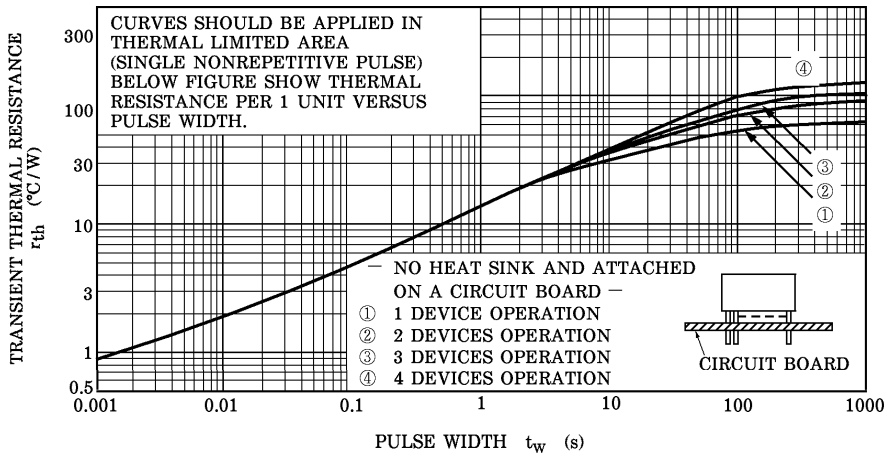
CAPACITANCE – V_{DS}



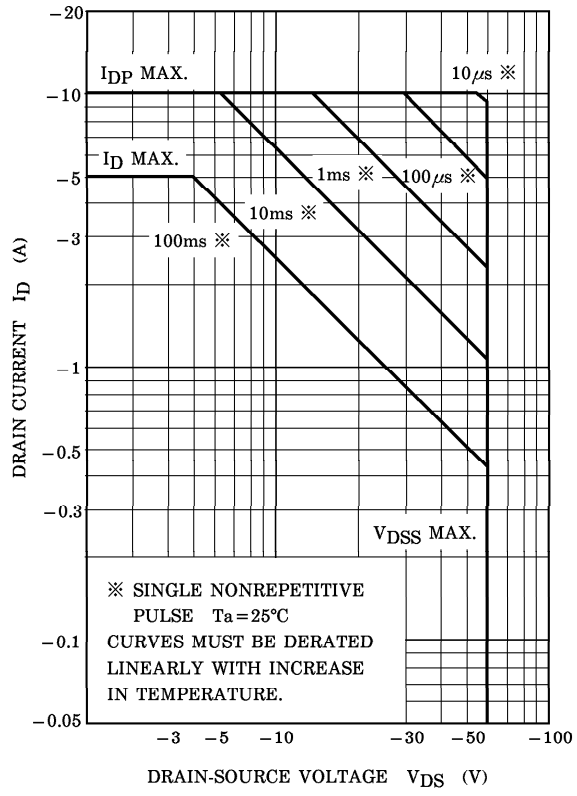
I_{DR} – V_{DSF}



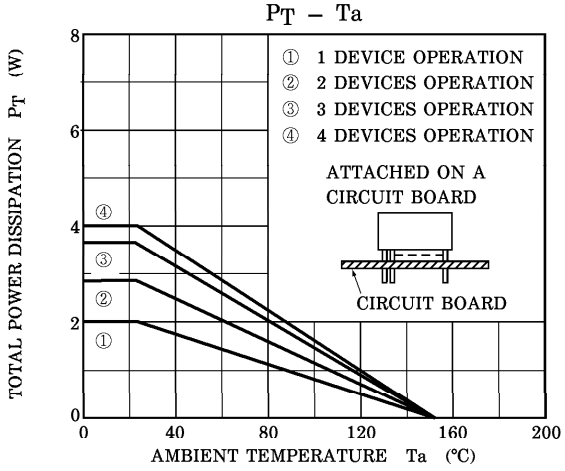
r_{th} – t_w



SAFE OPERATING AREA



P_T – Ta



ΔT_j – P_T