

MP4208

High Power High Speed Switching Applications

Hammer Drive, Pulse Motor Drive and Inductive Load Switching

- -4 V gate drive available
- Small package by full molding (SIP 10 pin)
- High drain power dissipation (4-device operation)
: P_T = 4 W (T_a = 25°C)
- Low drain-source ON resistance: R_{DS} (ON) = 0.2 Ω (typ.)
- Low leakage current: I_{GSS} = ±10 μA (max) (V_{GS} = ±16 V)
I_{DSS} = -100 μA (max) (V_{DS} = -60 V)
- Enhancement mode: V_{th} = -0.8 to -2.0 V (I_D = -1 mA)

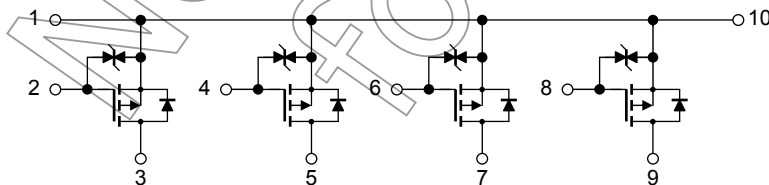
Absolute Maximum Ratings (T_a = 25°C)

Characteristics	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, T _a = 25°C)	P _D	2.0	W
Drain power dissipation (4-device operation, T _a = 25°C)	P _{DT}	4.0	W
Channel temperature	T _{ch}	150	°C
Storage temperature range	T _{stg}	-55 to 150	°C

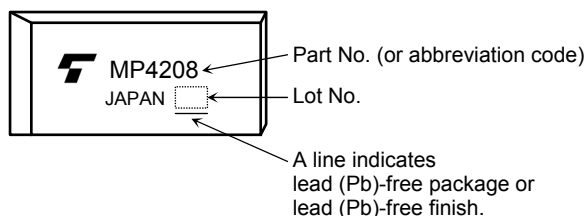
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Array Configuration

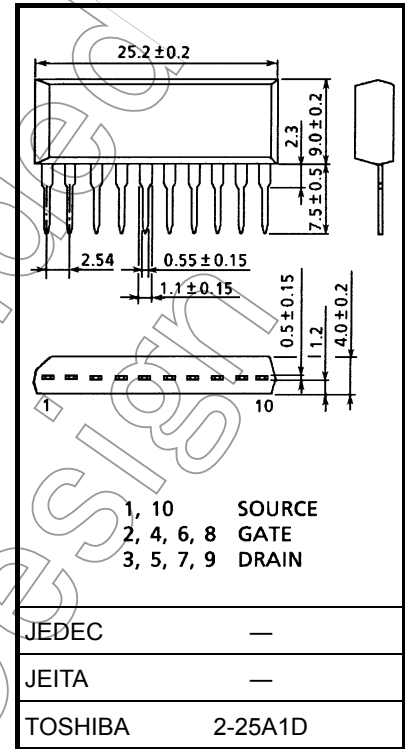


Marking



Industrial Applications

Unit: mm



Weight: 2.1 g (typ.)

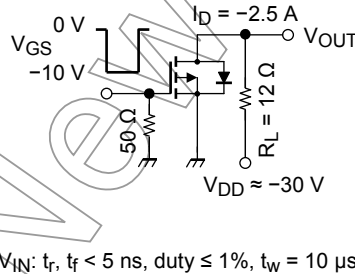
Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance from channel to ambient (4-device operation, $T_a = 25^\circ\text{C}$)	$\Sigma R_{th} (ch-a)$	31.3	$^\circ\text{C/W}$
Maximum lead temperature for soldering purposes (3.2 mm from case for 10 s)	T_L	260	$^\circ\text{C}$

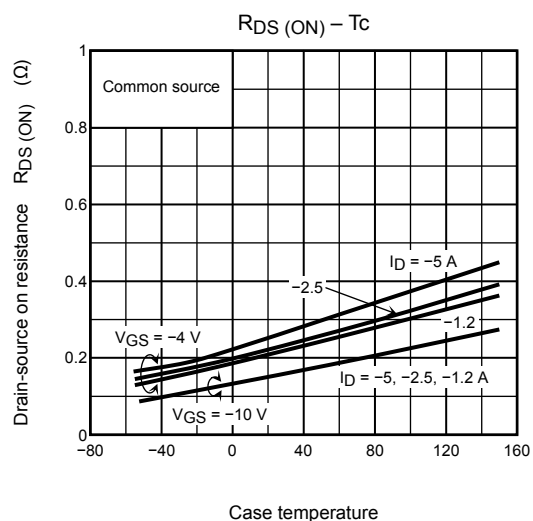
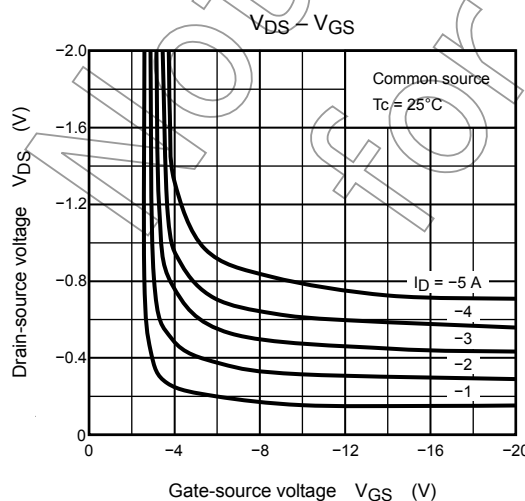
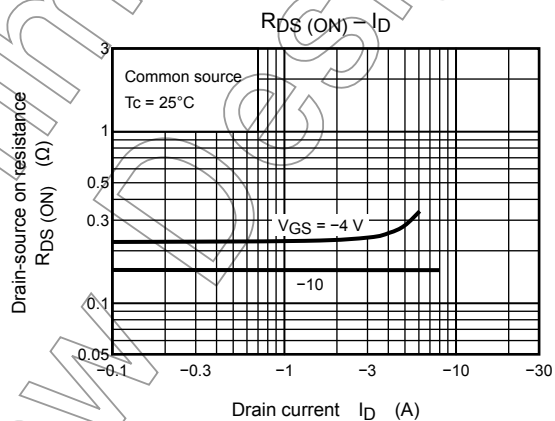
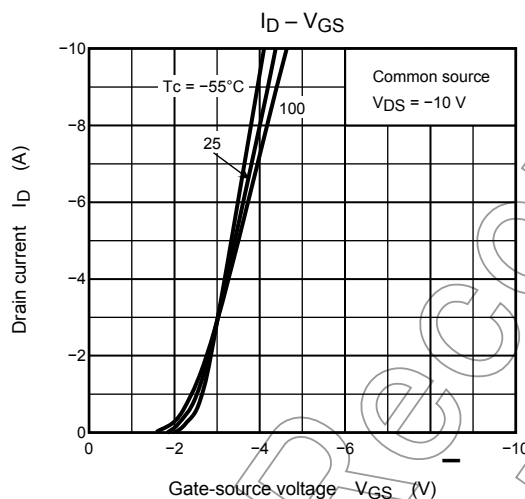
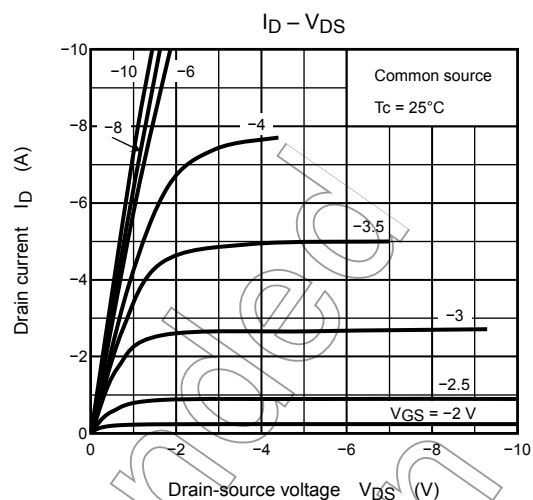
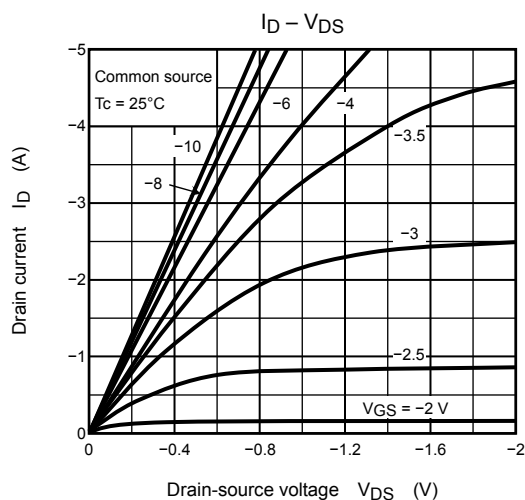
This transistor is an electrostatic-sensitive device. Please handle with caution.

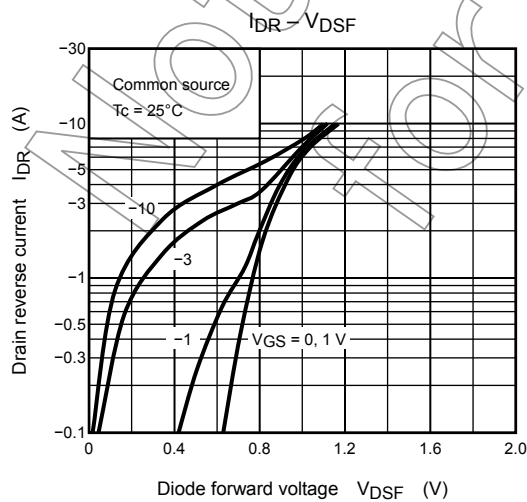
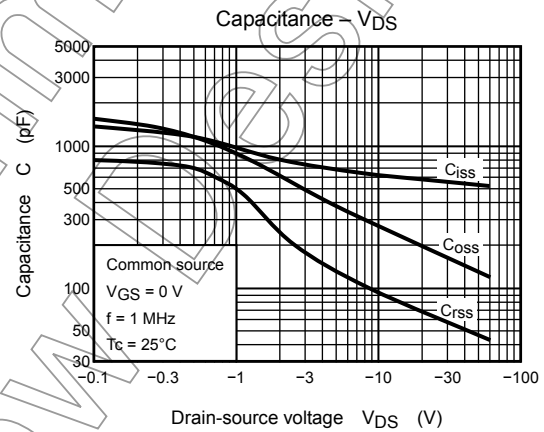
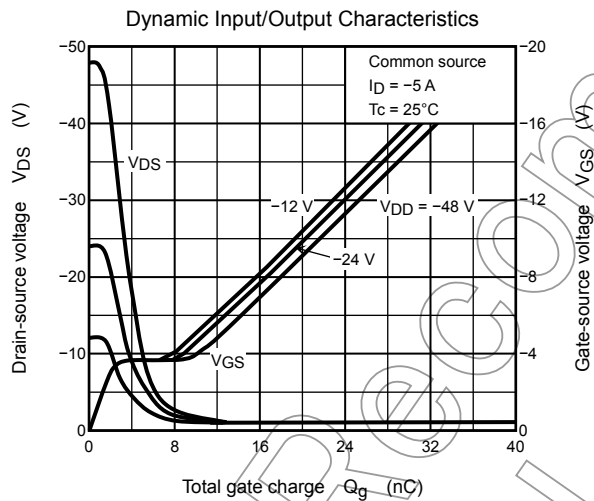
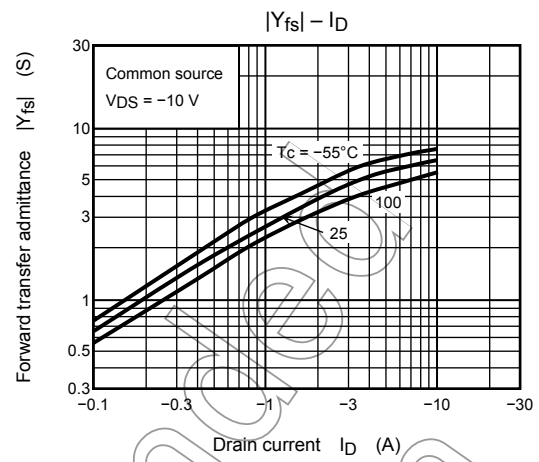
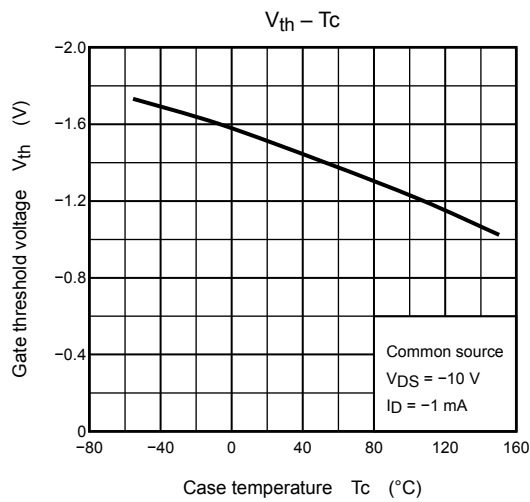
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

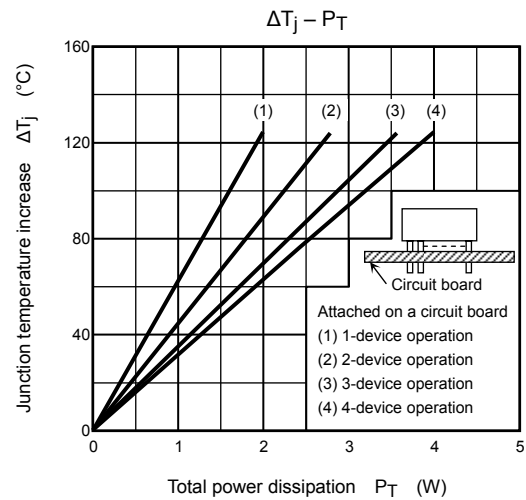
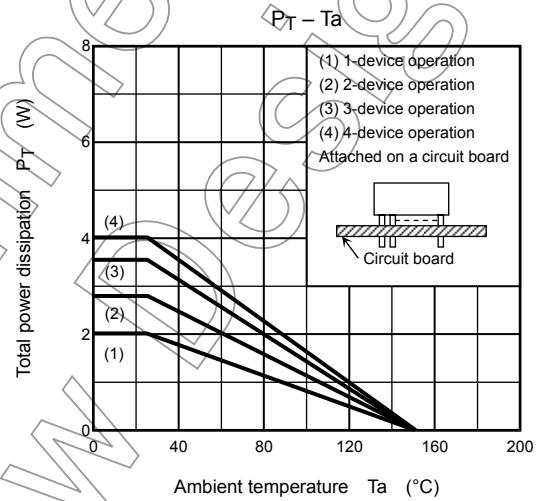
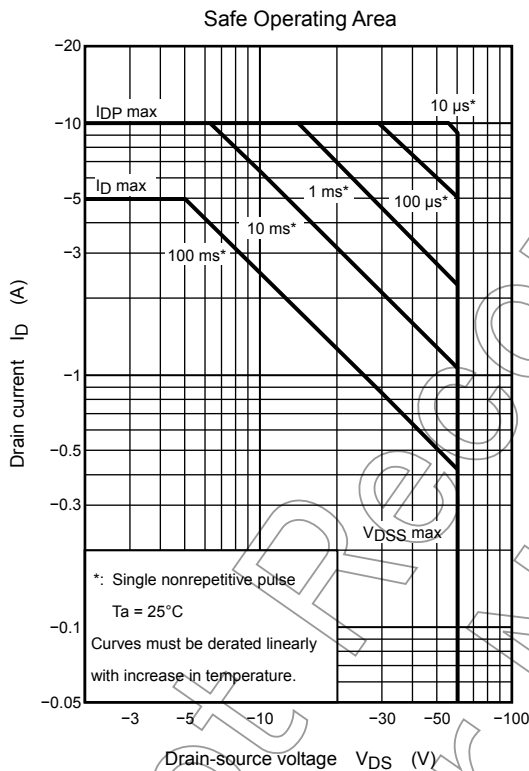
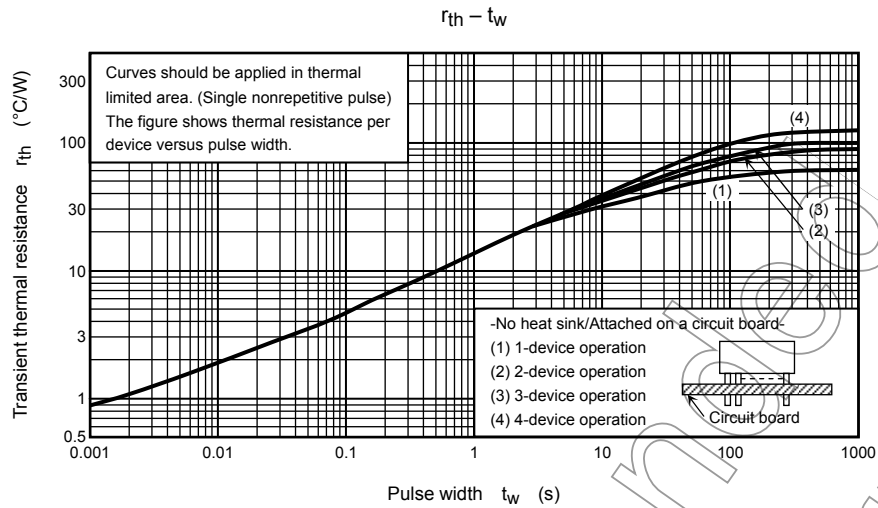
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS} = \pm 16\text{ V}, V_{DS} = 0\text{ V}$	—	—	± 10	μA
Drain cut-off current	I_{DSS}	$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}$	—	—	-100	μA
Drain-source breakdown voltage	$V_{(BR) DSS}$	$I_D = -10\text{ mA}, V_{GS} = 0\text{ V}$	-60	—	—	V
Gate threshold voltage	V_{th}	$V_{DS} = -10\text{ V}, I_D = -1\text{ mA}$	-0.8	—	-2.0	V
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = -10\text{ V}, I_D = -2.5\text{ A}$	1	3	—	S
Drain-source ON resistance	$R_{DS(ON)}$	$I_D = -2.5\text{ A}, V_{GS} = -4\text{ V}$	—	0.3	0.5	Ω
	$R_{DS(ON)}$	$I_D = -2.5\text{ A}, V_{GS} = -10\text{ V}$	—	0.2	0.3	
Input capacitance	C_{iss}	$V_{DS} = -10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	630	—	pF
Reverse transfer capacitance	C_{rss}	$V_{DS} = -10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	95	—	pF
Output capacitance	C_{oss}	$V_{DS} = -10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	290	—	pF
Switching time	Rise time	t_r	—	25	—	ns
	Turn-on time	t_{on}	—	45	—	
	Fall time	t_f	—	55	—	
	Turn-off time	t_{off}	—	200	—	
Total gate charge (gate-source plus gate-drain)		Q_g	—	22	—	nC
Gate-source charge		Q_{gs}	—	16	—	nC
Gate-drain ("miller") charge		Q_{gd}	—	6	—	nC

Source-Drain Diode Ratings and Characteristics ($T_a = 25^\circ\text{C}$)

Characteristics	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}	$I_{DR} = -5\text{ A}, V_{GS} = 0\text{ V}$	—	1.0	2.0	V
Reverse recovery time	t_{rr}	$I_{DR} = -5\text{ A}, V_{GS} = 0\text{ V}$	—	80	—	ns
Reverse recovery charge	Q_{rr}	$dI_{DR}/dt = -50\text{ A}/\mu\text{s}$	—	0.1	—	μC







RESTRICTIONS ON PRODUCT USE

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