

MP4210

High Power, High Speed Switching Applications
For Printer Head Pin Driver and Pulse Motor Driver
For Solenoid Driver

- 4-V gate drivability
- Small package by full molding (SIP 10 pins)
- High drain power dissipation (4-device operation)
: $P_T = 4 \text{ W}$ ($T_a = 25^\circ\text{C}$)
- Low drain-source ON resistance: $R_{DS}(\text{ON}) = 0.12 \Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 5.0 \text{ S}$ (typ.)
- Low leakage current: $I_{GSS} = \pm 10 \mu\text{A}$ (max) ($V_{GS} = \pm 16 \text{ V}$)
 $I_{DSS} = 100 \mu\text{A}$ (max) ($V_{DS} = 60 \text{ V}$)
- Enhancement mode: $V_{th} = 0.8 \text{ to } 2.0 \text{ V}$ ($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	60	V
Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$)		V_{DGR}	60	V
Gate-source voltage		V_{GSS}	± 20	V
	DC	I_D	5	
	Pulse	I_{DP}	20	
Drain power dissipation (1-device operation, $T_a = 25^\circ\text{C}$)		P_D	2.0	W
Drain power dissipation (4-device operation, $T_a = 25^\circ\text{C}$)		P_{DT}	4.0	W
Single pulse avalanche energy (Note 1)		E_{AS}	129	mJ
Avalanche current		I_{AR}	5	A
	1-device operation	E_{AR}	0.2	
	4-device operation	E_{ART}	0.4	
Channel temperature		T_{ch}	150	$^\circ\text{C}$
Storage temperature range		T_{stg}	-55 to 150	$^\circ\text{C}$

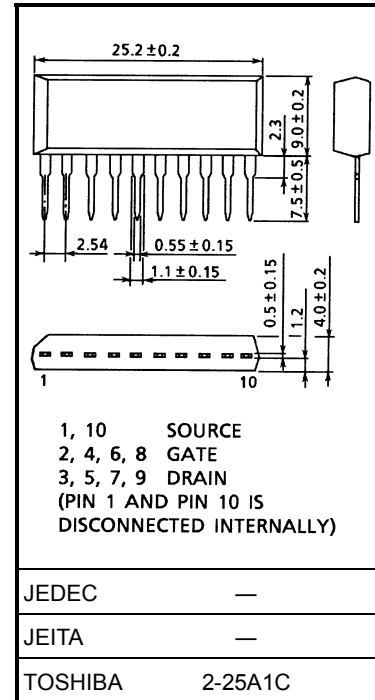
Note 1: Condition for avalanche energy (single pulse) measurement
 $V_{DD} = 25 \text{ V}$, starting $T_{ch} = 25^\circ\text{C}$, $L = 7 \text{ mH}$, $R_G = 25 \Omega$, $I_{AR} = 5 \text{ A}$

Note 2: Repetitive rating; pulse width limited by maximum channel temperature

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

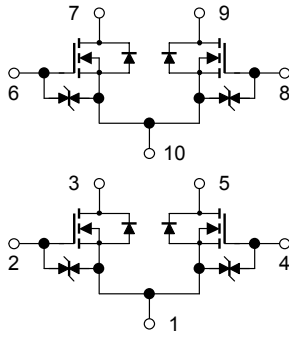
Industrial Applications

Unit: mm



Weight: 2.1 g (typ.)

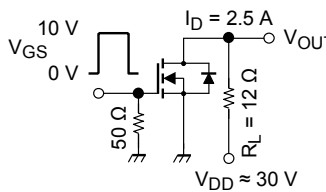
Array Configuration



Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance from channel to ambient (4-device operation, $T_a = 25^\circ\text{C}$)	$\Sigma R_{th(ch-a)}$	31.2	$^\circ\text{C/W}$
Maximum lead temperature for soldering purposes (3.2 mm from case for $t = 10$ s)	T_L	260	$^\circ\text{C}$

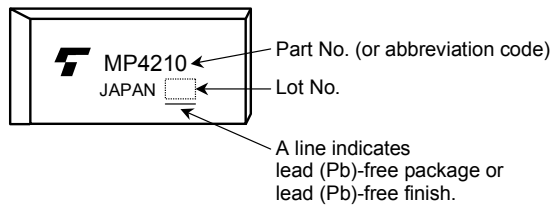
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

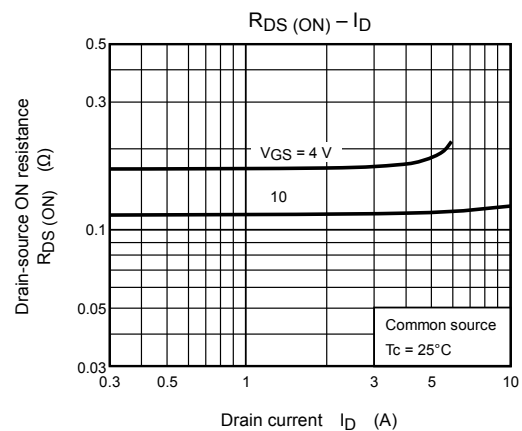
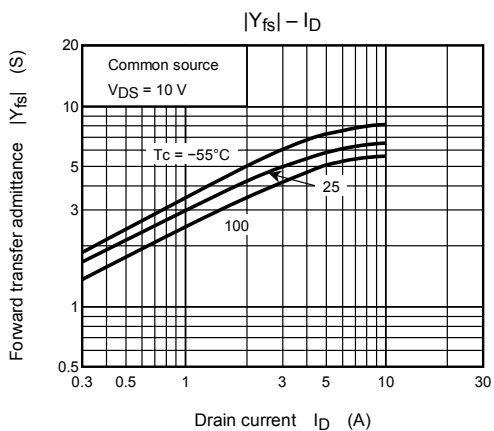
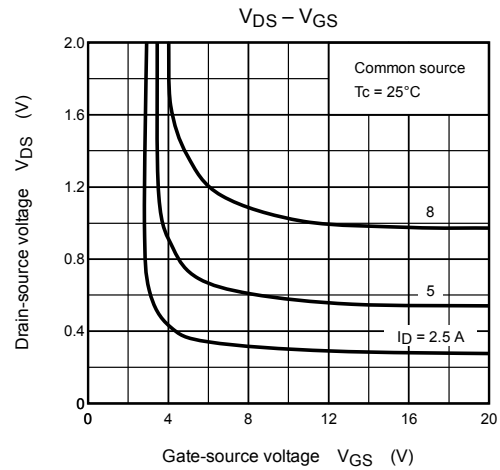
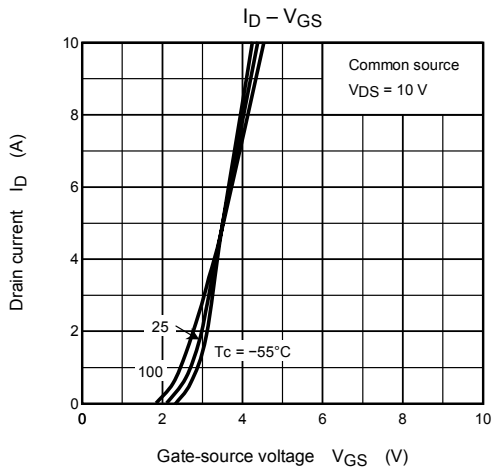
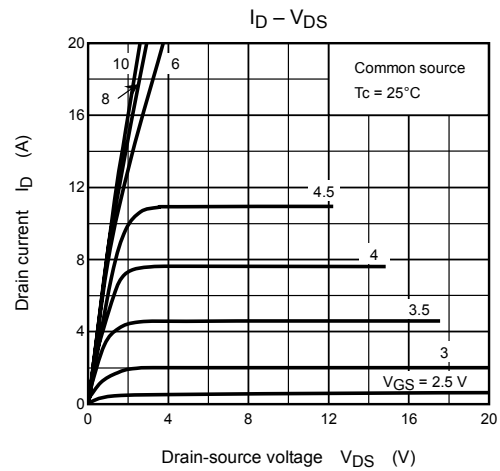
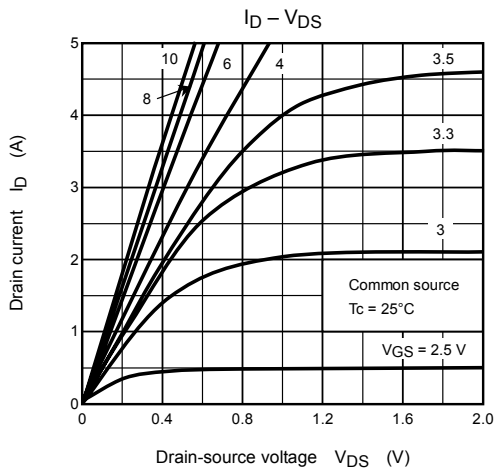
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 16\text{ V}$, $V_{DS} = 0\text{ V}$	—	—	± 10	μA
Drain cut-off current		I_{DSS}	$V_{DS} = 60\text{ V}$, $V_{GS} = 0\text{ V}$	—	—	100	μA
Drain-source breakdown voltage		$V_{(BR)DSS}$	$I_D = 10\text{ mA}$, $V_{GS} = 0\text{ V}$	60	—	—	V
Gate threshold voltage		V_{th}	$V_{DS} = 10\text{ V}$, $I_D = 1\text{ mA}$	0.8	—	2.0	V
Drain-source ON resistance		$R_{DS(on)}$	$V_{GS} = 4\text{ V}$, $I_D = 2.5\text{ A}$	—	0.21	0.32	Ω
			$V_{GS} = 10\text{ V}$, $I_D = 2.5\text{ A}$	—	0.12	0.16	
Forward transfer admittance		$ Y_{fs} $	$V_{DS} = 10\text{ V}$, $I_D = 2.5\text{ A}$	3.0	5.0	—	S
Input capacitance		C_{iss}	$V_{DS} = 10\text{ V}$, $V_{GS} = 0\text{ V}$ $f = 1\text{ MHz}$	—	370	—	pF
Reverse transfer capacitance		C_{rss}		—	60	—	pF
Output capacitance		C_{oss}		—	180	—	pF
Switching time	Rise time	t_r		—	18	—	ns
	Turn-on time	t_{on}		—	25	—	
	Fall time	t_f		—	55	—	
	Turn-off time	t_{off}		—	170	—	
Total gate charge (gate-source plus gate-drain)		Q_g	$V_{DD} \approx 48\text{ V}$, $V_{GS} = 10\text{ V}$ $I_D = 5\text{ A}$	—	12	—	nC
Gate-source charge		Q_{gs}		—	8	—	nC
Gate-drain ("miller") charge		Q_{gd}		—	4	—	nC

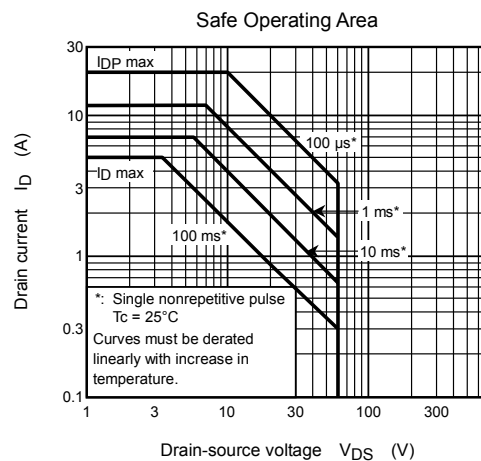
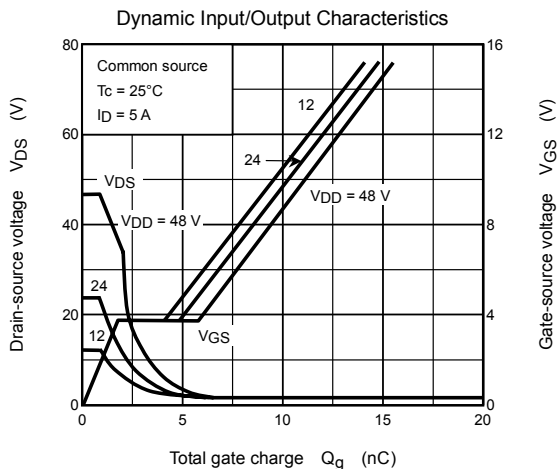
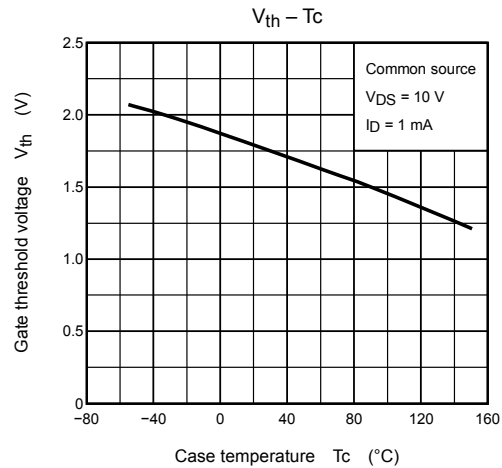
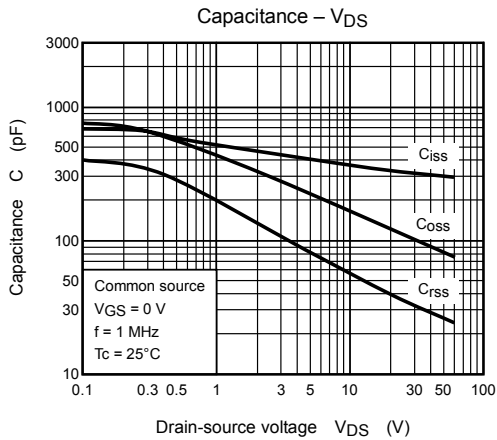
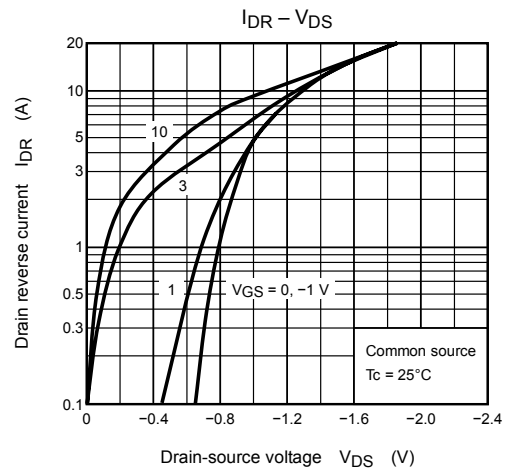
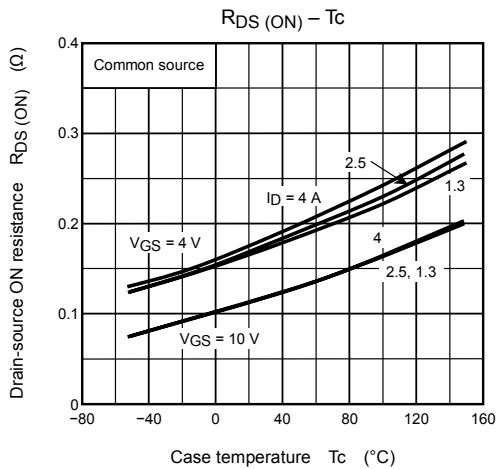
Source-Drain Diode Ratings and Characteristics (Ta = 25°C)

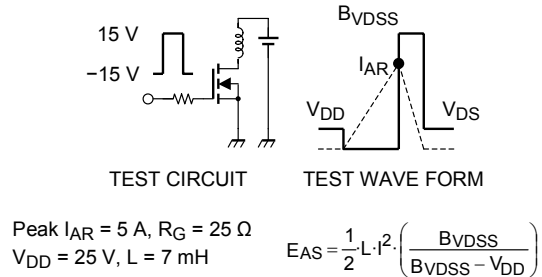
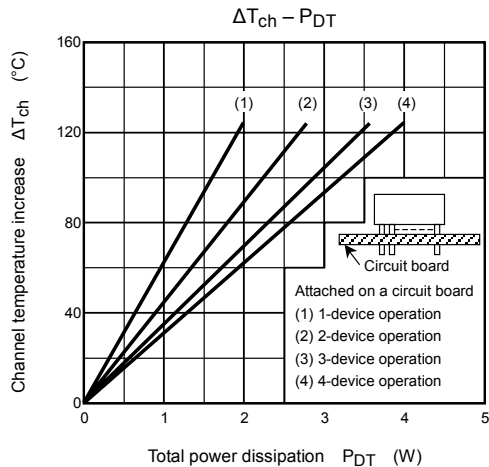
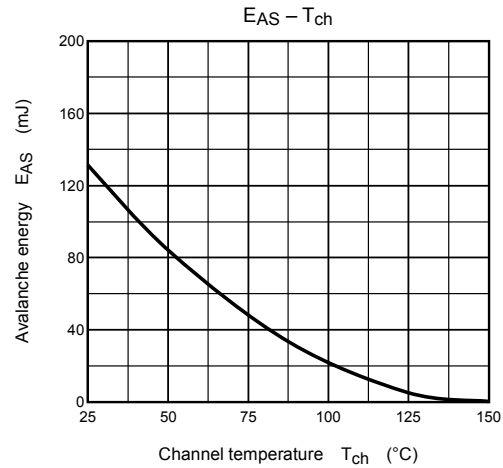
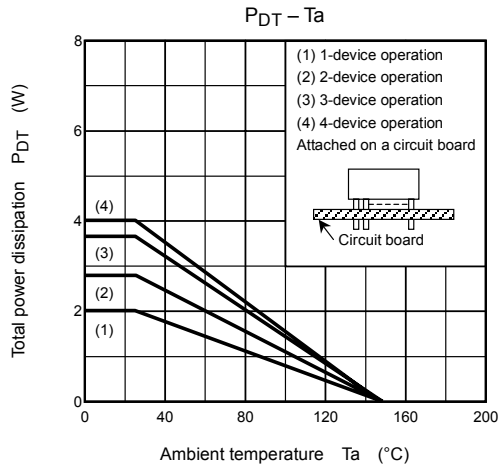
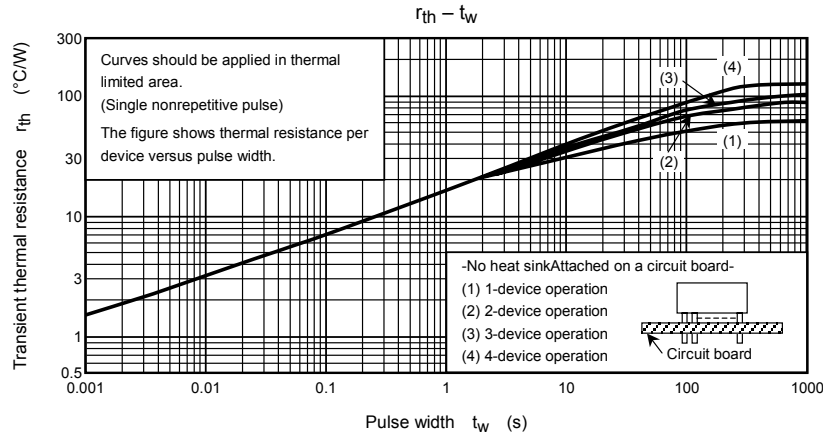
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current	I_{DR}	—	—	—	5	A
Pulse drain reverse current	I_{DRP}	—	—	—	20	A
Diode forward voltage	V_{DSF}	$I_{DR} = 5\text{ A}$, $V_{GS} = 0\text{ V}$	—	—	-1.7	V
Reverse recovery time	t_{rr}	$I_{DR} = 5\text{ A}$, $V_{GS} = 0\text{ V}$ $dI_{DR}/dt = 50\text{ A}/\mu\text{s}$	—	70	—	ns
Reverse recovery charge	Q_{rr}		—	0.1	—	μC

Marking









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