

TPC6201

HDD Motor Drive Applications

Notebook PC Applications

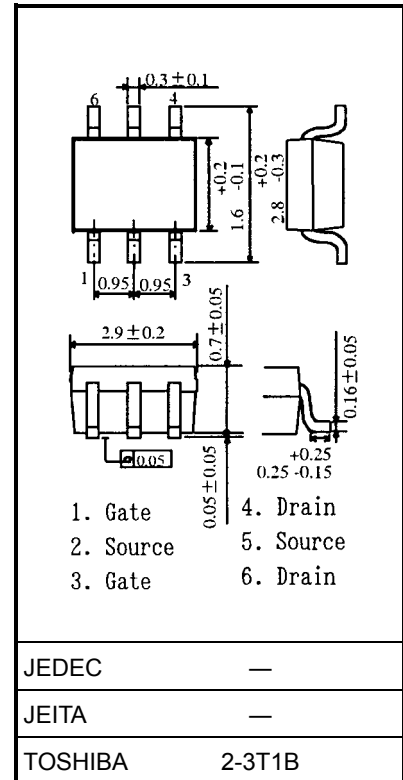
Portable Equipment Applications

- Low drain-source ON resistance: $R_{DS(ON)} = 80 \text{ m}\Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 3.8 \text{ S}$ (typ.)
- Low leakage current: $I_{DSS} = 10 \text{ }\mu\text{A}$ (max) ($V_{DS} = 30 \text{ V}$)
- Enhancement-model: $V_{th} = 1.3 \text{ to } 2.5 \text{ V}$ ($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

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

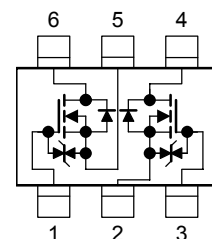
Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	30	V
Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$)		V_{DGR}	30	V
Gate-source voltage		V_{GSS}	± 20	V
Drain current	DC (Note 1)	I_D	2.5	A
	Pulse (Note 1)	I_{DP}	10	
Drain power dissipation ($t = 5 \text{ s}$) (Note 2a)	Single-device operation (Note 3a)	$P_D(1)$	0.9	W
	Single device value at dual operation (Note 3b)	$P_D(2)$	0.76	
Drain power dissipation ($t = 5 \text{ s}$) (Note 2b)	Single-device operation (Note 3a)	$P_D(1)$	0.4	W
	Single device value at dual operation (Note 3b)	$P_D(2)$	0.31	
Single pulse avalanche energy (Note 4)		E_{AS}	1.0	mJ
Avalanche current		I_{AR}	1.25	A
Repetitive avalanche energy (Note 5)		E_{AR}	0.16	mJ
Channel temperature		T_{ch}	150	$^\circ\text{C}$
Storage temperature range		T_{stg}	-55 to 150	$^\circ\text{C}$

Unit: mm



Weight: 0.011 g (typ.)

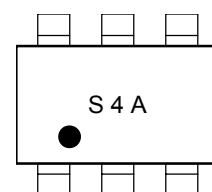
Circuit Configuration



Thermal Characteristics

Characteristics		Symbol	Max	Unit
Thermal Resistance (channel-to-ambient) ($t = 5 \text{ s}$) (Note 2a)	Single-device operation (Note 3a)	$R_{th(ch-a)}(2)$	139	$^\circ\text{C/W}$
	Single device value at dual operation (Note 3b)	$R_{th(ch-a)}(2)$	165	
Thermal Resistance (channel-to-ambient) ($t = 5 \text{ s}$) (Note 2b)	Single-device operation (Note 3a)	$R_{th(ch-a)}(2)$	310	$^\circ\text{C/W}$
	Single device value at dual operation (Note 3b)	$R_{th(ch-a)}(2)$	400	

Marking (Note 6)



Note: (Note 1), (Note 2), (Note 3), (Note 4), (Note 5), (Note 6) Please see next page.

This transistor is an electrostatically sensitive device. Please handle it with caution.

Electrical Characteristics (Ta = 25°C)

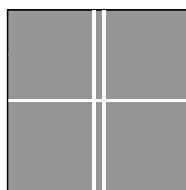
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 16\text{ V}, V_{DS} = 0\text{ V}$	—	—	± 10	μA
Drain cut-OFF current		I_{DSS}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$	—	—	10	μA
Drain-source breakdown voltage		$V_{(BR)DSS}$	$I_D = 10\text{ mA}, V_{GS} = 0\text{ V}$	30	—	—	V
		$V_{(BR)DSX}$	$I_D = 10\text{ mA}, V_{GS} = -20\text{ V}$	15	—	—	
Gate threshold voltage		V_{th}	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	1.3	—	2.5	V
Drain-source ON resistance		$R_{DS(ON)}$	$V_{GS} = 4.5\text{ V}, I_D = 1.3\text{ A}$	—	128	145	$\text{m}\Omega$
		$R_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 1.3\text{ A}$	—	80	95	
Forward transfer admittance		$ Y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 1.3\text{ A}$	1.25	3.8	—	S
Input capacitance		C_{iss}	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	170	—	pF
Reverse transfer capacitance		C_{rss}		—	25	—	
Output capacitance		C_{oss}		—	40	—	
Switching time	Rise time	t_r	<p>$V_{GS} = 10\text{ V}$ $V_{GS} = 0\text{ V}$ $I_D = 1.3\text{ A}$ $V_{DS} = 10\text{ V}$ $R_L = 11.5\ \Omega$ $V_{DD} \approx 15\text{ V}$ Duty $\leq 1\%$, $t_w = 10\ \mu\text{s}$</p>	—	2.4	—	ns
	Turn-ON time	t_{on}		—	8	—	
	Fall time	t_f		—	2	—	
	Turn-OFF time	t_{off}		—	11	—	
Total gate charge (gate-source plus gate-drain)		Q_g	$V_{DD} \approx 24\text{ V}, V_{GS} = 10\text{ V}, I_D = 2.5\text{ A}$	—	4.7	—	nC
Gate-source charge		Q_{gs}		—	3.4	—	
Gate-drain ("miller") charge		Q_{gd}		—	1.3	—	

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Pulse drain reverse current (Note 1)		I_{DRP}	—	—	—	10	A
Forward voltage (diode)		V_{DSF}	$I_{DR} = 2.5\text{ A}, V_{GS} = 0\text{ V}$	—	—	-1.2	V

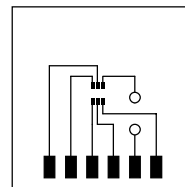
Note 1: Please use devices on condition that the channel temperature is below 150°C.

Note 2: (a) Device mounted on a glass-epoxy board (a) (t = 5 s)
 (b) Device mounted on a glass-epoxy board (b) (t = 5 s)



(a)

FR-4
 $25.4 \times 25.4 \times 0.8$
 Unit: (mm)



(b)

FR-4
 $25.4 \times 25.4 \times 0.8$
 Unit: (mm)

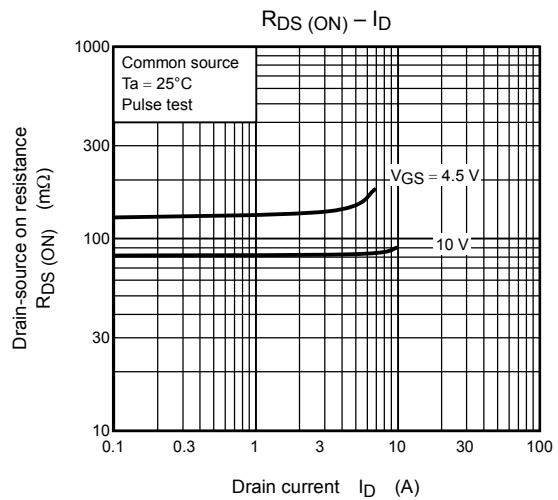
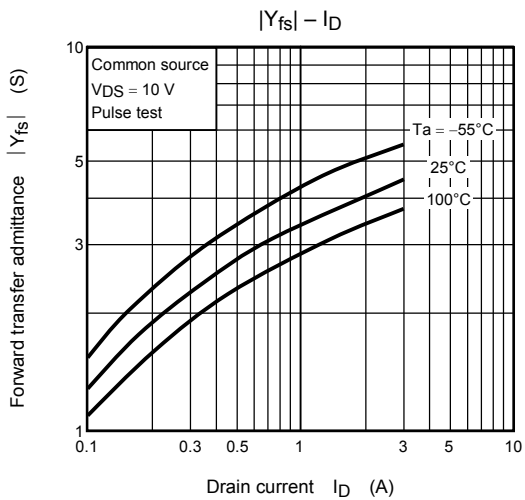
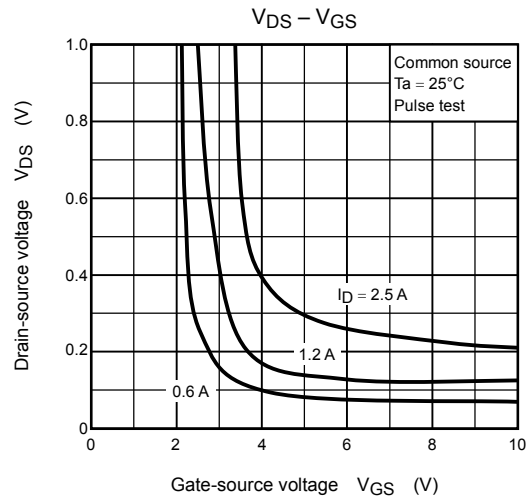
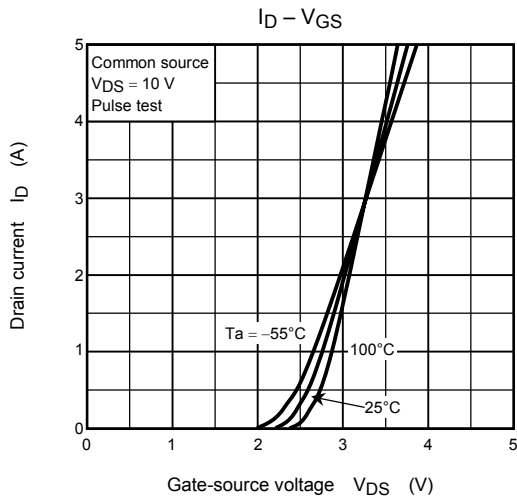
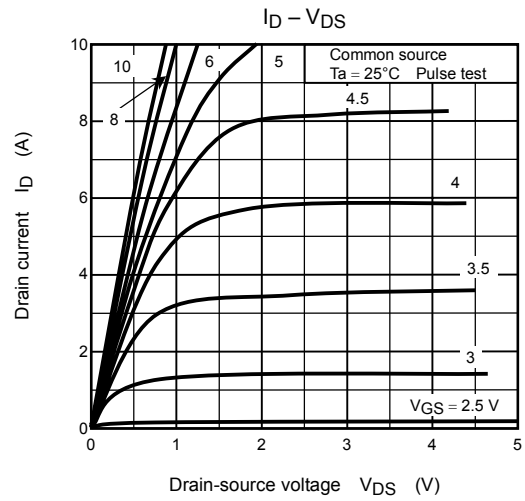
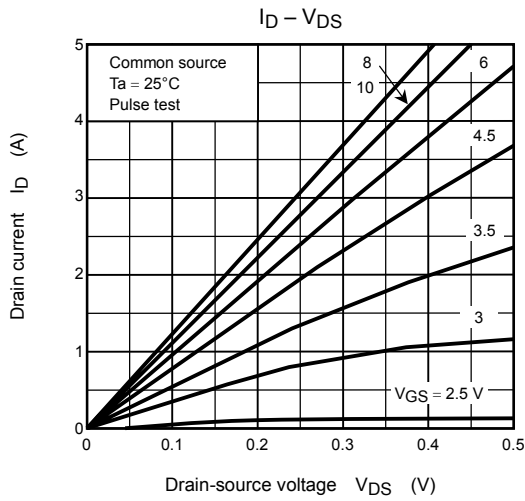
Note 3: (a) Single-device operation; values of P_D (1) and $R_{th(ch-a)}$ (1) for a single device during single-device operation

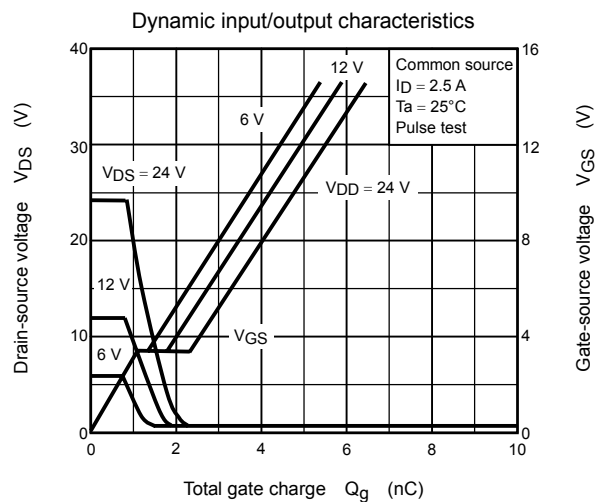
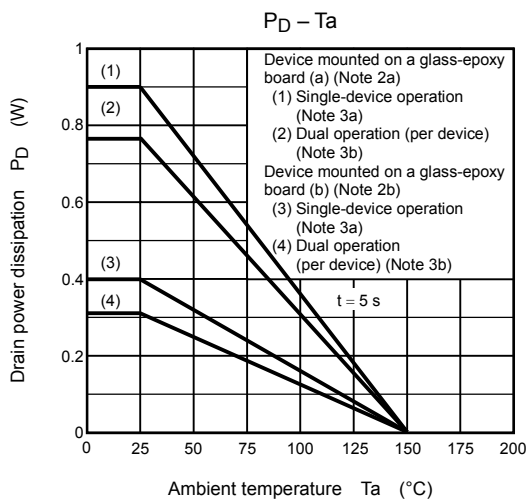
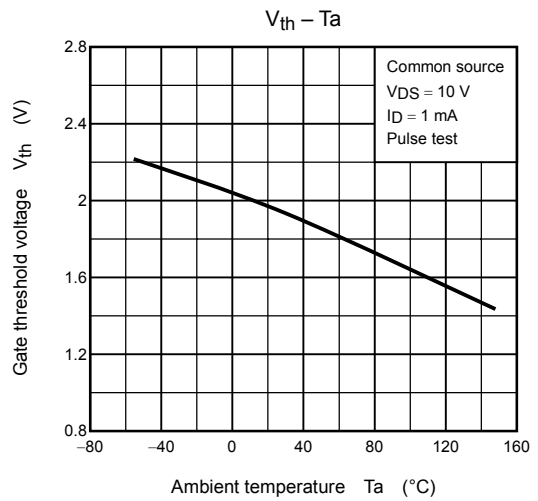
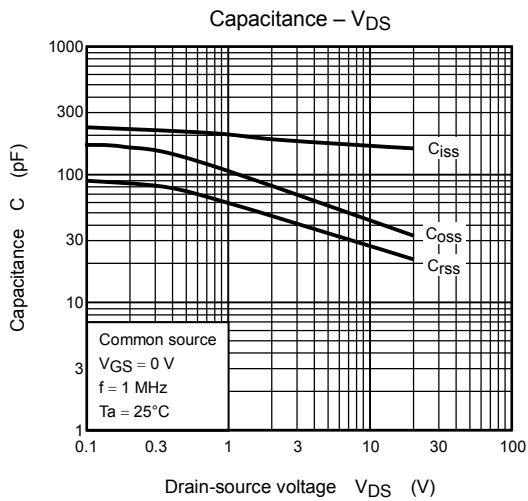
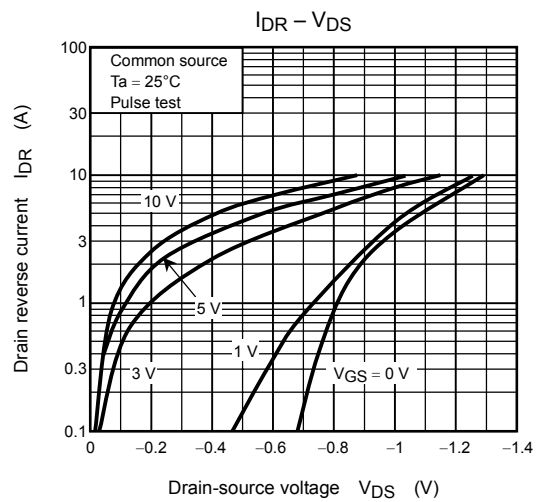
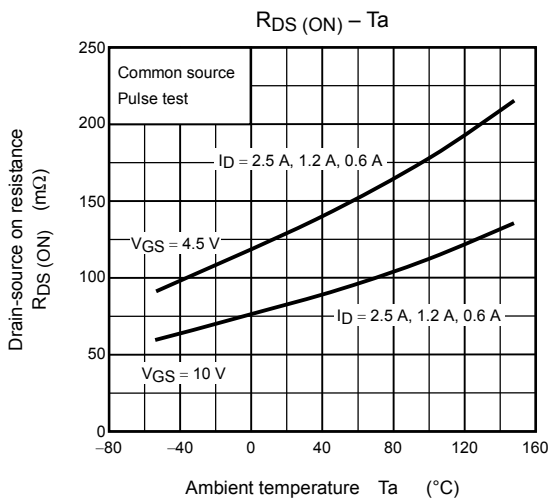
(b) Dual operation; values of P_D (2) and $R_{th(ch-a)}$ (2) for a single device during dual operation

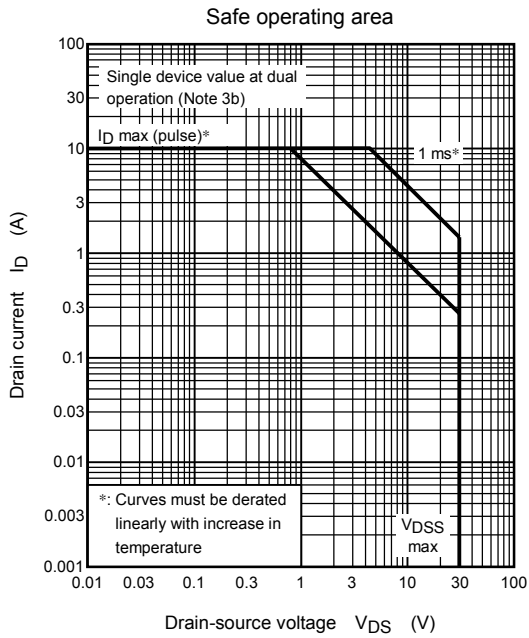
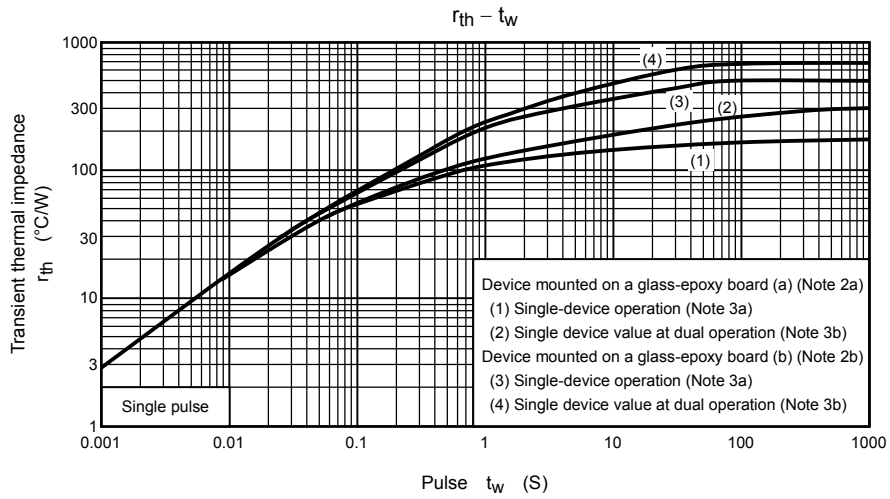
Note 4: $V_{DD} = 24\text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 0.5\text{ mH}$, $R_G = 25\ \Omega$, $I_{AR} = 1.25\text{ A}$

Note 5: Repetitive rating; pulse width limited by maximum channel temperature

Note 6: Black round marking "●" locates on the left lower side of parts number marking "S4A" indicates terminal No.1.







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