

TPC8208

Lithium Ion Battery Applications

Notebook PC Applications

Portable Equipment Applications

- Small footprint due to small and thin package
- Low drain-source ON resistance: $R_{DS(ON)} = 38\text{ m}\Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 6.3\text{ S}$ (typ.)
- Low leakage current: $I_{DSS} = 10\text{ }\mu\text{A}$ (max) ($V_{DS} = 20\text{ V}$)
- Enhancement mode: $V_{th} = 0.5\text{ to }1.2\text{ V}$ ($V_{DS} = 10\text{ V}$, $I_D = 200\text{ }\mu\text{A}$)

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

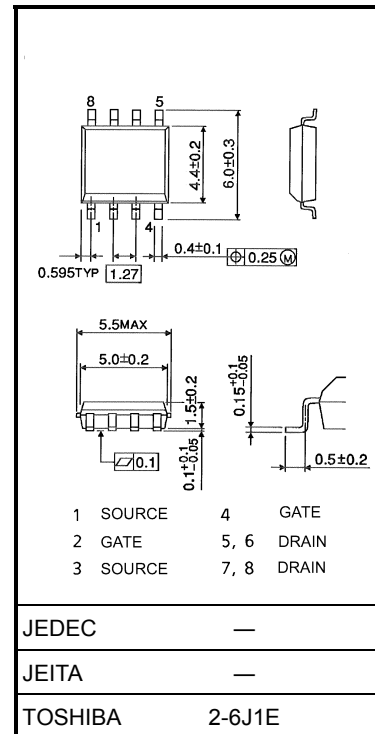
Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	20	V
Drain-gate voltage ($R_{GS} = 20\text{ k}\Omega$)		V_{DGR}	20	V
Gate-source voltage		V_{GSS}	± 12	V
Drain current	DC (Note 1)	I_D	5	A
	Pulse (Note 1)	I_{DP}	20	
Drain power dissipation ($t = 10\text{ s}$) (Note 2a)	Single-device operation (Note 3a)	$P_D(1)$	1.5	W
	Single-device value at dual operation (Note 3b)	$P_D(2)$	1.1	
Drain power dissipation ($t = 10\text{ s}$) (Note 2b)	Single-device operation (Note 3a)	$P_D(1)$	0.75	W
	Single-device value at dual operation (Note 3b)	$P_D(2)$	0.45	
Single pulse avalanche energy (Note 4)		E_{AS}	16.3	mJ
Avalanche current		I_{AR}	5	A
Repetitive avalanche energy Single-device value at dual operation (Note 2a, 3b, 5)		E_{AR}	0.1	mJ
Channel temperature		T_{ch}	150	$^\circ\text{C}$
Storage temperature range		T_{stg}	-55 to 150	$^\circ\text{C}$

Note: Note 1, Note 2, Note 3, Note 4 and Note 5: See the next page.

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.).

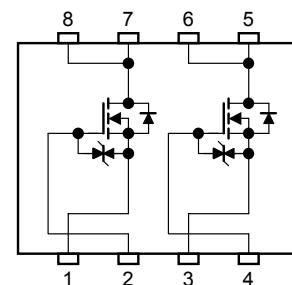
This transistor is an electrostatic-sensitive device. Please handle with caution.

Unit: mm



Weight: 0.080 g (typ.)

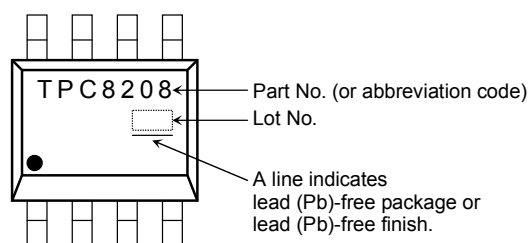
Circuit Configuration



Thermal Characteristics

Characteristics		Symbol	Max	Unit
Thermal resistance, channel to ambient ($t = 10$ s) (Note 2a)	Single-device operation (Note 3a)	$R_{th(ch-a)}(1)$	83.3	$^{\circ}\text{C}/\text{W}$
	Single-device value at dual operation (Note 3b)	$R_{th(ch-a)}(2)$	114	
Thermal resistance, channel to ambient ($t = 10$ s) (Note 2b)	Single-device operation (Note 3a)	$R_{th(ch-a)}(1)$	167	$^{\circ}\text{C}/\text{W}$
	Single-device value at dual operation (Note 3b)	$R_{th(ch-a)}(2)$	278	

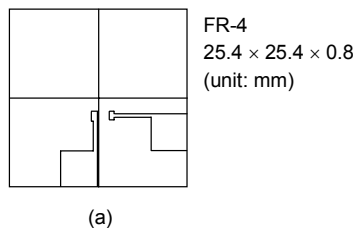
Marking (Note 6)



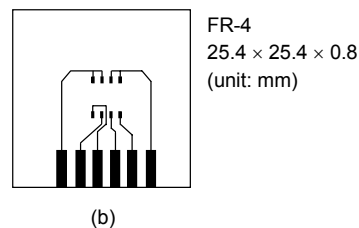
Note 1: Ensure that the channel temperature does not exceed 150°C .

Note 2:

a) Device mounted on a glass-epoxy board (a)



b) Device mounted on a glass-epoxy board (b)



Note 3:

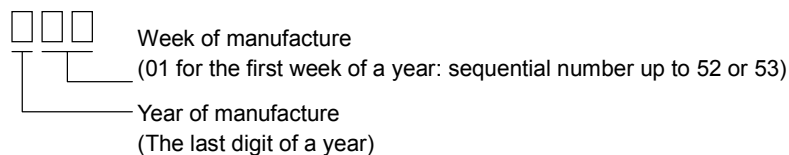
- a) The power dissipation and thermal resistance values are shown for a single device.
(During single-device operation, power is only applied to one device.)
- b) The power dissipation and thermal resistance values are shown for a single device.
(During dual operation, power is evenly applied to both devices.)

Note 4: $V_{DD} = 16$ V, $T_{ch} = 25^{\circ}\text{C}$ (initial), $L = 0.5$ mH, $R_G = 25$ Ω , $I_{AR} = 5$ A

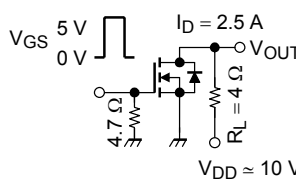
Note 5: Repetitive rating:pulse width limited by maximum channel temperature

Note 6: • on lower left of the marking indicates Pin 1.

※ Weekly code: (Three digits)

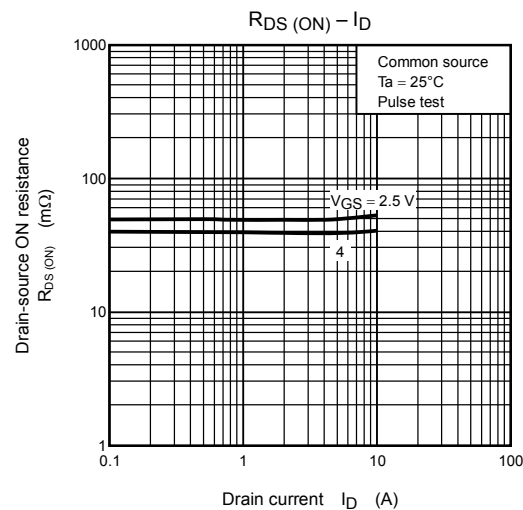
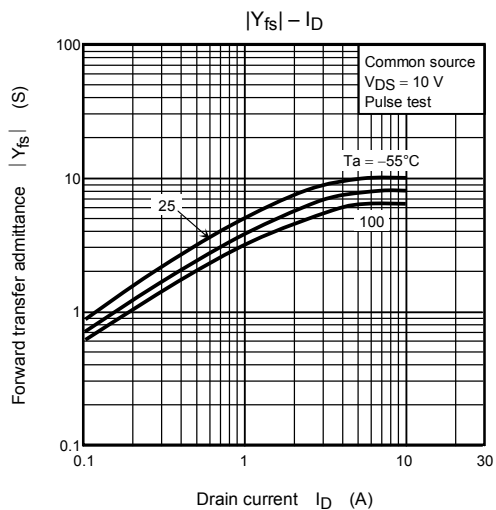
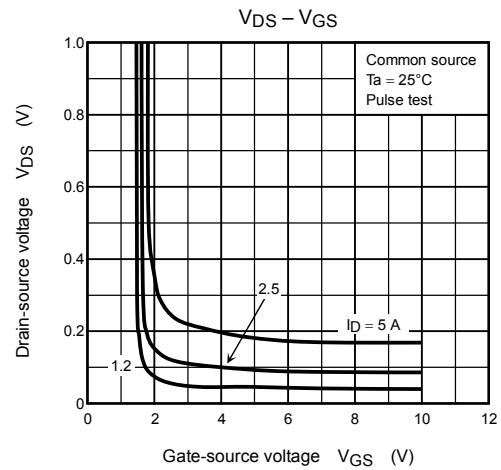
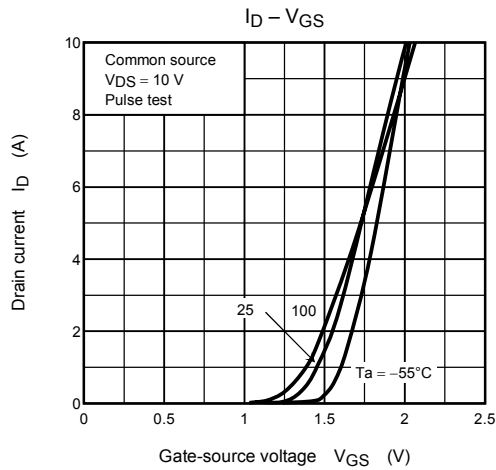
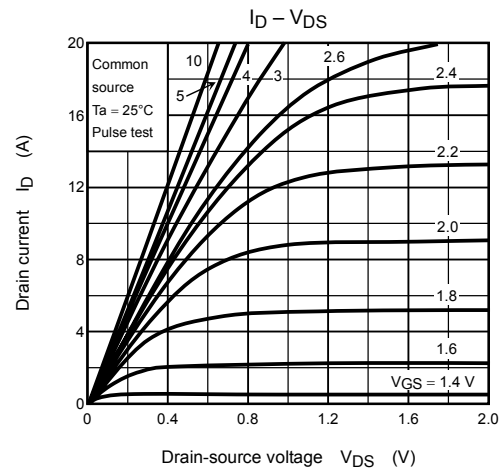
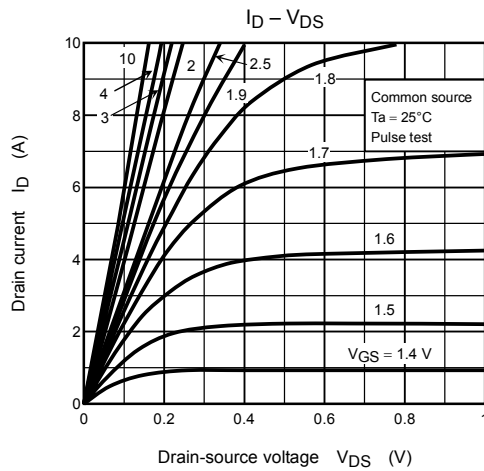


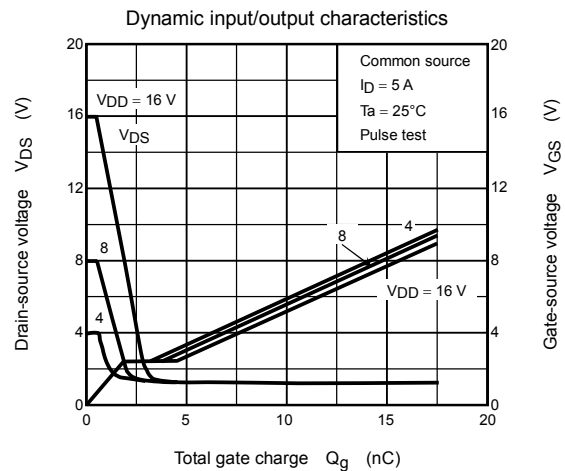
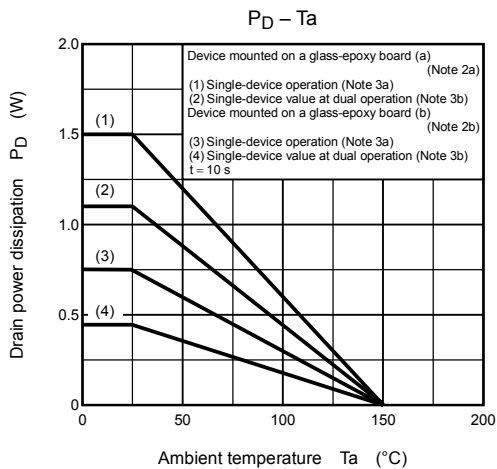
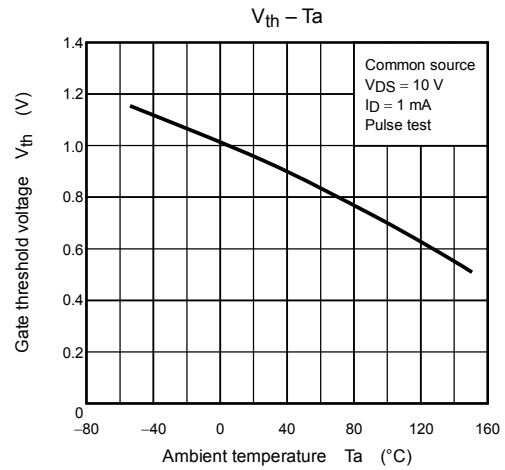
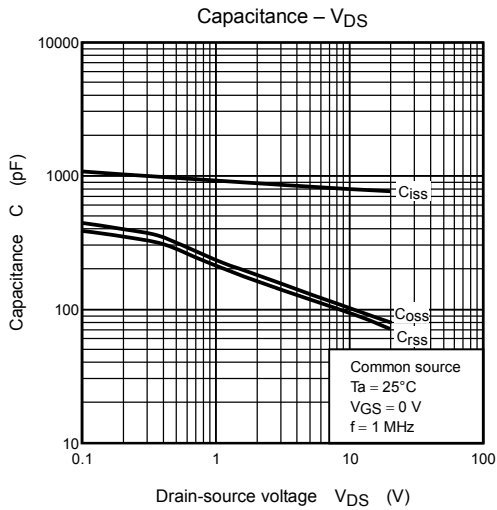
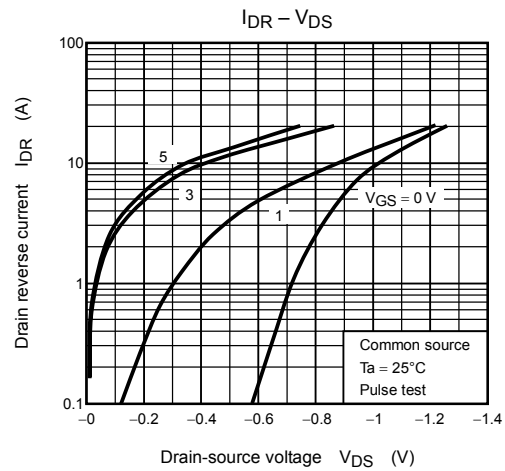
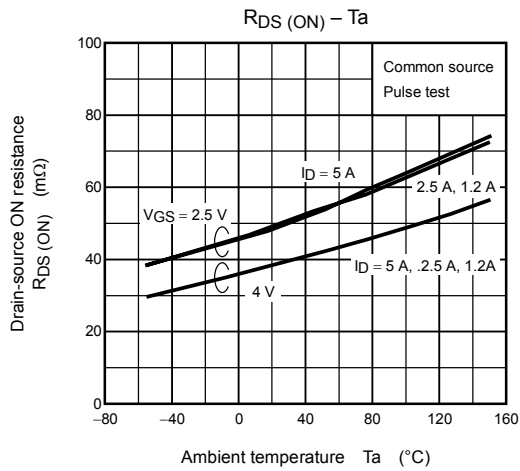
Electrical Characteristics (Ta = 25°C)

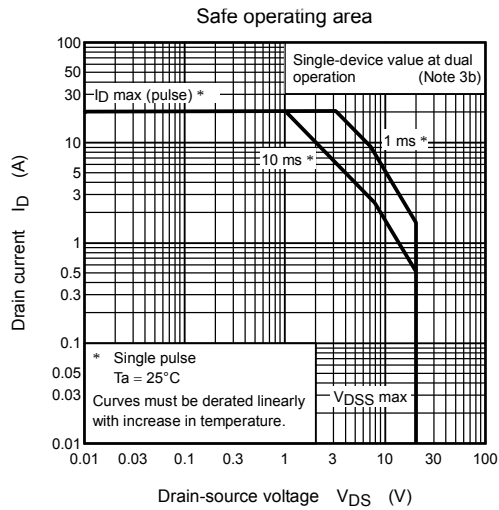
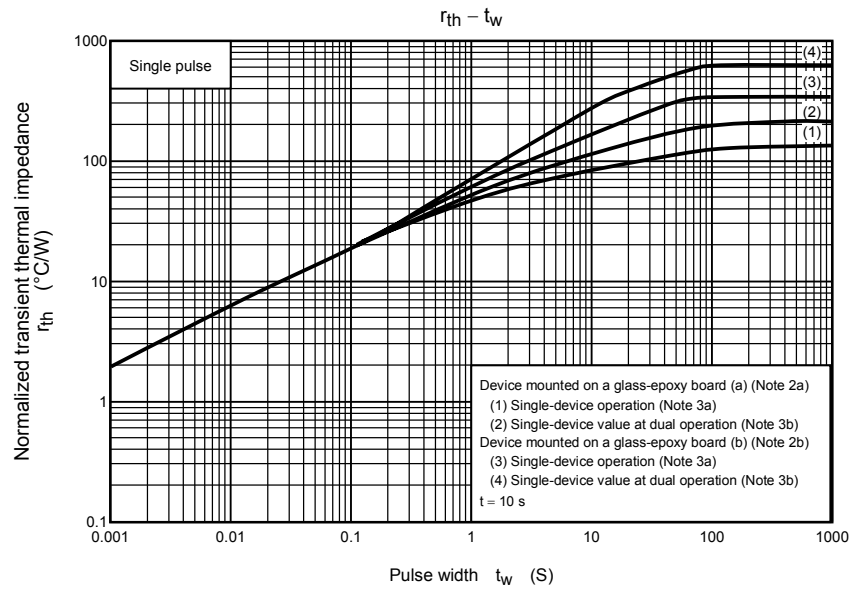
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 10 \text{ V}$, $V_{DS} = 0 \text{ V}$	—	—	± 10	μA
Drain cut-OFF current		I_{DSS}	$V_{DS} = 20 \text{ V}$, $V_{GS} = 0 \text{ V}$	—	—	10	μA
Drain-source breakdown voltage	$V_{(BR) DSS}$	$I_D = 10 \text{ mA}$, $V_{GS} = 0 \text{ V}$	20	—	—	V	
	$V_{(BR) DSX}$	$I_D = 10 \text{ mA}$, $V_{GS} = -12 \text{ V}$	8	—	—		
Gate threshold voltage		V_{th}	$V_{DS} = 10 \text{ V}$, $I_D = 200 \mu\text{A}$	0.5	—	1.2	V
Drain-source ON resistance	$R_{DS (ON)}$	$V_{GS} = 2.0 \text{ V}$, $I_D = 2.5 \text{ A}$	—	57	100	$\text{m}\Omega$	
		$V_{GS} = 2.5 \text{ V}$, $I_D = 2.5 \text{ A}$	—	46	70		
		$V_{GS} = 4.0 \text{ V}$, $I_D = 2.5 \text{ A}$	—	38	50		
Forward transfer admittance		$ Y_{fs} $	$V_{DS} = 10 \text{ V}$, $I_D = 2.5 \text{ A}$	3.2	6.3	—	S
Input capacitance		C_{iss}	$V_{DS} = 10 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$	—	780	—	pF
Reverse transfer capacitance		C_{rss}		—	90	—	
Output capacitance		C_{oss}		—	100	—	
Switching time	Rise time	t_r	 $V_{GS} = 5 \text{ V}$ 0 V $I_D = 2.5 \text{ A}$ V_{OUT} 4.7Ω 4Ω R_L $V_{DD} \approx 10 \text{ V}$ $\text{Duty} \leq 1\%$, $t_w = 10 \mu\text{s}$	—	5.0	—	ns
	Turn-ON time	t_{on}		—	12	—	
	Fall time	t_f		—	2.7	—	
	Turn-OFF time	t_{off}		—	21	—	
Total gate charge (gate-source plus gate-drain)		Q_g	$V_{DD} \approx 16 \text{ V}$, $V_{GS} = 5 \text{ V}$, $I_D = 5 \text{ A}$	—	9.5	—	nC
Gate-source charge 1		Q_{gs1}		—	2.0	—	
Gate-drain ("miller") charge		Q_{gd}		—	2.2	—	

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	Pulse (Note 1)	I_{DRP}	—	—	—	20	A
Forward voltage (diode)		V_{DSF}	$I_{DR} = 5 \text{ A}$, $V_{GS} = 0 \text{ V}$	—	—	-1.2	V







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