

TPC8211

Lithium Ion Battery Applications

Portable Equipment Applications

Notebook PC Applications

- Low drain-source ON resistance: $R_{DS} (ON) = 25 \text{ m}\Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 7.0 \text{ S}$ (typ.)
- Low leakage current: $I_{DSS} = 10 \text{ }\mu\text{A}$ (max) ($V_{DS} = 30 \text{ V}$)
- Enhancement mode: $V_{th} = 1.3 \text{ to } 2.5 \text{ V}$ ($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

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

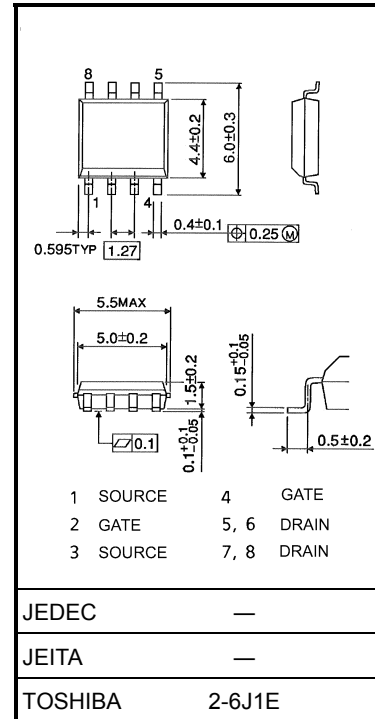
Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	30	V
Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$)		V_{DGR}	30	V
Gate-source voltage		V_{GSS}	± 20	V
Drain current	D C (Note 1)	I_D	5.5	A
	Pulse (Note 1)	I_{DP}	22	
Drain power dissipation ($t = 10 \text{ s}$) (Note 2a)	Single-device 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}	39.3	mJ
Avalanche current		I_{AR}	5.5	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).

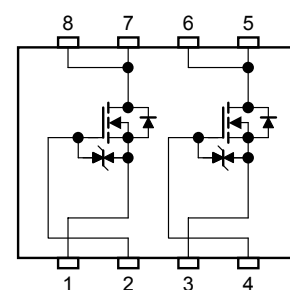
This transistor is an electrostatic-sensitive device. Please handle with caution.

Unit: mm



Weight: 0.08 g (typ.)

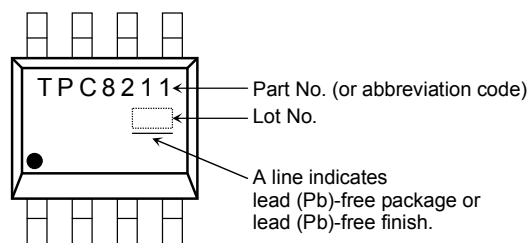
Circuit Configuration



Thermal Characteristics

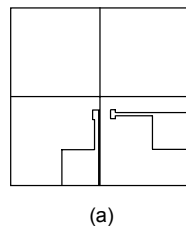
Characteristics		Symbol	Max	Unit
Thermal resistance, channel to ambient ($t = 10$ s) (Note 2a)	Single-device operation (Note 3a)	$R_{th(ch-a)}(1)$	83.3	°C/W
	Single-device value at dual operation (Note 3b)	$R_{th(ch-a)}(2)$	114	
Thermal resistance, channel to ambient ($t = 10$ s) (Note 2b)	Single-device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

Marking (Note 6)



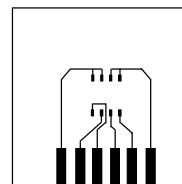
Note 1: Ensure that the channel temperature does not exceed 150°C.

Note 2:



(a)

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



(b)

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: $V_{DD} = 24$ V, $T_{ch} = 25^{\circ}\text{C}$ (initial), $L = 1.0$ mH, $R_G = 25\ \Omega$, $I_{AR} = 5.5$ 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)



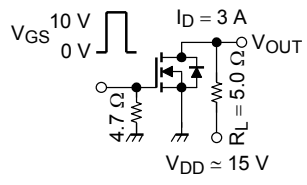
Week of manufacture

(01 for the first week of a year, sequential number up to 52 or 53)

Year of manufacture

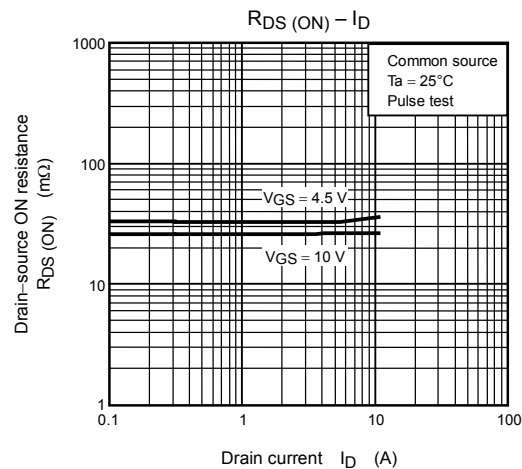
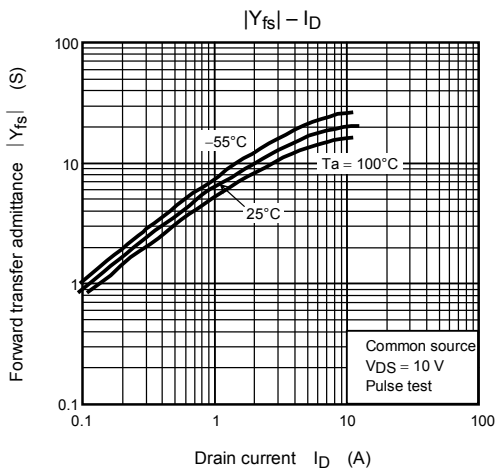
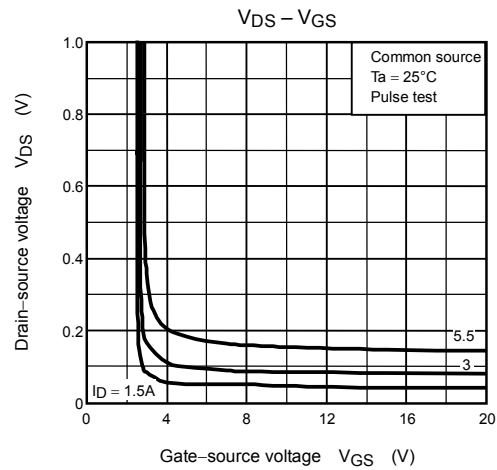
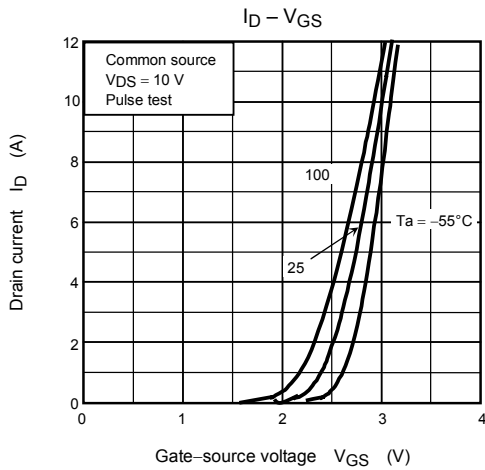
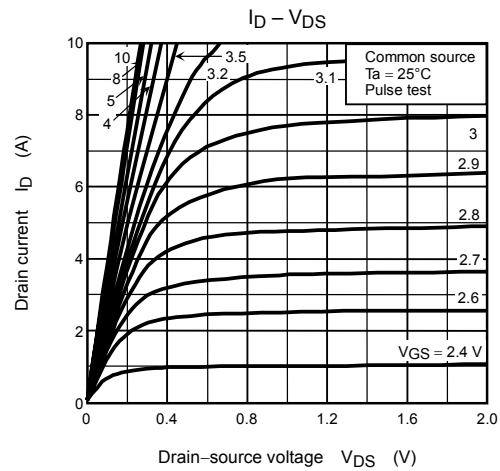
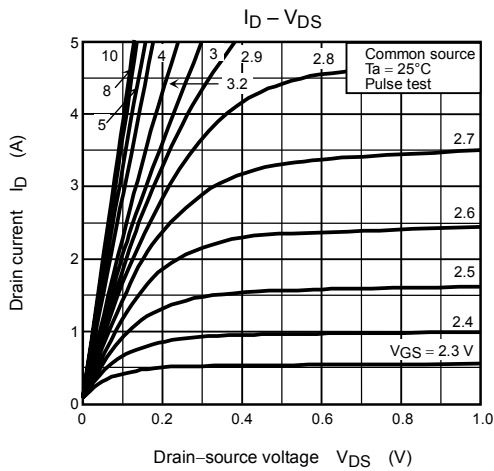
(The last digit of a year)

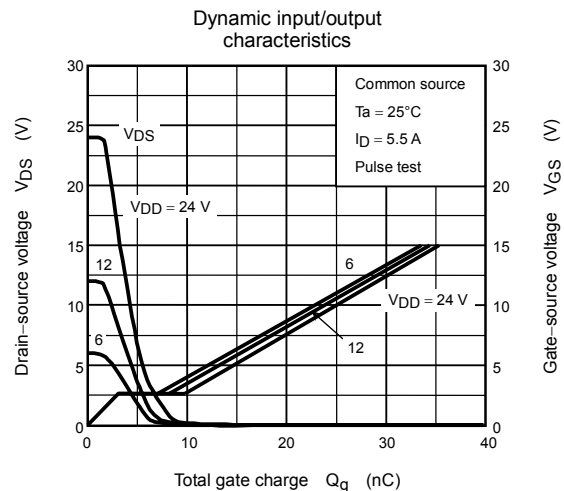
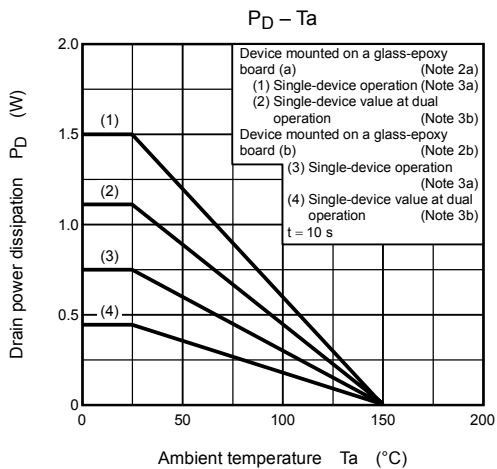
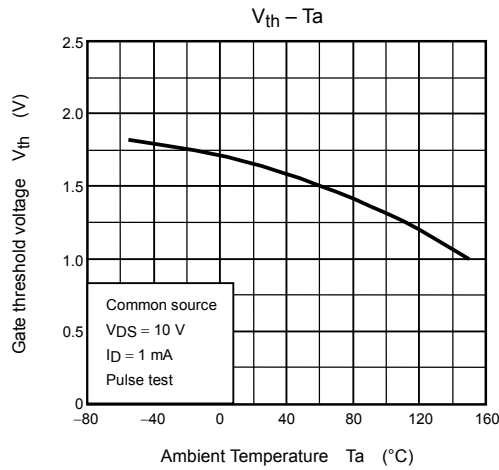
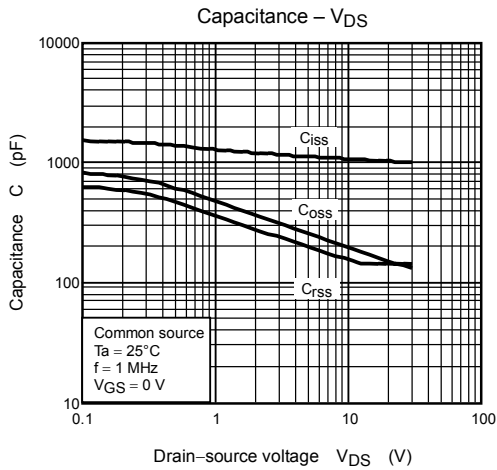
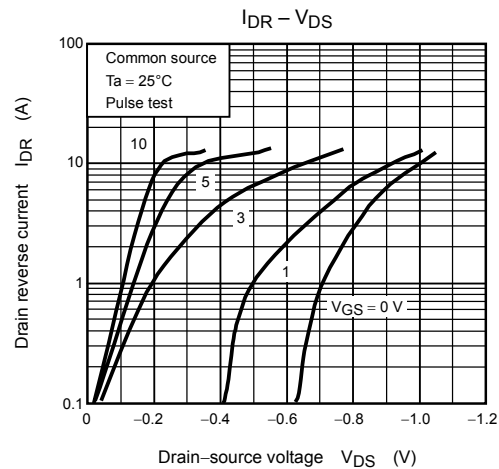
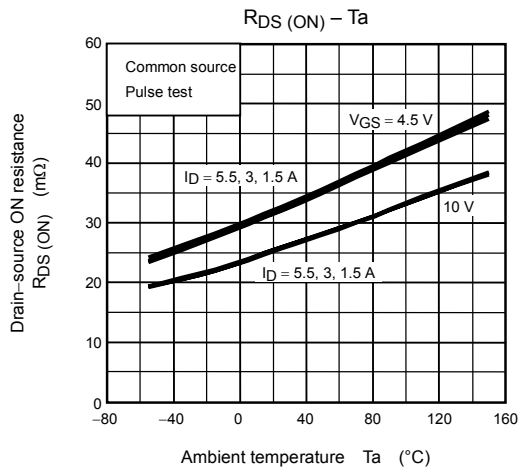
Electrical Characteristics (Ta = 25°C)

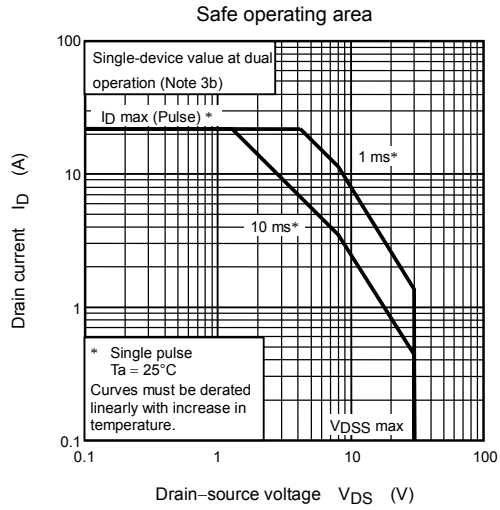
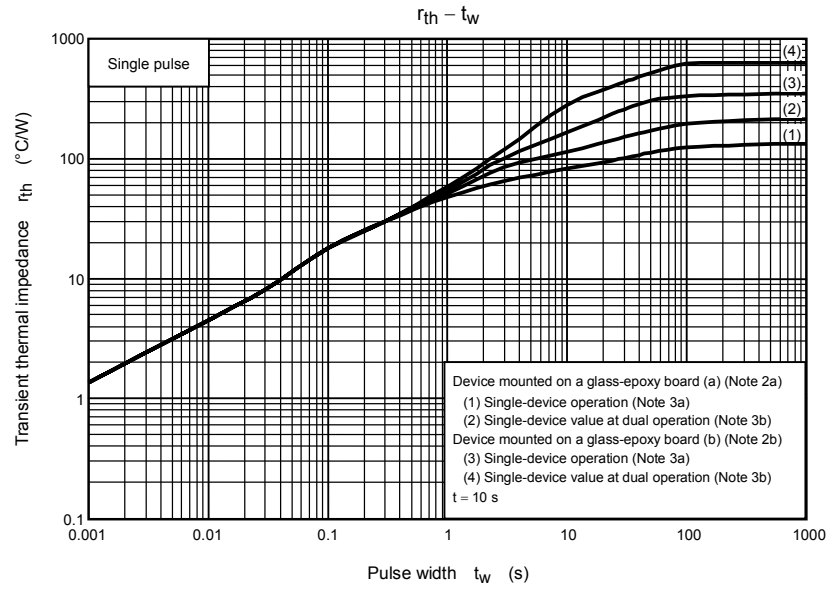
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 16 \text{ V}, V_{DS} = 0 \text{ V}$	—	—	± 10	μA
Drain cut-OFF current		I_{DSS}	$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V}$	—	—	10	μA
Drain-source breakdown voltage		$V_{(BR) DSS}$	$I_D = 10 \text{ mA}, V_{GS} = 0 \text{ V}$	30	—	—	V
		$V_{(BR) DSS}$	$I_D = 10 \text{ mA}, V_{GS} = -20 \text{ V}$	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		$R_{DS(ON)}$	$V_{GS} = 4.5 \text{ V}, I_D = 3 \text{ A}$	—	31	44	m Ω
		$R_{DS(ON)}$	$V_{GS} = 10 \text{ V}, I_D = 3 \text{ A}$	—	25	36	
Forward transfer admittance		$ Y_{fs} $	$V_{DS} = 10 \text{ V}, I_D = 3 \text{ A}$	3.5	7.0	—	S
Input capacitance		C_{iss}	$V_{DS} = 10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	—	1250	—	pF
Reverse transfer capacitance		C_{rss}		—	155	—	
Output capacitance		C_{oss}		—	170	—	
Switching time	Rise time	t_r	 $V_{GS} = 10 \text{ V}, 0 \text{ V}$ $I_D = 3 \text{ A}$ $V_{DD} \approx 15 \text{ V}$ $Duty \leq 1\%, t_w = 10 \mu\text{s}$	—	5	—	ns
	Turn-ON time	t_{on}		—	11	—	
	Fall time	t_f		—	9	—	
	Turn-OFF time	t_{off}		—	63	—	
Total gate charge (Gate-source plus gate-drain)		Q_g	$V_{DD} \approx 24 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 5.5 \text{ A}$	—	25	—	nC
Gate-source charge		Q_{gs}		—	20	—	
Gate-drain ("miller") charge		Q_{gd}		—	5	—	

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	Pulse (Note 1)	I_{DRP}	—	—	—	22	A
		V_{DSF}	$I_{DR} = 5.5 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	-1.2	V







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