

TPC8214-H

High-Efficiency DC/DC Converter Applications CCFL Inverters

- Small footprint due to a small and thin package
- High-speed switching
- Small gate charge: $Q_{SW} = 2.0 \text{ nC}$ (typ.)
- Low drain-source ON-resistance: $R_{DS(ON)} = 130 \text{ m}\Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 5.4 \text{ S}$ (typ.)
- Low leakage current: $I_{DSS} = 10 \text{ }\mu\text{A}$ (max) ($V_{DS} = 100 \text{ V}$)
- Enhancement mode: $V_{th} = 1.1 \text{ to } 2.3 \text{ V}$ ($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

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

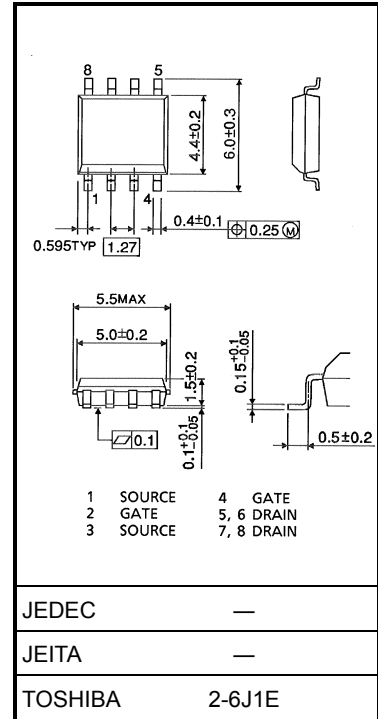
Characteristic		Symbol	Rating	Unit
Drain-source voltage		V_{DS}	100	V
Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$)		V_{DGR}	100	V
Gate-source voltage		V_{GSS}	± 20	V
Drain current	D C (Note 1)	I_D	2.2	A
	Pulse (Note 1)	I_{DP}	8.8	
Drain power dissipation ($t = 10 \text{ s}$) (Note 2a)	Single-device 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}	3.9	mJ
Avalanche current		I_{AR}	2.2	A
Repetitive avalanche energy (Note 2a, Note 3b, Note 5)		E_{AR}	0.026	mJ
Channel temperature		T_{ch}	150	$^\circ\text{C}$
Storage temperature range		T_{stg}	-55~150	$^\circ\text{C}$

Note: For Notes 1 to 5, refer to 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).

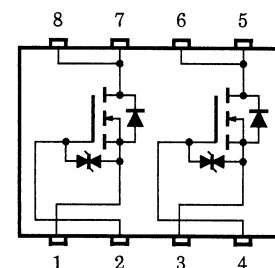
This transistor is an electrostatic-sensitive device. Handle with care.

Unit: mm



Weight: 0.085 g (typ.)

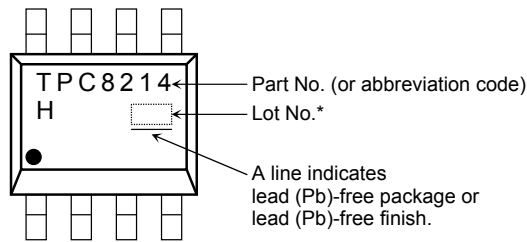
Circuit Configuration



Thermal Characteristics

Characteristic		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	

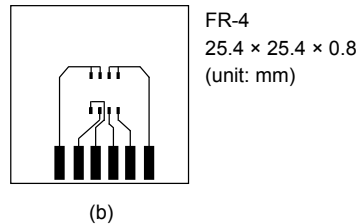
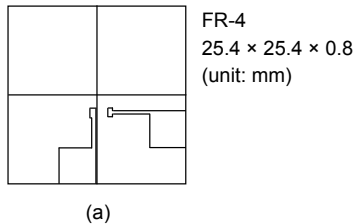
Marking



Note 1: The channel temperature should not exceed 150°C during use.

Note 2:

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



Note 3:

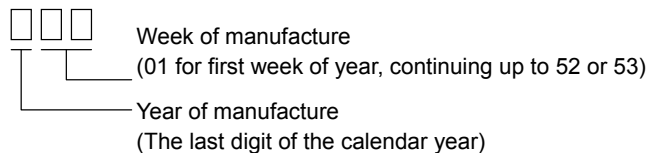
- a) The power dissipation and thermal resistance values are shown for a single device (During single-device operation, power is only applied to one device.)
- b) The power dissipation and thermal resistance values are shown for a single device (During dual operation, power is evenly applied to both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

Note 4: $V_{DD} = 50\text{ V}$, $T_{ch} = 25^\circ\text{C}$ (Initial), $L = 1.0\text{ mH}$, $R_G = 25\ \Omega$, $I_{AR} = 2.2\text{ A}$

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

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

* Weekly code: (Three digits)

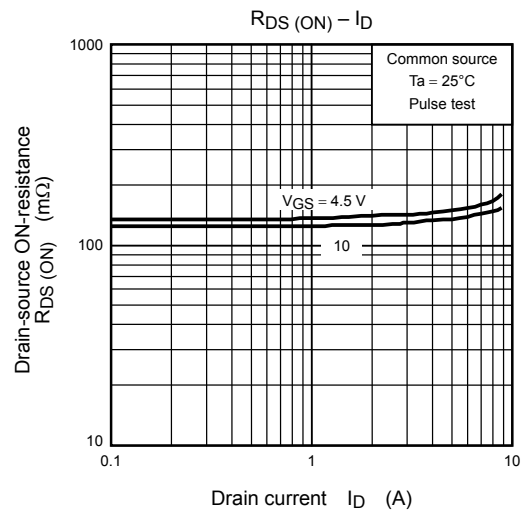
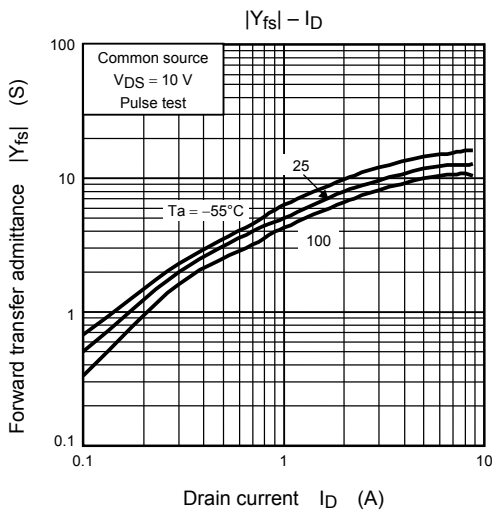
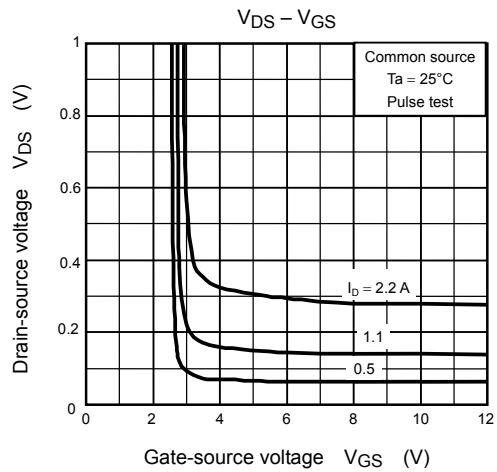
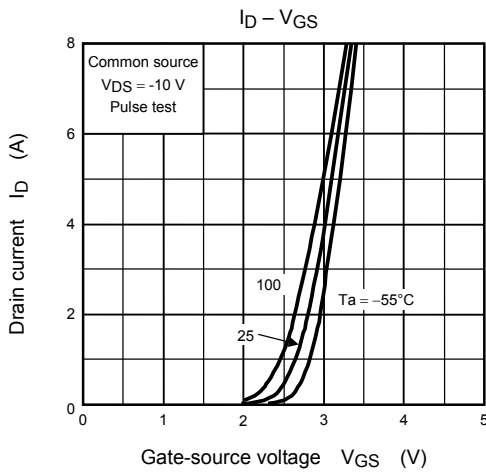
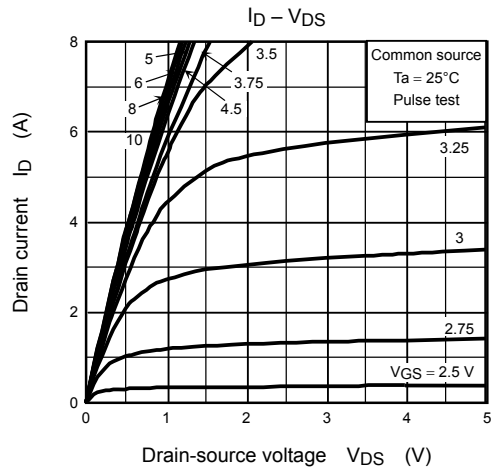
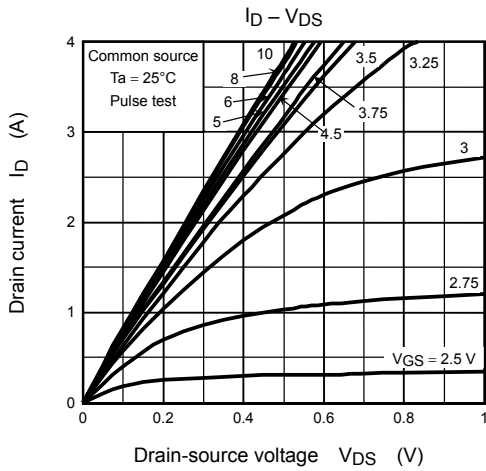


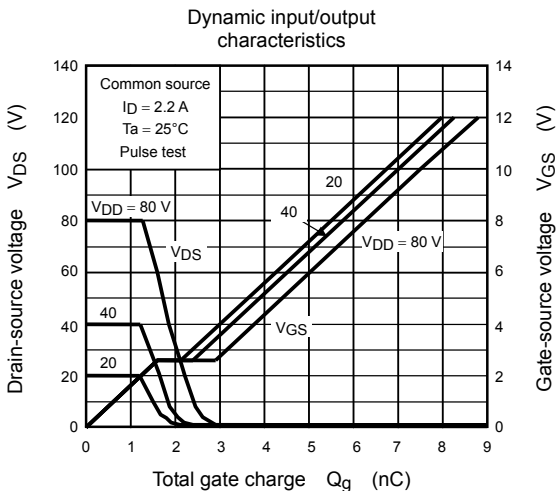
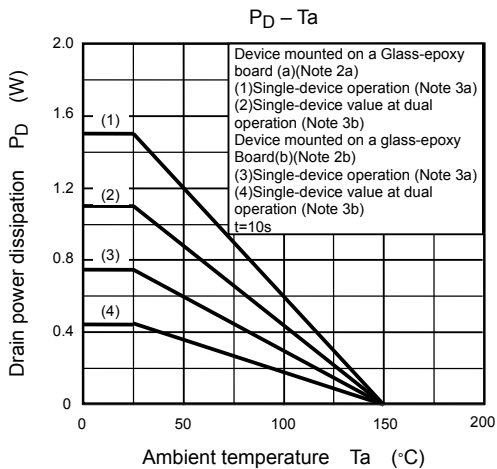
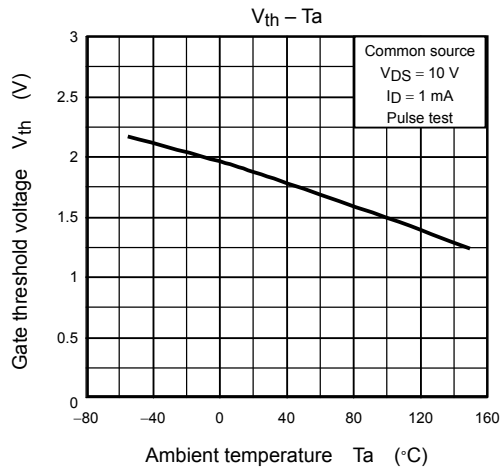
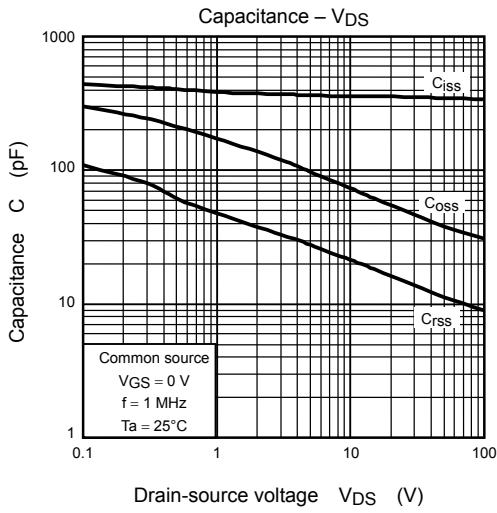
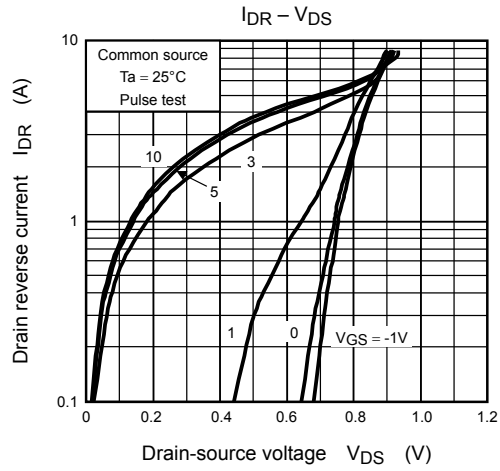
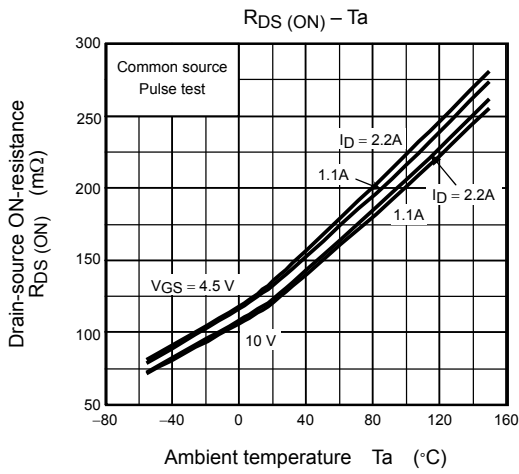
Electrical Characteristics (Ta = 25°C)

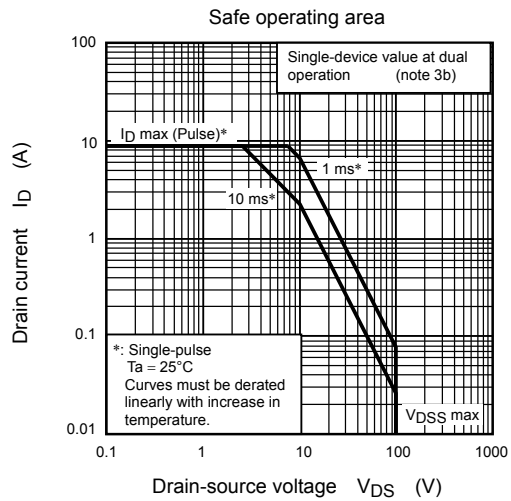
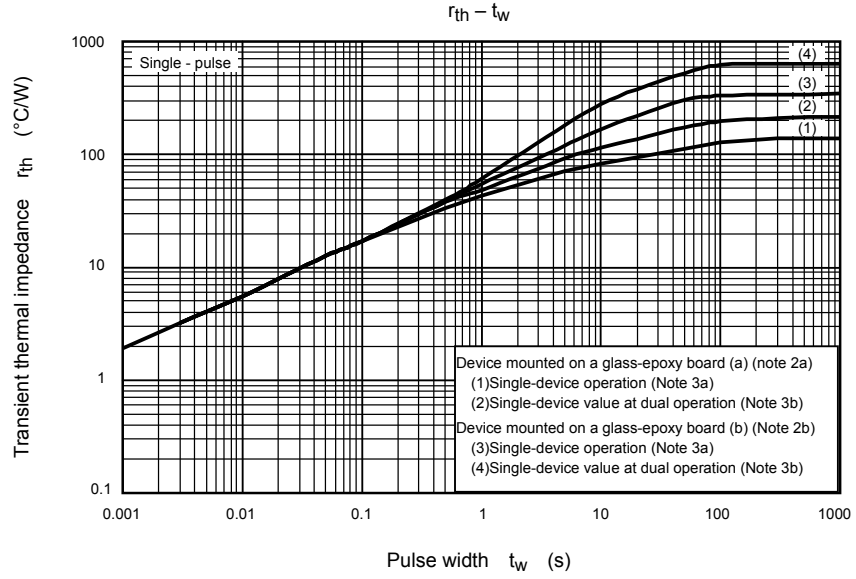
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 16\text{ V}, V_{DS} = 0\text{ V}$	—	—	± 10	μA
Drain cutoff current		I_{DSS}	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$	—	—	10	μA
Drain-source breakdown voltage		$V_{(BR) DSS}$	$I_D = 10\text{ mA}, V_{GS} = 0\text{ V}$	100	—	—	V
		$V_{(BR) DSX}$	$I_D = 10\text{ mA}, V_{GS} = -20\text{ V}$	60	—	—	
Gate threshold voltage		V_{th}	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	1.1	—	2.3	V
Drain-source ON-resistance		$R_{DS(ON)}$	$V_{GS} = 4.5\text{ V}, I_D = 1.1\text{ A}$	—	140	190	m Ω
		$R_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 1.1\text{ A}$	—	130	180	
Forward transfer admittance		$ Y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 1.1\text{ A}$	2.7	5.4	—	S
Input capacitance		C_{iss}	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	360	—	pF
Reverse transfer capacitance		C_{rss}		—	22	—	
Output capacitance		C_{oss}		—	75	—	
Switching time	Rise time	t_r	<p>$V_{GS} = 10\text{ V}$ 0 V $I_D = 1.1\text{ A}$ $V_{DD} \approx 50\text{ V}$ $R_L = 45\ \Omega$ $47\ \Omega$ V_{OUT}</p> <p>Duty $\leq 1\%$, $t_w = 10\ \mu\text{s}$</p>	—	7	—	ns
	Turn-on time	t_{on}		—	14	—	
	Fall time	t_f		—	3	—	
	Turn-off time	t_{off}		—	17	—	
Total gate charge (gate-source plus gate-drain) (Note 7)		Q_g	$V_{DD} \approx 80\text{ V}, V_{GS} = 10\text{ V}, I_D = 2.2\text{ A}$	—	7.5	—	nC
			$V_{DD} \approx 80\text{ V}, V_{GS} = 5\text{ V}, I_D = 2.2\text{ A}$	—	4.5	—	
Gate-source charge 1		Q_{gs1}	$V_{DD} \approx 80\text{ V}, V_{GS} = 10\text{ V}, I_D = 2.2\text{ A}$	—	1.6	—	
Gate-drain ("Miller") charge		Q_{gd}		—	1.3	—	
Gate switch charge		Q_{SW}		—	2.0	—	

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

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	Pulse (Note 1)	I_{DRP}	—	—	—	8.8	A
Forward voltage (diode)		V_{DSF}	$I_{DR} = 2.2\text{ A}, V_{GS} = 0\text{ V}$	—	—	-1.2	V







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