

TPCA8024

Lithium-Ion Battery Applications

Notebook PC Applications

Portable Equipment Applications

- Small footprint due to a small and thin package
- Low drain-source ON-resistance: $R_{DS(ON)} = 3.5 \text{ m}\Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 72 \text{ S}$ (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 ($T_a = 25^\circ\text{C}$)

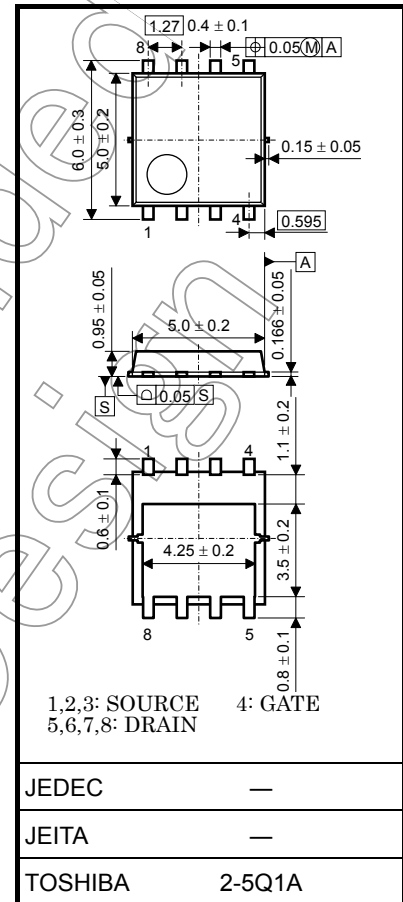
Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	30	V
Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$)	V_{DGR}	30	V
Gate-source voltage	V_{GSS}	± 20	V
Drain current	DC (Note 1)	I_D	A
	Pulse (Note 1)	I_{DP}	
Drain power dissipation ($T_c = 25^\circ\text{C}$)	P_D	35	W
Drain power dissipation ($t = 10 \text{ s}$) (Note 2a)	P_D	2.8	W
Drain power dissipation ($t = 10 \text{ s}$) (Note 2b)	P_D	1.6	W
Single pulse avalanche energy (Note 3)	E_{AS}	159	mJ
Avalanche current	I_{AR}	35	A
Repetitive avalanche energy ($T_c = 25^\circ\text{C}$) (Note 4)	E_{AR}	3.5	mJ
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55 to 150	$^\circ\text{C}$

Note: For Note 1 to 4, 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).

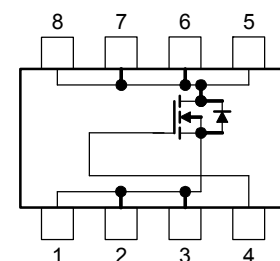
This transistor is an electrostatic-sensitive device. Handle with care.

Unit: mm



Weight: 0.069 g (typ.)

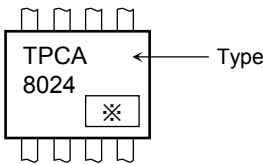
Circuit Configuration



Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case ($T_c=25^{\circ}\text{C}$)	$R_{th(ch-c)}$	3.57	$^{\circ}\text{C/W}$
Thermal resistance, channel to ambient ($t = 10\text{ s}$) (Note 2a)	$R_{th(ch-a)}$	44.6	$^{\circ}\text{C/W}$
Thermal resistance, channel to ambient ($t = 10\text{ s}$) (Note 2b)	$R_{th(ch-a)}$	78.1	$^{\circ}\text{C/W}$

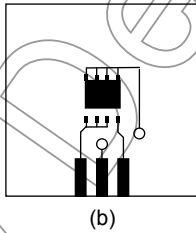
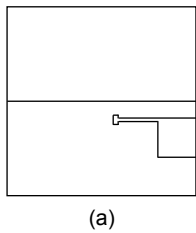
Marking (Note 5)



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

Note 2:

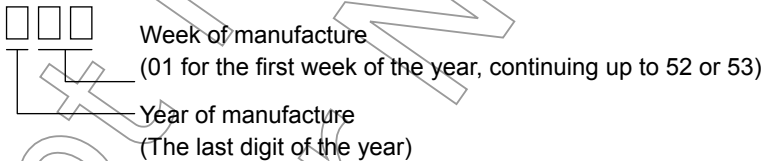
- (a) Device mounted on a glass-epoxy board (a) (b) Device mounted on a glass-epoxy board (b)



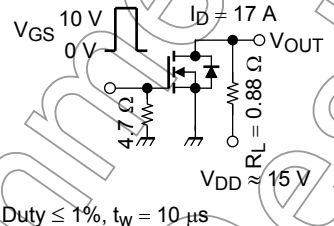
Note 3: $V_{DD} = 24\text{ V}$, $T_{ch} = 25^{\circ}\text{C}$ (initial), $L = 0.1\text{mH}$, $R_G = 25\ \Omega$, $I_{AR} = 35\text{ A}$

Note 4: Repetitive rating: pulse width limited by max channel temperature

Note 5: * Weekly code: (Three digits)

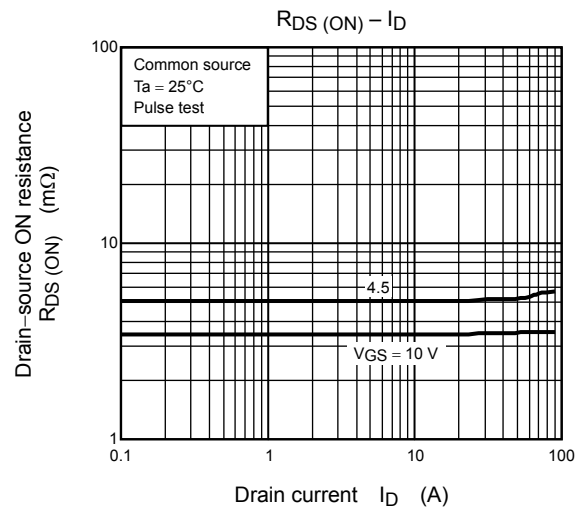
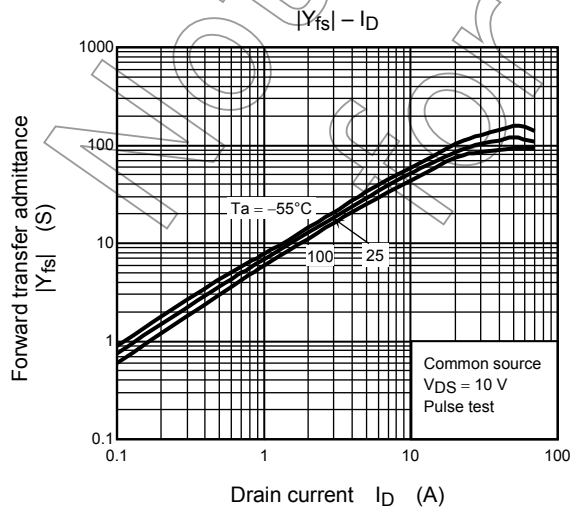
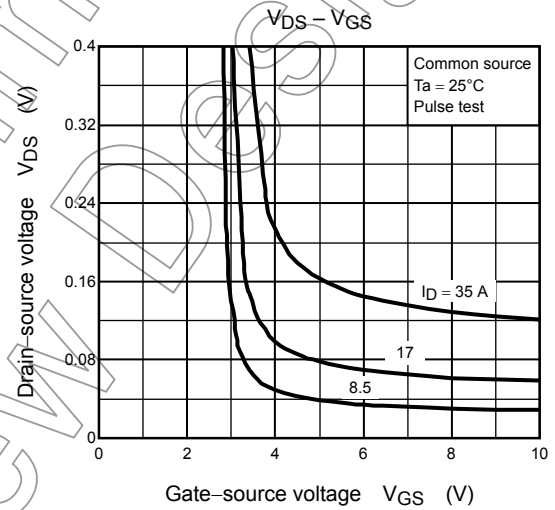
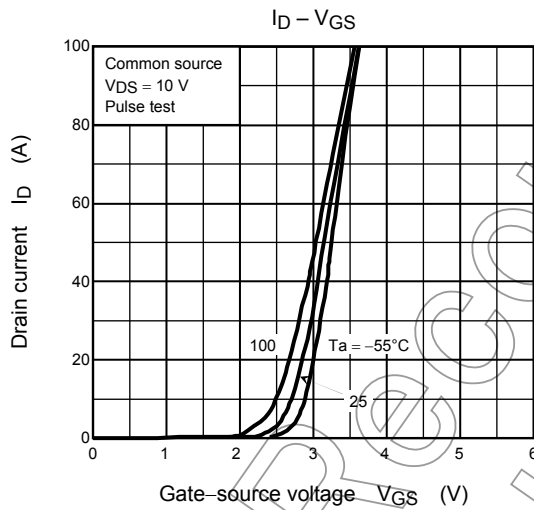
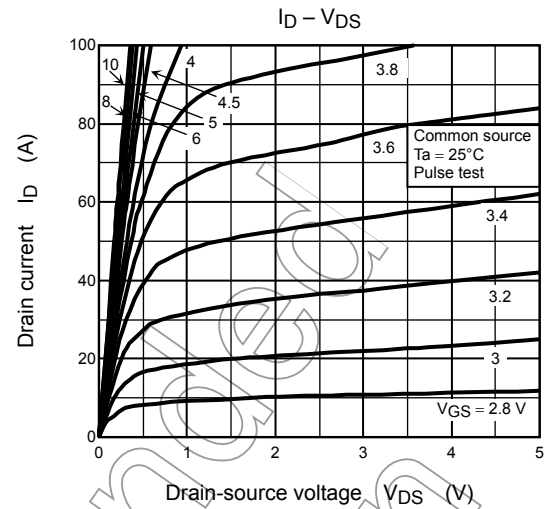
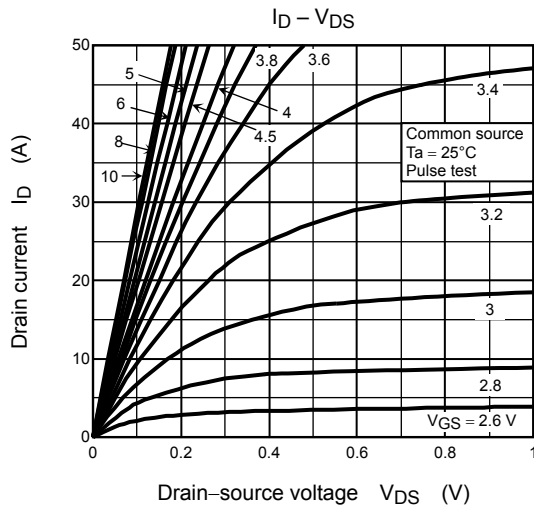


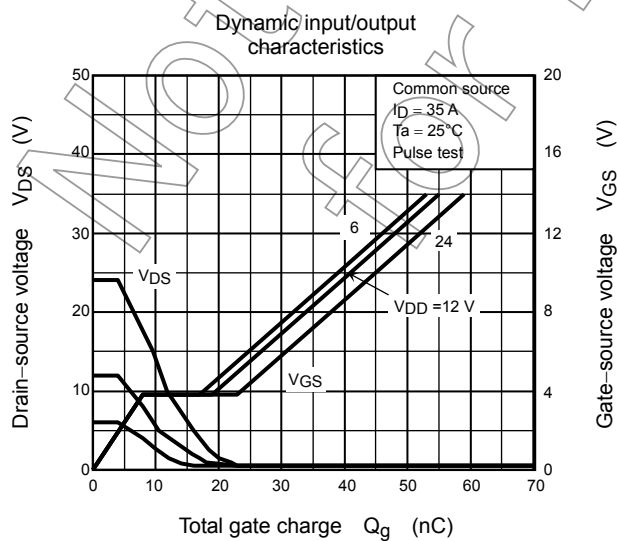
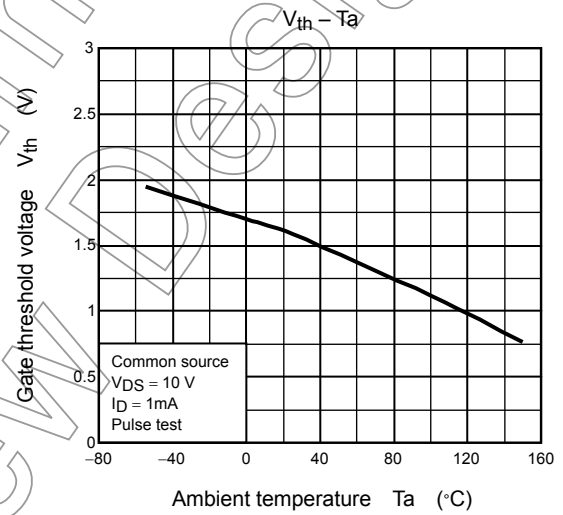
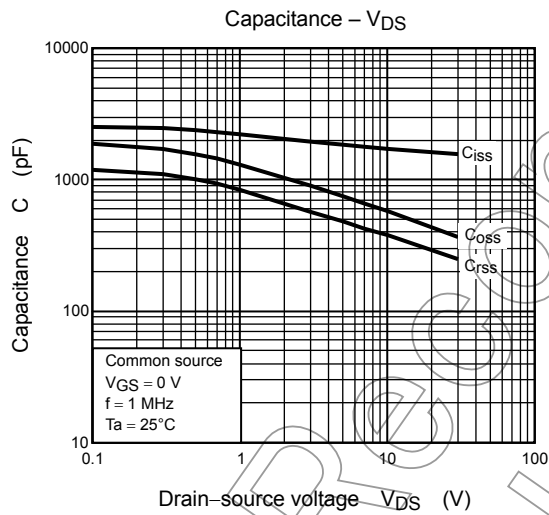
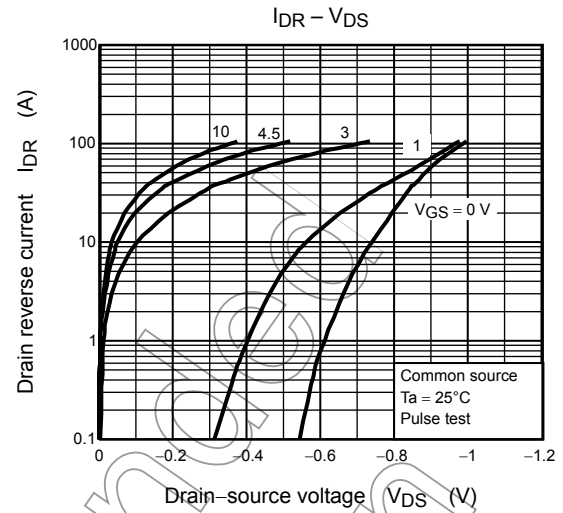
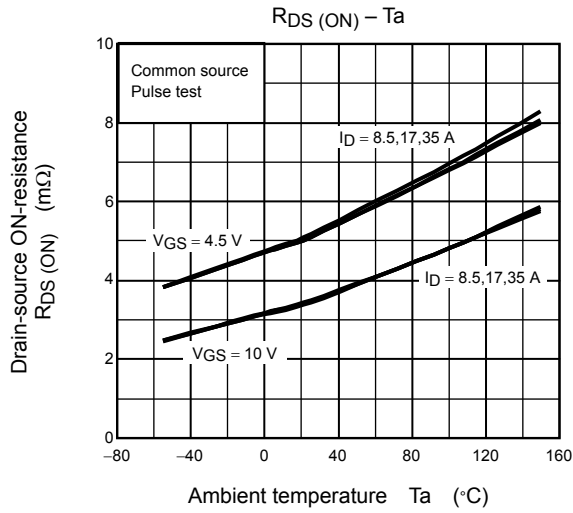
Electrical Characteristics (Ta = 25°C)

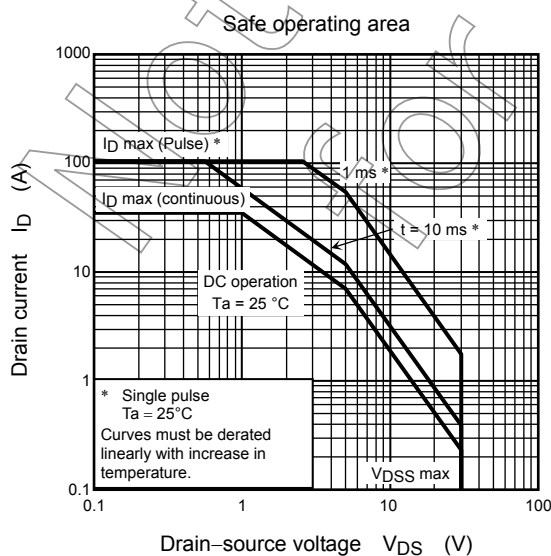
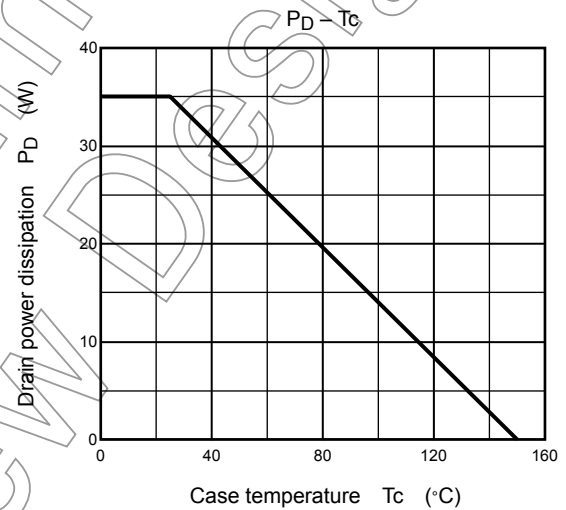
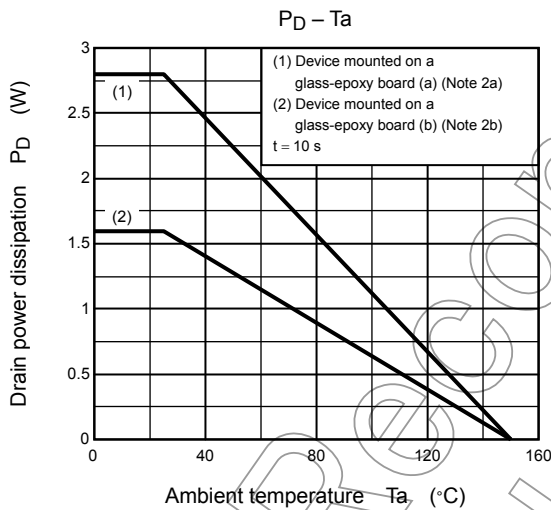
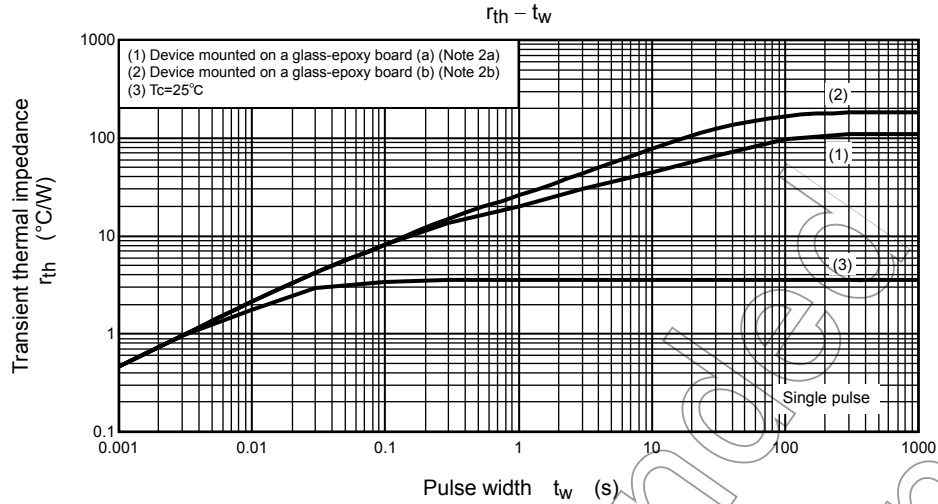
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I _{GSS}	V _{GS} = ±20 V, V _{DS} = 0 V	—	—	±100	nA
Drain cut-OFF current		I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V	—	—	10	μA
Drain-source breakdown voltage		V (BR) DSS	I _D = 10 mA, V _{GS} = 0 V	30	—	—	V
		V (BR) DSX	I _D = 10 mA, V _{GS} = -20 V	10	—	—	
Gate threshold voltage		V _{th}	V _{DS} = 10 V, I _D = 1 mA	1.3	—	2.5	V
Drain-source ON-resistance		R _{DS (ON)}	V _{GS} = 4.5 V, I _D = 17 A	—	5.4	7.8	mΩ
			V _{GS} = 10 V, I _D = 17 A	—	3.5	4.3	
Forward transfer admittance		Y _{fs}	V _{DS} = 10 V, I _D = 17 A	36	72	—	S
Input capacitance		C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	—	1800	—	pF
Reverse transfer capacitance		C _{rss}		—	370	—	
Output capacitance		C _{oss}		—	570	—	
Switching time	Rise time	t _r		—	11	—	ns
	Turn-on time	t _{on}		—	19	—	
	Fall time	t _f		—	22	—	
	Turn-off time	t _{off}		—	64	—	
Total gate charge (gate-source plus gate-drain)		Q _g	V _{DD} ≈ 24 V, V _{GS} = 10 V, I _D = 35 A	—	45	—	nC
Gate-source charge 1		Q _{gs1}		—	8	—	
Gate-drain (“miller”) charge		Q _{gd}		—	15	—	

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	Pulse (Note 1)	I_{DRP}	—	—	—	105	A
Forward voltage (diode)		V_{DSF}	$I_{DR} = 35 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	-1.2	V







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