

TPC8035-H

High Efficiency DC-DC Converter Applications

Notebook PC Applications

Portable Equipment Applications

- Small footprint due to small and thin package
- High-speed switching
- Small gate charge: $Q_{SW} = 17 \text{ nC}$ (typ.)
- Low drain-source ON-resistance: $R_{DS(ON)} = 2.3 \text{ m}\Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 70 \text{ S}$ (typ.)
- Low leakage current: $I_{DSS} = 10 \text{ }\mu\text{A}$ (max) ($V_{DS} = 30 \text{ V}$)
- Enhancement mode: $V_{th} = 1.3 \text{ to } 2.3 \text{ V}$ ($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

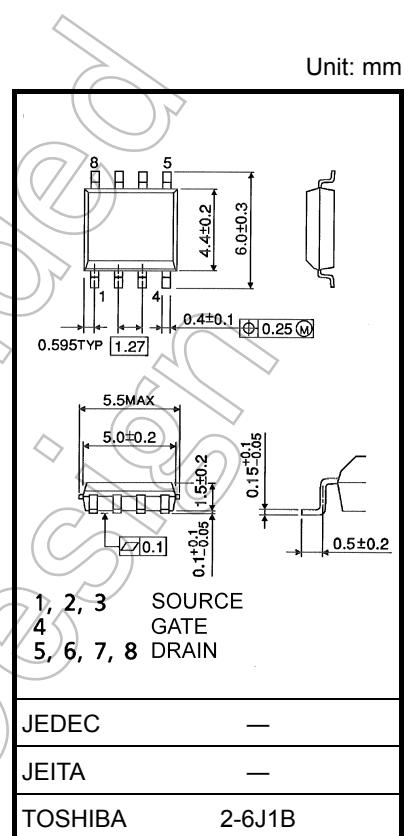
Absolute Maximum Ratings (Ta = 25°C)

Characteristic	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	18
	Pulsed (Note 1)	I _{DP}	72
Drain power dissipation ($t = 10\text{ s}$) (Note 2a)	P _D	1.9	W
Drain power dissipation ($t = 10\text{ s}$) (Note 2b)	P _D	1.0	W
Single pulse avalanche energy (Note 3)	E _{AS}	211	mJ
Avalanche current	I _{AR}	18	A
Repetitive avalanche energy (Note 2a) (Note 4)	E _{AR}	0.082	mJ
Channel temperature	T _{ch}	150	°C
Storage temperature range	T _{stg}	-55 to 150	°C

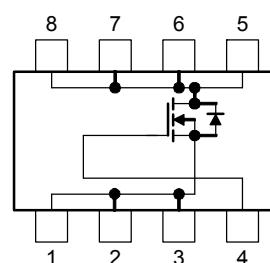
Note: For Notes 1 to 4, refer to the next page.

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.



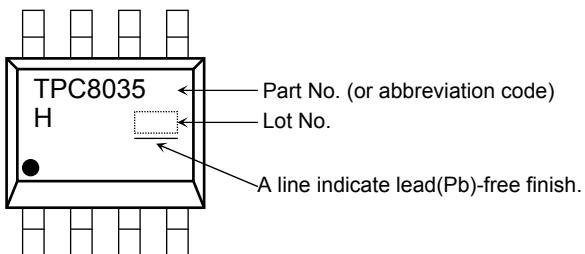
Circuit Configuration



Thermal Characteristics

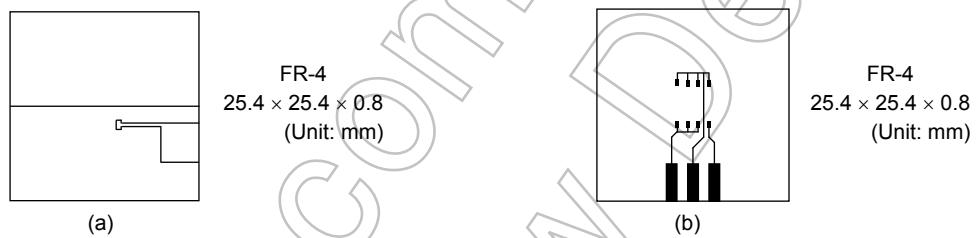
Characteristic	Symbol	Max	Unit
Thermal resistance, channel to ambient ($t = 10$ s) (Note 2a)	R_{th} (ch-a)	65.8	°C/W
Thermal resistance, channel to ambient ($t = 10$ s) (Note 2b)	R_{th} (ch-a)	125	°C/W

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)

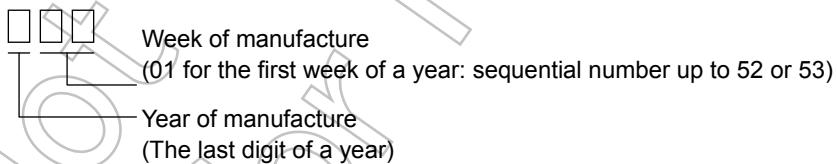


Note 3: $V_{DD} = 24$ V, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 500$ μH , $R_G = 25$ Ω , $I_{AR} = 18$ A

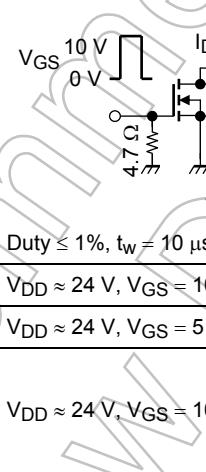
Note 4: Repetitive rating: pulse width limited by max channel temperature

Note 5: • on lower left of the marking indicates Pin 1.

* Weekly code: (Three digits)

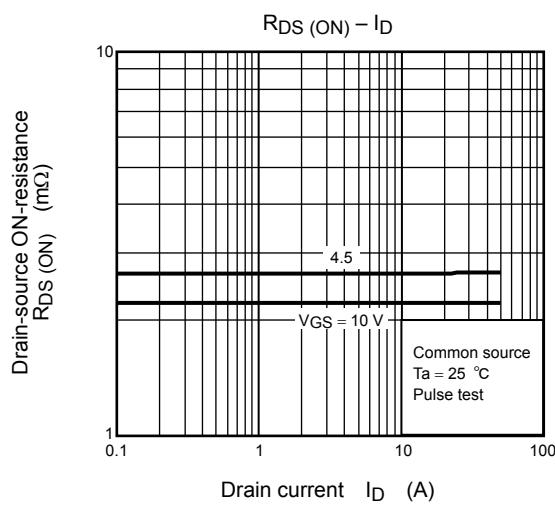
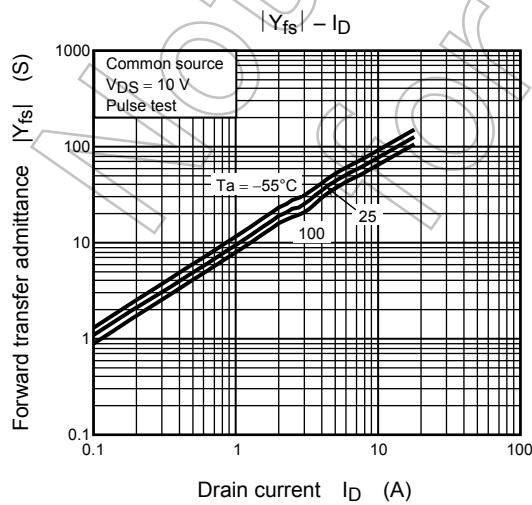
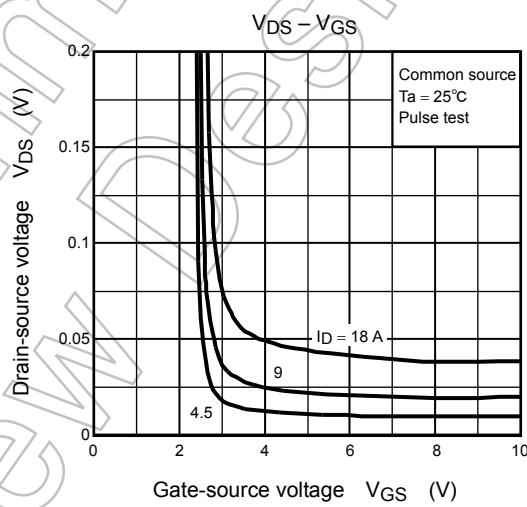
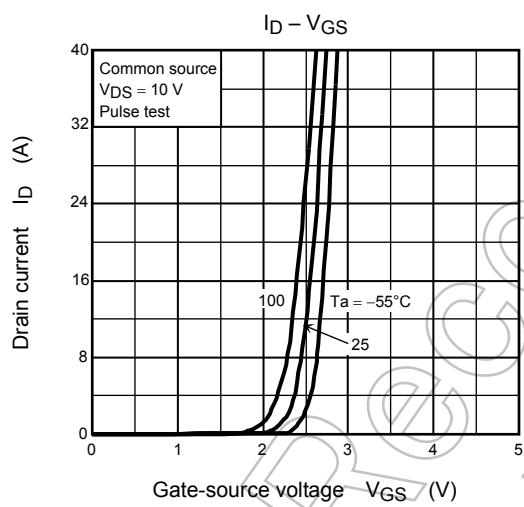
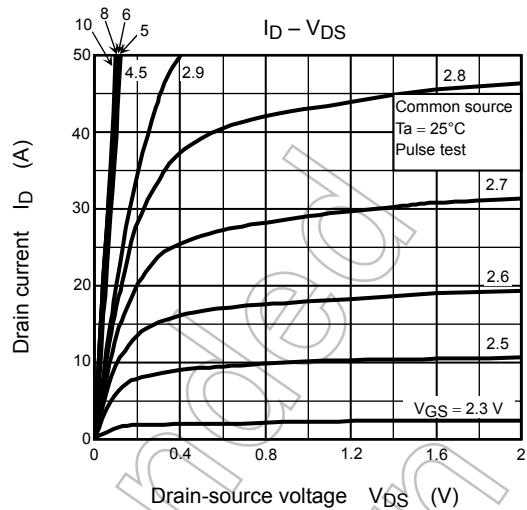
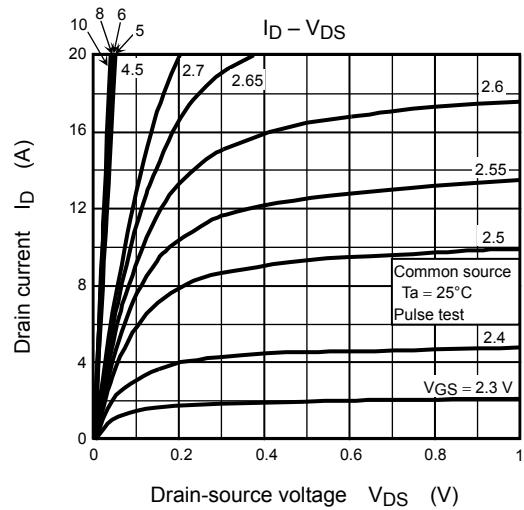


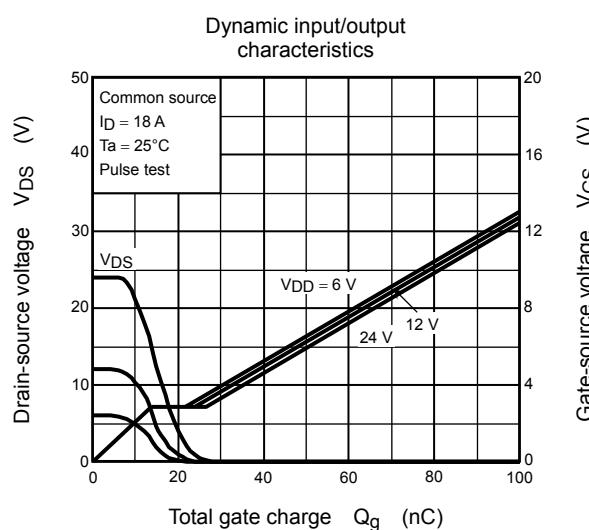
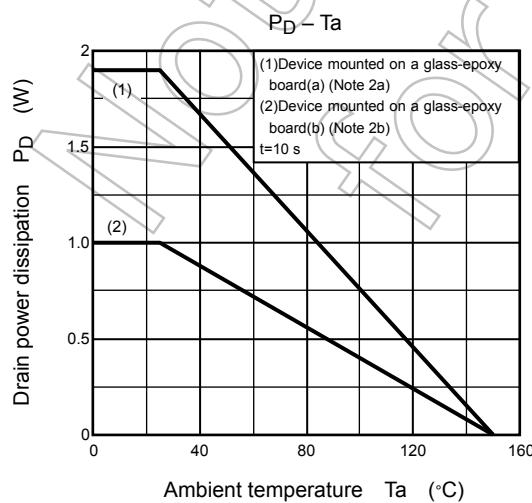
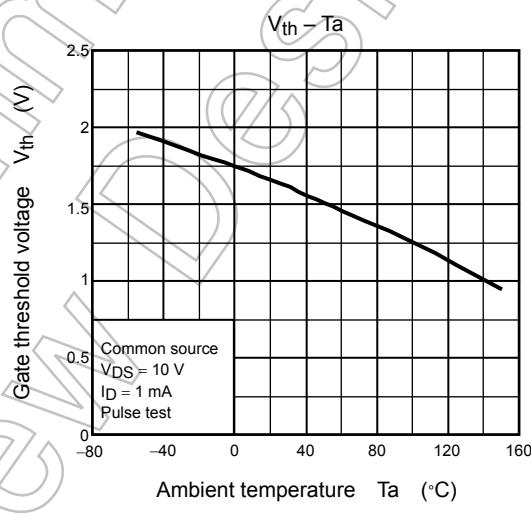
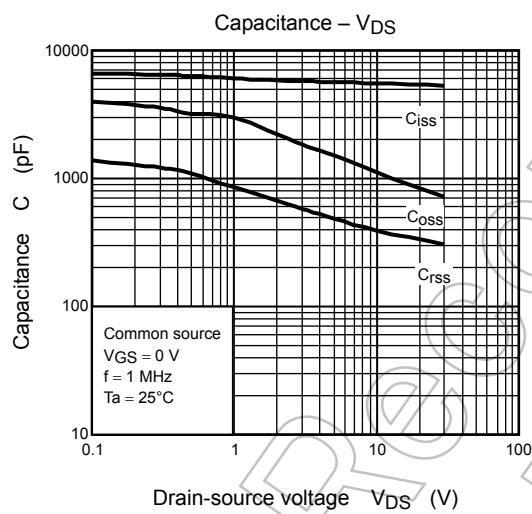
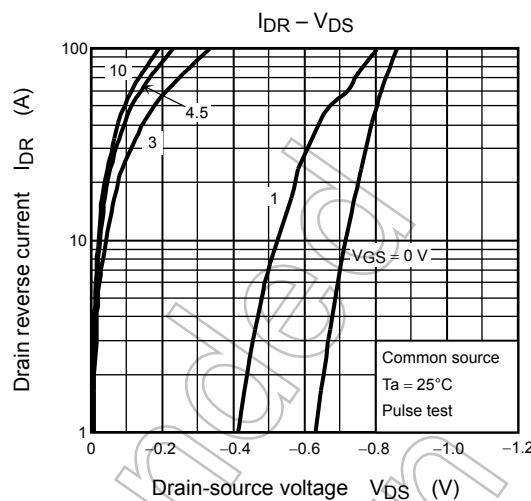
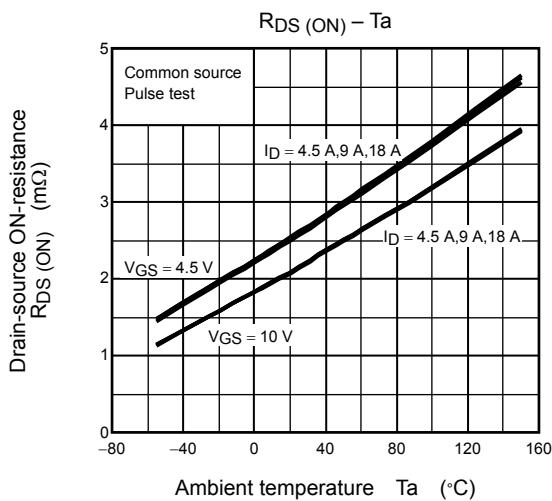
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

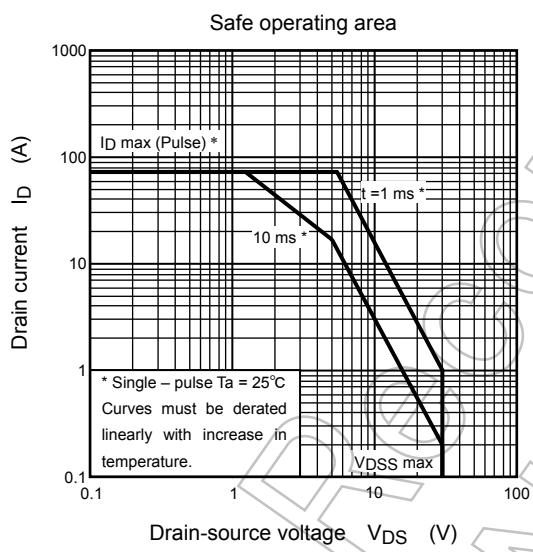
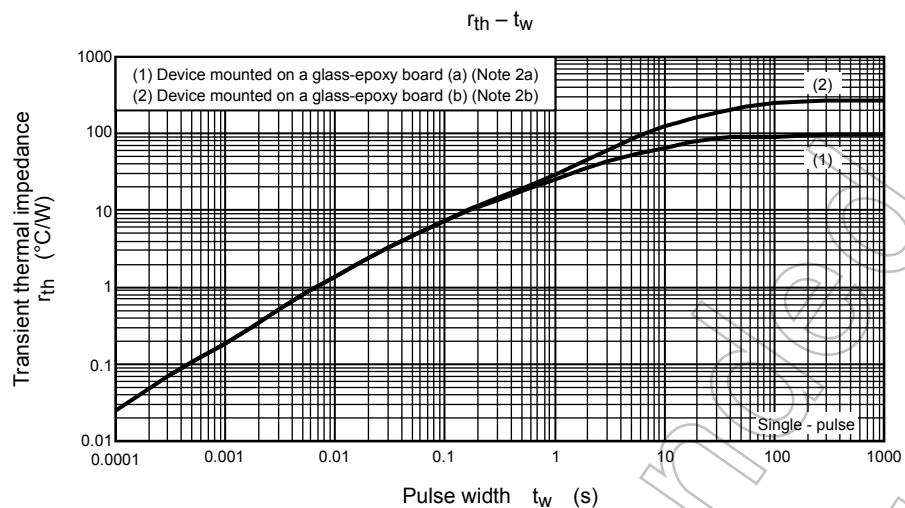
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS} = \pm 20\text{ V}$, $V_{DS} = 0\text{ V}$	—	—	± 100	nA
Drain cut-OFF current	I_{DSS}	$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$	—	—	10	μA
Drain-source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$I_D = 10\text{ mA}$, $V_{GS} = 0\text{ V}$	30	—	—	V
	$V_{(\text{BR})\text{DSX}}$	$I_D = 10\text{ mA}$, $V_{GS} = -20\text{ V}$	15	—	—	
Gate threshold voltage	V_{th}	$V_{DS} = 10\text{ V}$, $I_D = 1\text{ mA}$	1.3	—	2.3	V
Drain-source ON-resistance	$R_{DS\text{ (ON)}}$	$V_{GS} = 4.5\text{ V}$, $I_D = 9\text{ A}$	—	2.6	3.6	$\text{m}\Omega$
		$V_{GS} = 10\text{ V}$, $I_D = 9\text{ A}$	—	2.3	3.2	
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 10\text{ V}$, $I_D = 9\text{ A}$	35	70	—	S
Input capacitance	C_{iss}	$V_{DS} = 10\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	—	6000	7800	pF
Reverse transfer capacitance	C_{rss}		—	380	610	
Output capacitance	C_{oss}		—	1100	—	
Gate resistance	r_g	$V_{DS} = 10\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	—	1.0	1.5	Ω
Switching time	Rise time	t_r		—	5.1	—
	Turn-ON time	t_{on}		—	16	—
	Fall time	t_f		—	11	—
	Turn-OFF time	t_{off}		—	69	—
Total gate charge (gate-source plus gate-drain)	Q_g	$V_{DD} \approx 24\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 18\text{ A}$	—	82	—	nC
		$V_{DD} \approx 24\text{ V}$, $V_{GS} = 5\text{ V}$, $I_D = 18\text{ A}$	—	44	—	
Gate-source charge 1	Q_{gs1}	$V_{DD} \approx 24\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 18\text{ A}$	—	14	—	nC
Gate-drain ("miller") charge	Q_{gd}		—	13	—	
Gate switch charge	Q_{SW}		—	17	—	

Source-Drain Ratings and Characteristics ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current Pulse (Note 1)	I_{DRP}	—	—	—	72	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 18\text{ A}$, $V_{GS} = 0\text{ V}$	—	—	-1.2	V







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20070701-EN GENERAL

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