

TOSHIBA Field Effect Transistor Silicon N-Channel MOS Type (π -MOSV)

TPC8012-H

Switching Regulator Applications
DC/DC Converter Applications

- Low drain-source ON-resistance: $R_{DS(ON)} = 0.28 \Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 1.35 \text{ S}$ (typ.)
- Low leakage current: $I_{DSS} = 100 \mu\text{A}$ (max) ($V_{DS} = 200 \text{ V}$)
- Enhancement mode: $V_{th} = 3.0$ to 5.0 V ($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

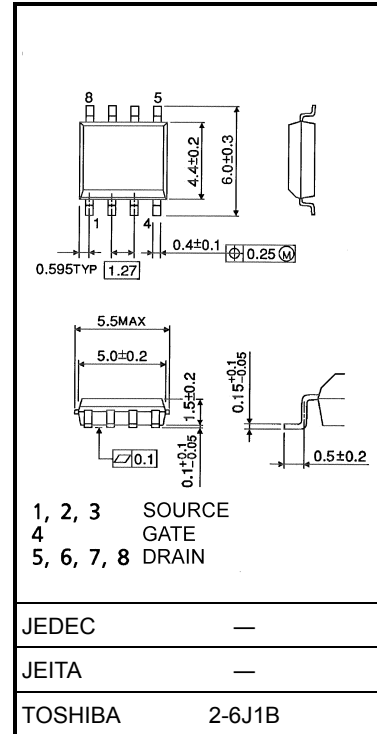
Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	200	V
Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$)		V_{DGR}	200	V
Gate-source voltage		V_{GSS}	± 30	V
Drain current	DC (Note 1)	I_D	1.8	A
	Pulse (Note 1)	I_{DP}	7.2	
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}	2.05	mJ
Avalanche current		I_{AR}	1.8	A
Repetitive avalanche energy (Note 2a) (Note 4)		E_{AR}	0.19	mJ
Channel temperature		T_{ch}	150	$^\circ\text{C}$
Storage temperature range		T_{stg}	-55 to 150	$^\circ\text{C}$

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

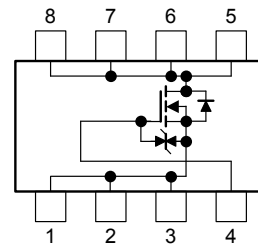
This transistor is an electrostatic-sensitive device. Handle with care.

Unit: mm



Weight: 0.085 g (typ.)

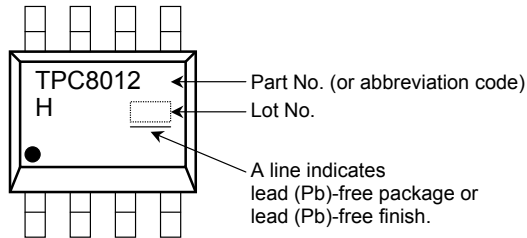
Circuit Configuration



Thermal Characteristics

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

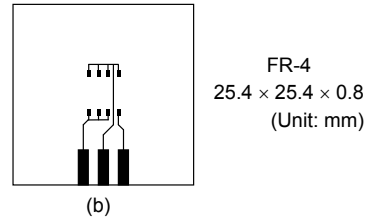
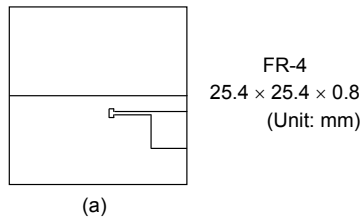
Marking (Note 5)



Note 1: 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)

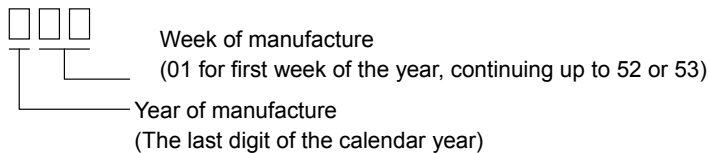


Note 3: $V_{DD} = 50\text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 1.0\text{ mH}$, $R_G = 25\ \Omega$, $I_{AR} = 1.8\text{ A}$

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

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

* Weekly code: (Three digits)

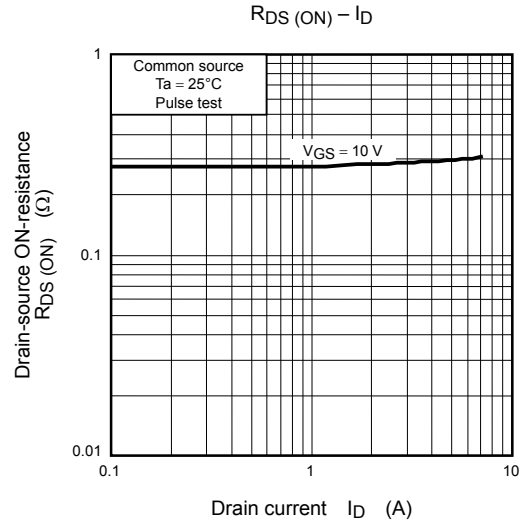
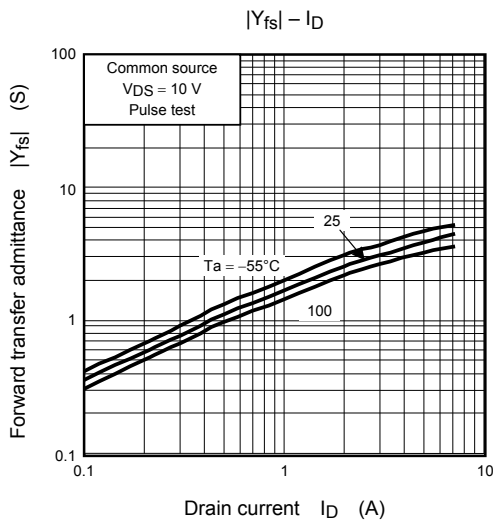
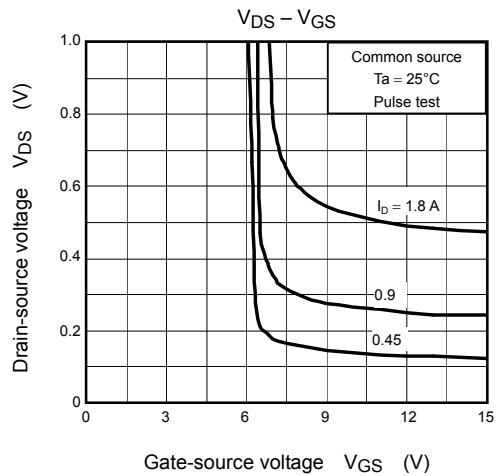
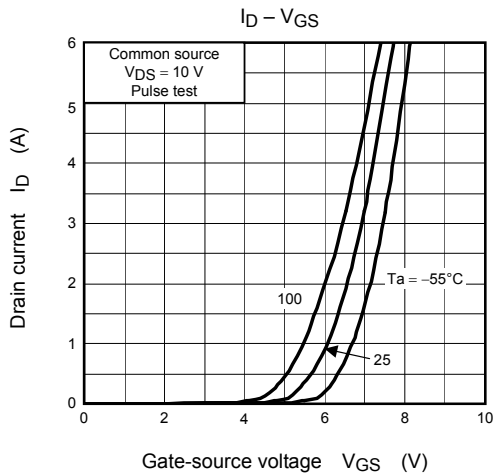
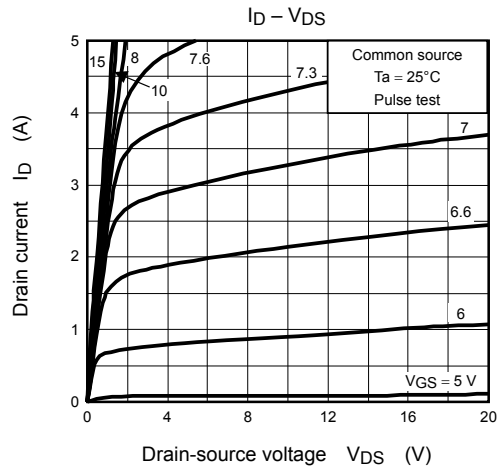
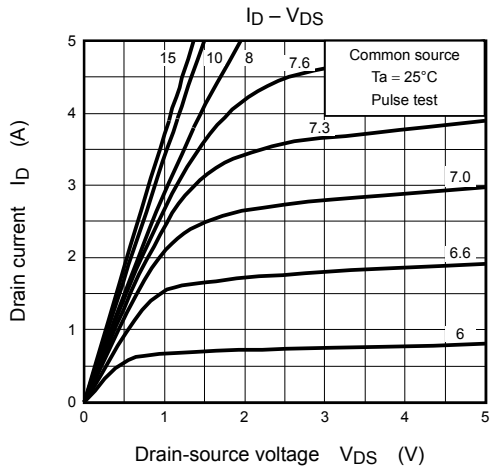


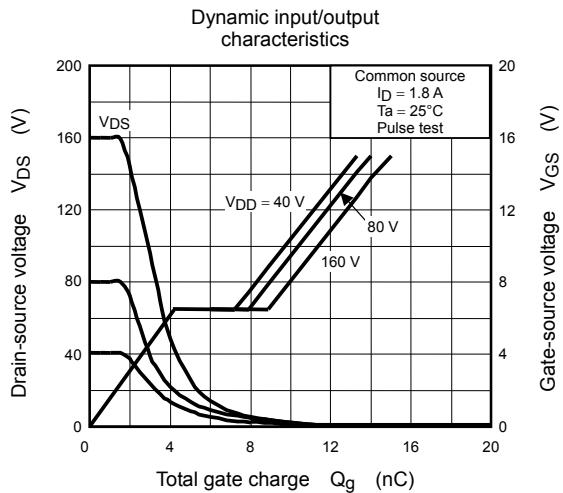
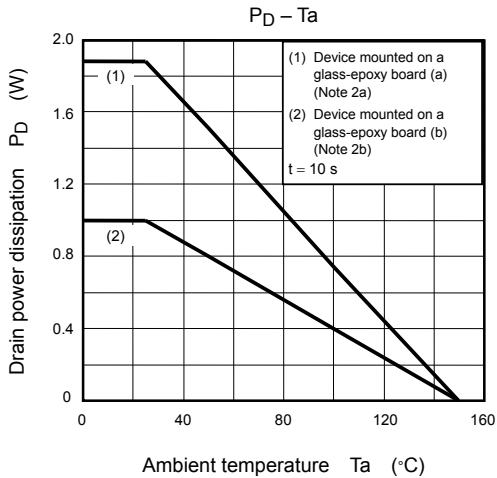
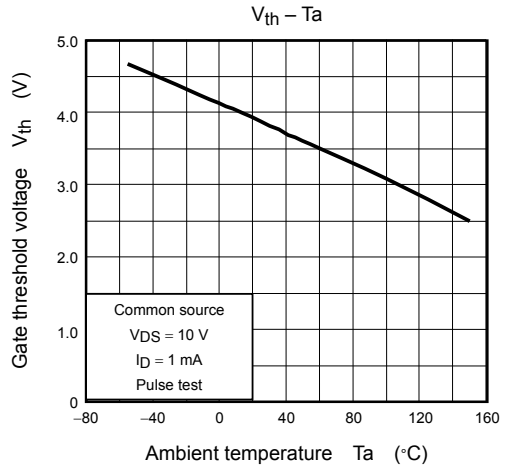
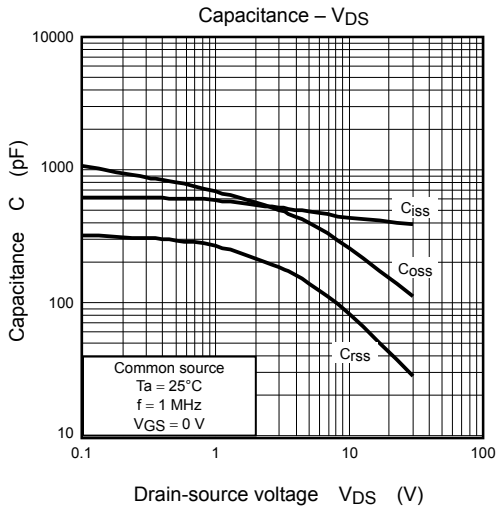
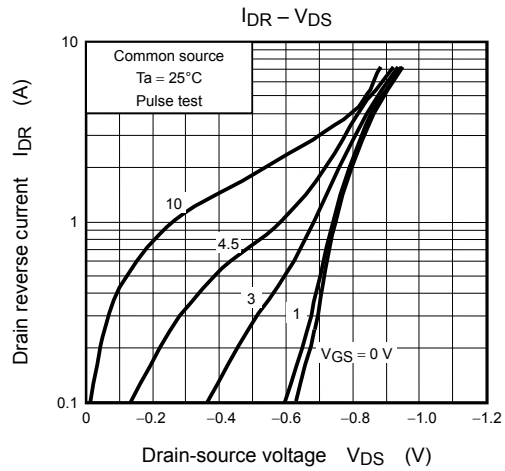
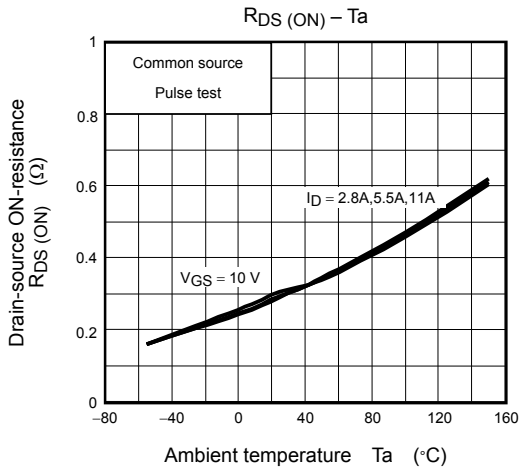
Electrical Characteristics (Ta = 25°C)

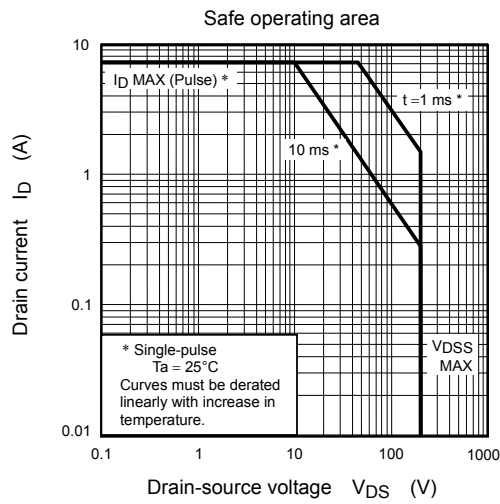
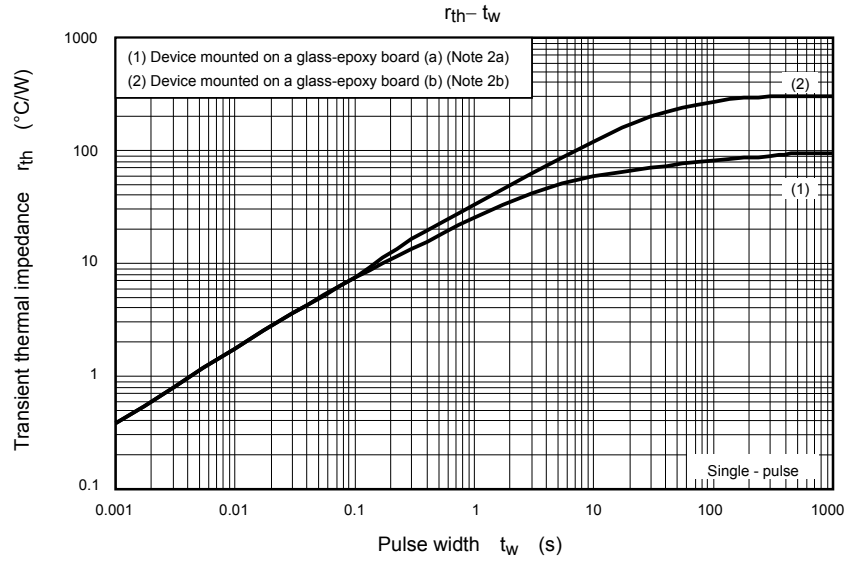
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 25 \text{ V}, V_{DS} = 0 \text{ V}$	—	—	± 10	μA
Drain cutoff current		I_{DSS}	$V_{DS} = 200 \text{ V}, V_{GS} = 0 \text{ V}$	—	—	100	μA
Drain-source breakdown voltage		$V_{(BR)DSS}$	$I_D = 10 \text{ mA}, V_{GS} = 0 \text{ V}$	200	—	—	V
Gate threshold voltage		V_{th}	$V_{DS} = 10 \text{ V}, I_D = 1 \text{ mA}$	3.0	—	5.0	V
Drain-source ON-resistance		$R_{DS(ON)}$	$V_{GS} = 10 \text{ V}, I_D = 0.9 \text{ A}$	—	0.28	0.40	Ω
Forward transfer admittance		$ Y_{fs} $	$V_{DS} = 10 \text{ V}, I_D = 0.9 \text{ A}$	0.65	1.35	—	S
Input capacitance		C_{iss}	$V_{DS} = 10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	—	440	—	pF
Reverse transfer capacitance		C_{riss}		—	80	—	
Output capacitance		C_{oss}		—	260	—	
Switching time	Rise time	t_r	<p>$V_{GS} = 10 \text{ V}$ 0 V $I_D = 0.9 \text{ A}$ V_{OUT} 50Ω 111Ω $V_{DD} \approx 100 \text{ V}$ $Duty \leq 1\%, t_w = 10 \mu\text{s}$</p>	—	23	—	ns
	Turn-on time	t_{on}		—	28	—	
	Fall time	t_f		—	22	—	
	Turn-off time	t_{off}		—	73	—	
Total gate charge (gate-source plus gate-drain)		Q_g	$V_{DD} \approx 160 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 1.8 \text{ A}$	—	11	—	nC
Gate-source charge 1		Q_{gs}		—	6	—	
Gate-drain ("Miller") charge		Q_{gd}		—	5	—	

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

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	Pulse (Note 1)	I_{DRP}	—	—	—	7.2	A
Forward voltage (diode)		V_{DSF}	$I_{DR} = 1.8 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	-1.5	V







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