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 Ω (typ.)
- High forward transfer admittance: $|Y_{fs}|$ = 1.35 S (typ.)
- Low leakage current: I_{DSS} = 100 μA (max) (V_{DS} = 200 V)
- Enhancement mode: V_{th} = 3.0 to 5.0 V (V_{DS} = 10 V, I_D = 1 mA)

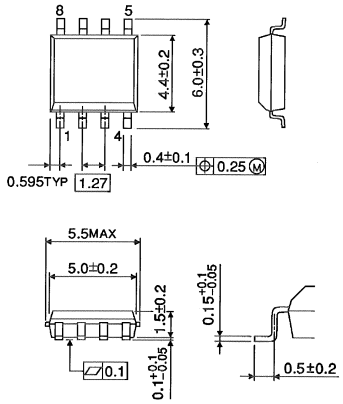
Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	200	V
Drain-gate voltage (R_{GS} = 20 kΩ)		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 s) (Note 2a)		P_D	1.9	W
Drain power dissipation (t = 10 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	°C
Storage temperature range		T_{stg}	−55 to 150	°C

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

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

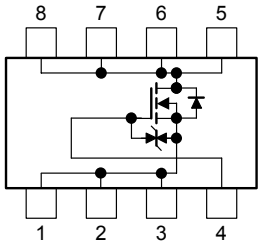
Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	2-6J1B

Weight: 0.085 g (typ.)

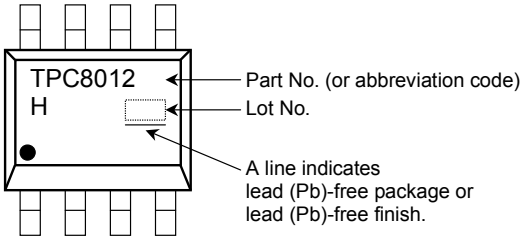
Circuit Configuration



Thermal Characteristics

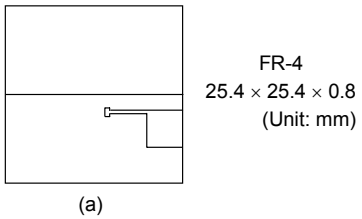
Characteristic	Symbol	Max	Unit
Thermal resistance, channel to ambient (t = 10 s) (Note 2a)	$R_{th\ (ch\text{-}a)}$	65.8	°C/W
Thermal resistance, channel to ambient (t = 10 s) (Note 2b)	$R_{th\ (ch\text{-}a)}$	125	°C/W

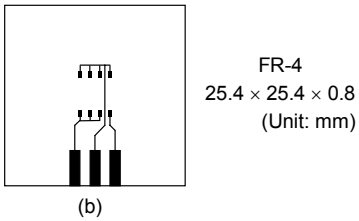
Marking (Note 5)



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)



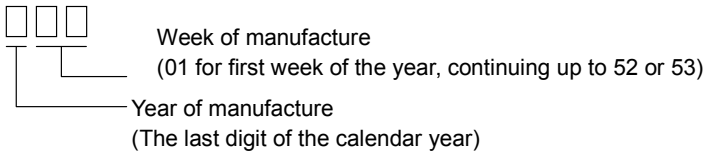


Note 3: V_{DD} = 50 V, T_{ch} = 25°C (initial), L = 1.0 mH, R_G = 25 Ω, I_{AR} = 1.8 A

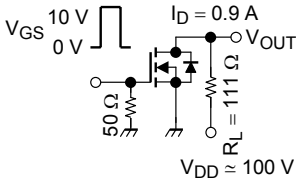
Note 4: Repetitive rating: pulse width limited by maximum channel temperature

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

* Weekly code: (Three digits)



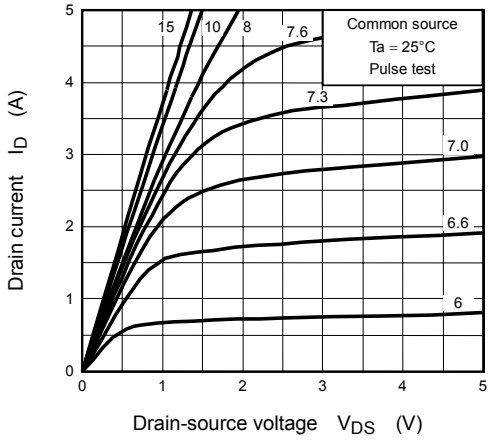
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	V_{GS} = ±25 V, V_{DS} = 0 V	—	—	±10	μA
Drain cutoff current		I_{DSS}	V_{DS} = 200 V, V_{GS} = 0 V	—	—	100	μA
Drain-source breakdown voltage		$V_{(BR)\ DSS}$	I_D = 10 mA, V_{GS} = 0 V	200	—	—	V
Gate threshold voltage		V_{th}	V_{DS} = 10 V, I_D = 1 mA	3.0	—	5.0	V
Drain-source ON-resistance		$R_{DS\ (ON)}$	V_{GS} = 10 V, I_D = 0.9 A	—	0.28	0.40	Ω
Forward transfer admittance		$\|Y_{fs}\|$	V_{DS} = 10 V, I_D = 0.9 A	0.65	1.35	—	S
Input capacitance		C_{iss}	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 MHz	—	440	—	pF
Reverse transfer capacitance		C_{rss}		—	80	—	
Output capacitance		C_{oss}		—	260	—	
Switching time	Rise time	t_r	 Duty ≦ 1%, t_w = 10 μs	—	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} ≃ 160 V, V_{GS} = 10 V, I_D = 1.8 A	—	11	—	nC
Gate-source charge 1		Q_{gs}		—	6	—	
Gate-drain (“Miller”) charge		Q_{gd}		—	5	—	

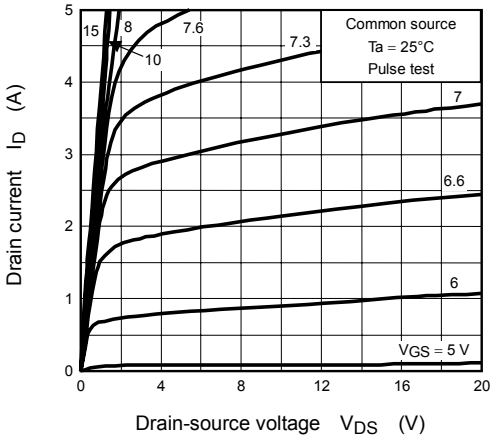
Source-Drain Ratings and Characteristics (Ta = 25°C)

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 A, V_{GS} = 0 V	—	—	−1.5	V

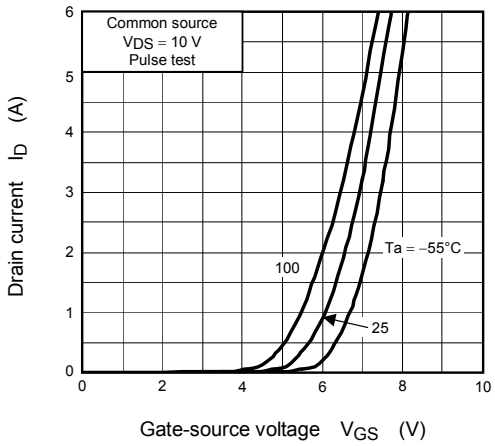
$I_D - V_{DS}$



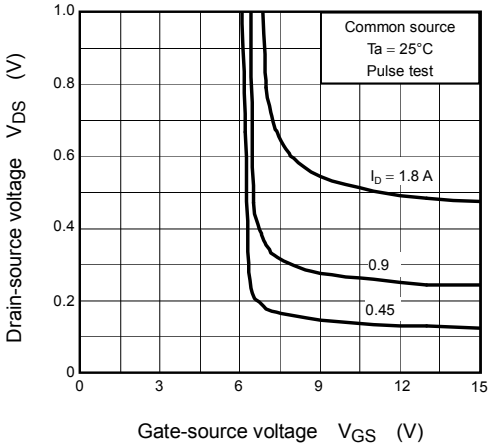
$I_D - V_{DS}$



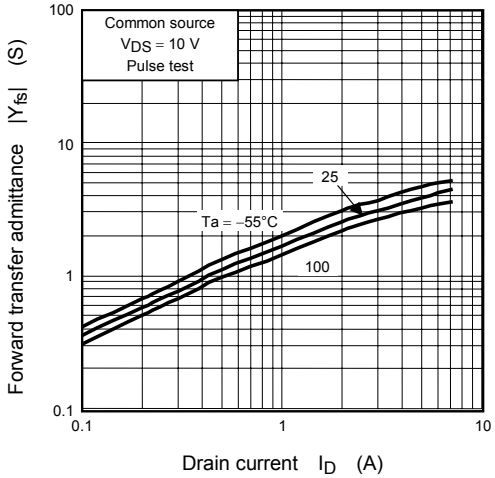
$I_D - V_{GS}$



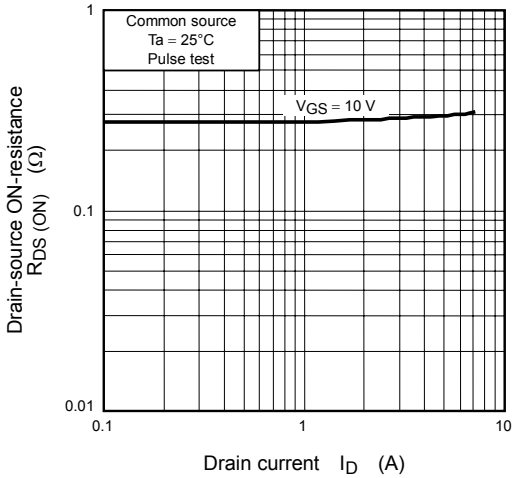
$V_{DS} - V_{GS}$



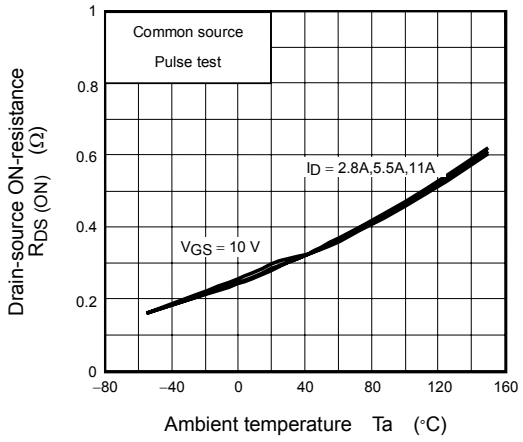
$|Y_{fs}| - I_D$



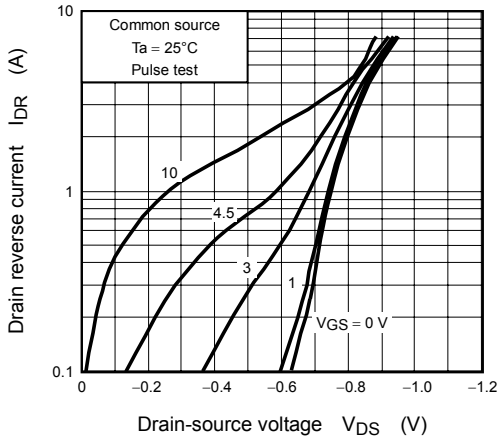
$R_{DS\ (ON)} - I_D$



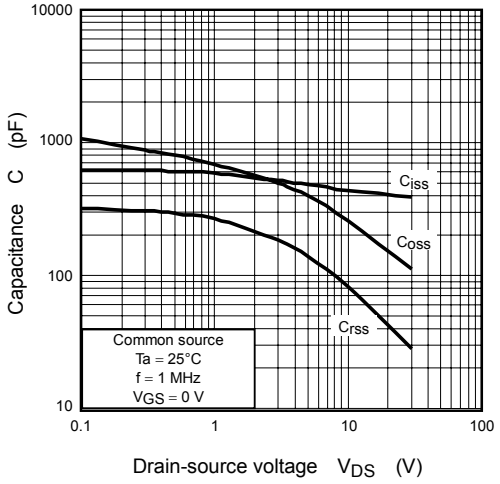
$R_{DS\ (ON)}$ – Ta



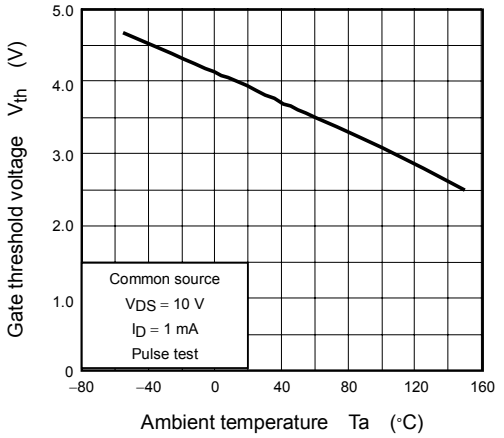
I_{DR} – V_{DS}



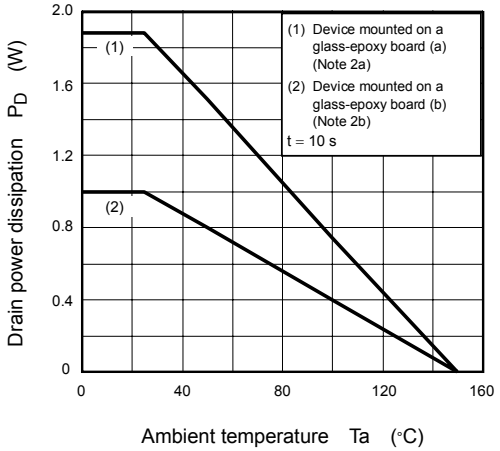
Capacitance – V_{DS}



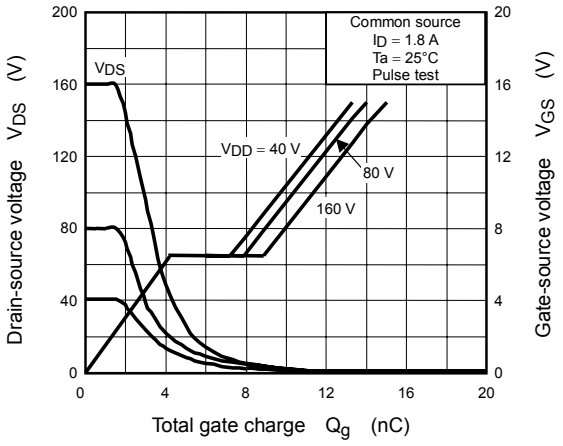
V_{th} – Ta



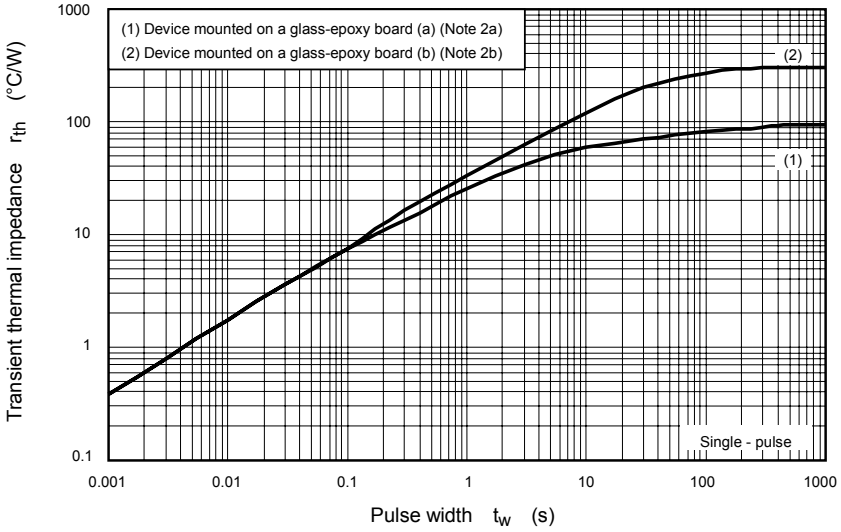
P_D – Ta



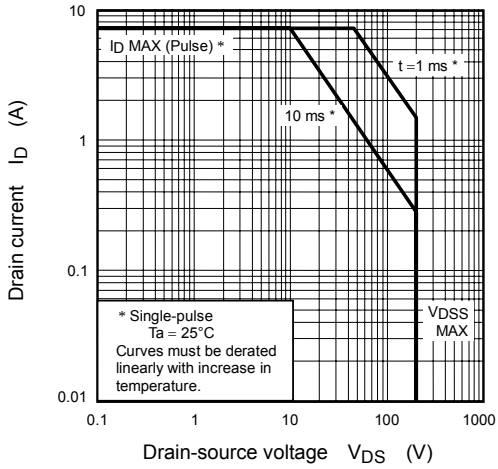
Dynamic input/output characteristics



r_{th}– t_w



Safe operating area



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