

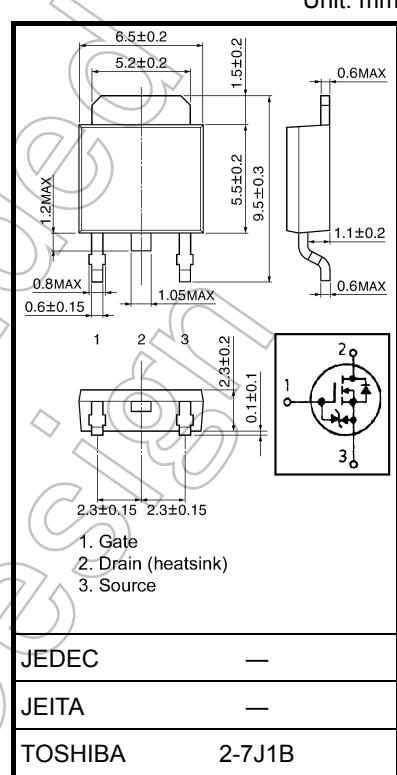
TOSHIBA Field Effect Transistor Silicon N-Channel MOS Type (π -MOSV)**2SK3498**

DC-DC Converter, Relay Drive and Motor Drive Applications

- Low drain-source ON-resistance: $R_{DS(ON)} = 4.2 \Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 0.6 \text{ S}$ (typ.)
- Low leakage current: $I_{DSS} = 100 \mu\text{A}$ (max) ($V_{DS} = 400 \text{ V}$)
- Enhancement mode: $V_{th} = 2.0$ to 4.0 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}	400	V
Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$)	V_{DGR}	400	V
Gate-source voltage	V_{GSS}	± 30	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	20	W
Single-pulse avalanche energy (Note 2)	E_{AS}	113	mJ
Avalanche current	I_{AR}	1	A
Repetitive avalanche energy (Note 3)	E_{AR}	2	mJ
Channel temperature	T_{ch}	150	°C
Storage temperature range	T_{stg}	-55 to 150	°C



Weight: 0.36 g (typ.)

Note: 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).

Thermal Characteristics

Characteristic	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th}(\text{ch-c})$	6.25	°C/W
Thermal resistance, channel to ambient	$R_{th}(\text{ch-a})$	125	°C/W

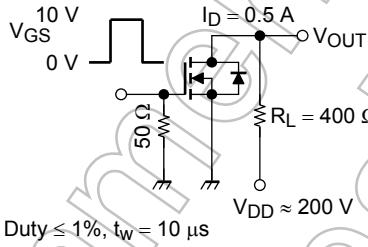
Note 1: Ensure that the channel temperature does not exceed 150°C.

Note 2: $V_{DD} = 90 \text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 183 \text{ mH}$, $R_G = 25 \Omega$, $I_{AR} = 1 \text{ A}$

Note 3: Repetitive rating: pulse width limited by maximum channel temperature

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

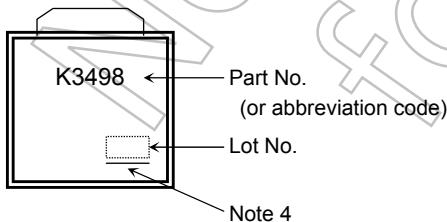
Electrical Characteristics ($T_a = 25^\circ C$)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit	
Gate leakage current	I_{GSS}	$V_{GS} = \pm 25 V, V_{DS} = 0 V$	—	—	± 10	μA	
Gate-source breakdown voltage	$V_{(BR) GSS}$	$I_G = \pm 10 \mu A, V_{DS} = 0 V$	± 30	—	—	V	
Drain cutoff current	I_{DSS}	$V_{DS} = 400 V, V_{GS} = 0 V$	—	—	100	μA	
Drain-source breakdown voltage	$V_{(BR) DSS}$	$I_D = 10 mA, V_{GS} = 0 V$	400	—	—	V	
Gate threshold voltage	V_{th}	$V_{DS} = 10 V, I_D = 1 mA$	2.0	—	4.0	V	
Drain-source ON-resistance	$R_{DS} (\text{ON})$	$V_{GS} = 10 V, I_D = 0.5 A$	—	4.2	5.5	Ω	
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 10 V, I_D = 0.5 A$	0.3	0.6	—	S	
Input capacitance	C_{iss}	$V_{DS} = 10 V, V_{GS} = 0 V, f = 1 \text{ MHz}$	—	145	—	pF	
Reverse transfer capacitance	C_{rss}		—	35	—		
Output capacitance	C_{oss}		—	80	—		
Switching time	Rise time	t_r	 V_{GS} 10 V 0 V $I_D = 0.5 A$ V_{OUT} C 50 $R_L = 400 \Omega$ $V_{DD} \approx 200 V$ Duty $\leq 1\%$, $t_w = 10 \mu s$	—	14	—	ns
	Turn-on time	t_{on}		—	56	—	
	Fall time	t_f		—	26	—	
	Turn-off time	t_{off}		—	75	—	
Total gate charge (gate-source plus gate-drain)	Q_g	$V_{DD} \approx 320 V, V_{GS} = 10 V, I_D = 1 A$	—	5.7	—	nC	
Gate-source charge	Q_{gs}		—	3.0	—		
Gate-drain ("Miller") charge	Q_{gd}		—	2.7	—		

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

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	1	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	3	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 1 A, V_{GS} = 0 V$	—	—	-1.7	V
Reverse recovery time	t_{rr}	$I_{DR} = 1 A, V_{GS} = 0 V,$ $dI_{DR}/dt = 100 A/\mu s$	—	650	—	ns
Reverse recovery charge	Q_{rr}	$dI_{DR}/dt = 100 A/\mu s$	—	14.6	—	μC

Marking

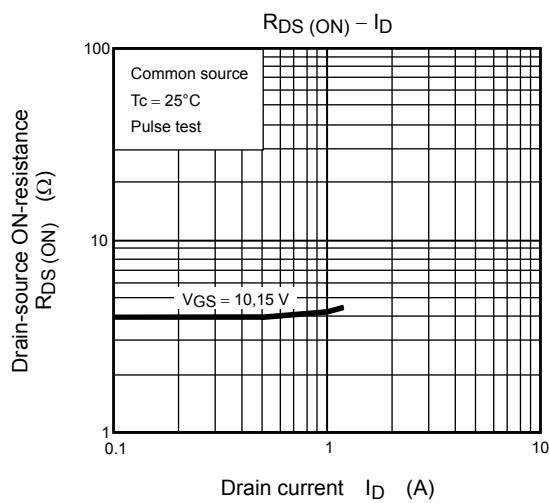
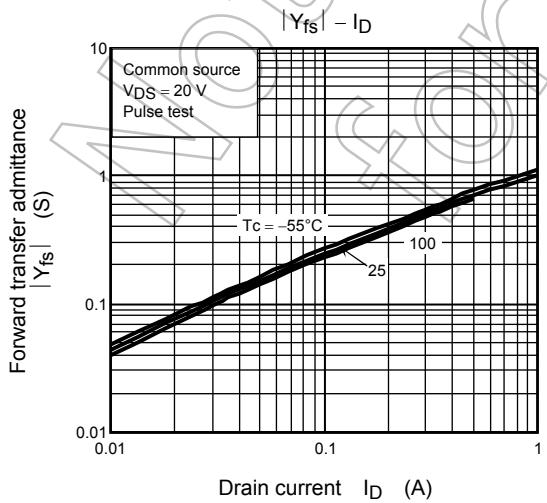
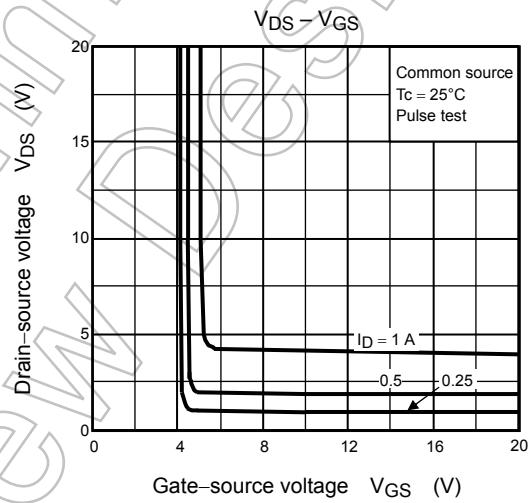
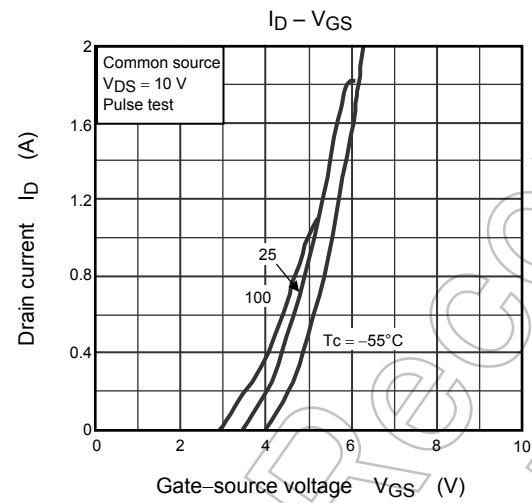
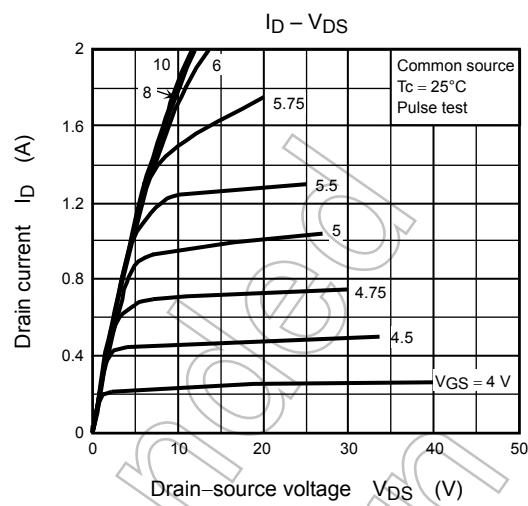
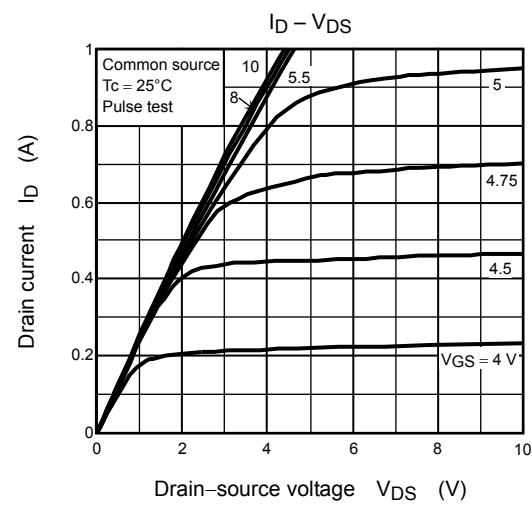


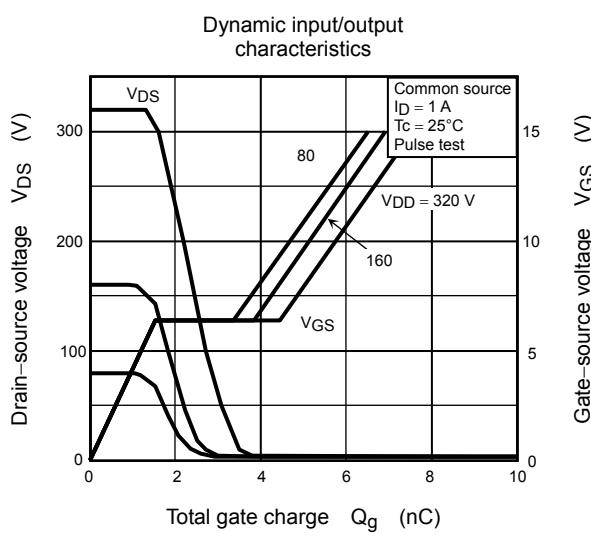
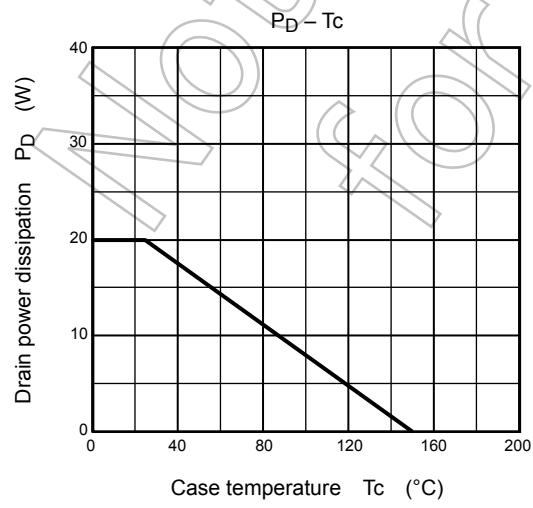
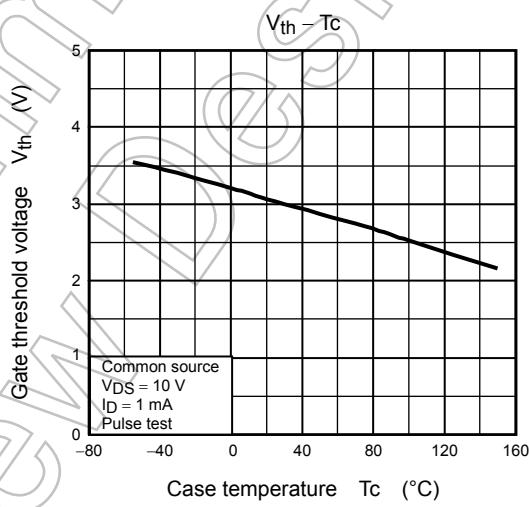
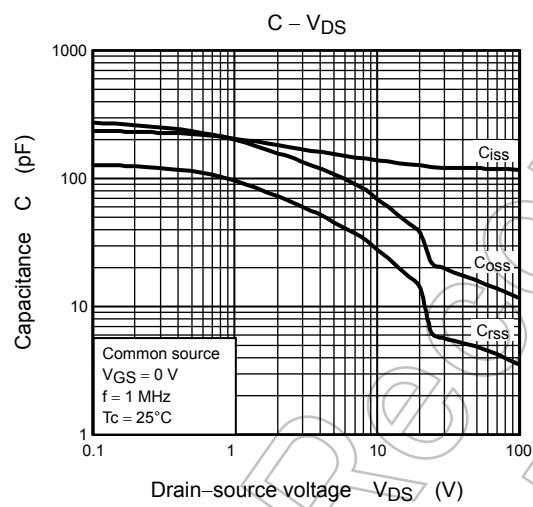
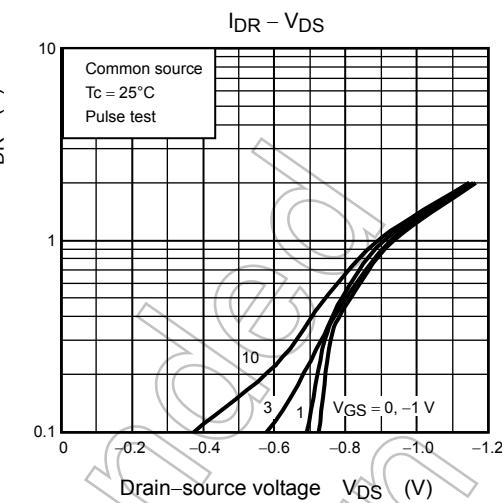
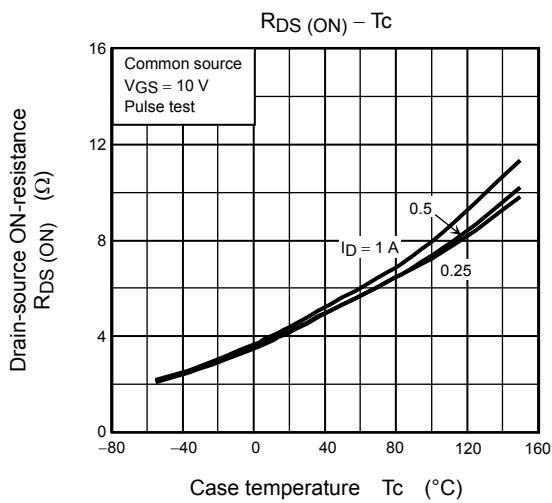
Note 4: A line under a Lot No. identifies the indication of product Labels.

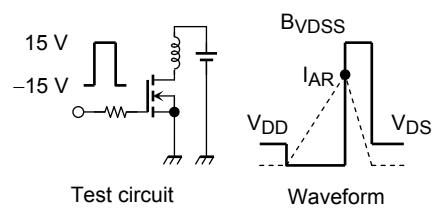
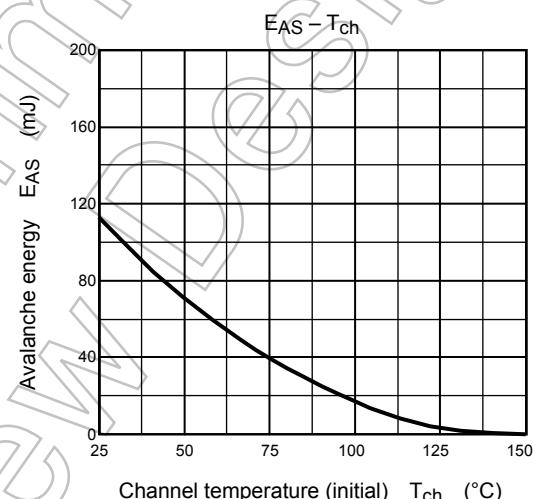
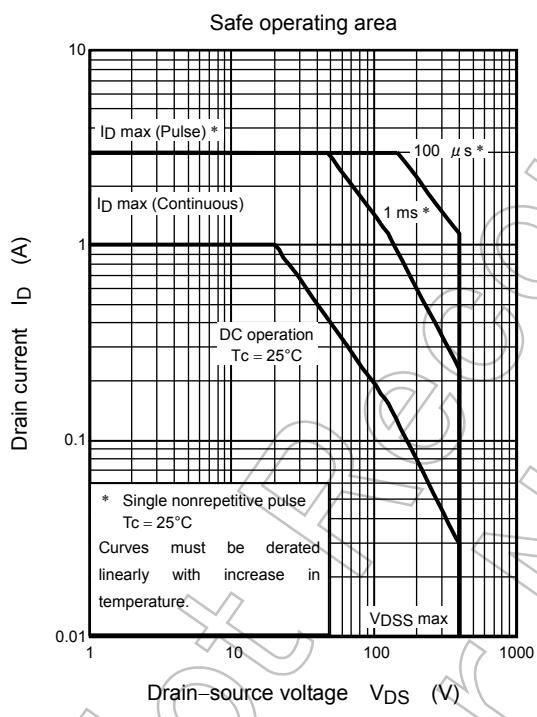
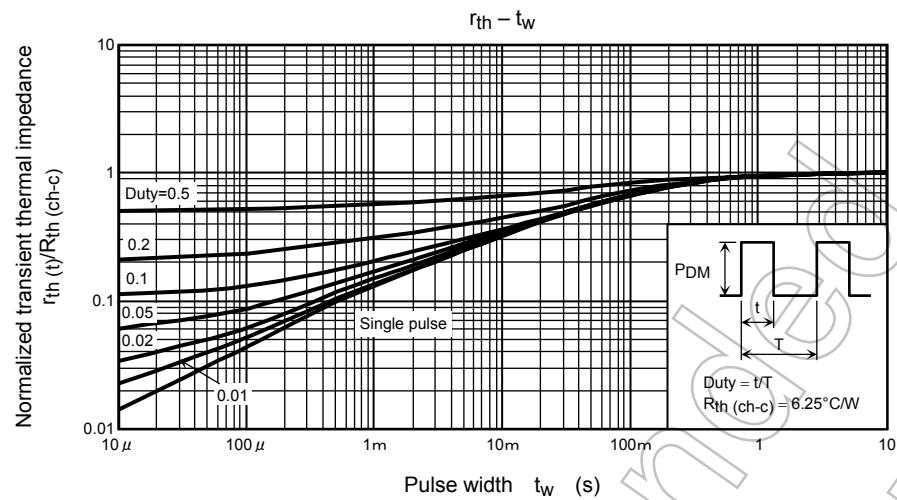
Not underlined: [[Pb]]/INCLUDES > MCV

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$$R_G = 25 \Omega$$

$$V_{DD} = 90 \text{ V}, L = 183 \text{ mH}$$

$$E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{B_{VDSS}}{B_{VDSS} - V_{DD}} \right)$$

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