

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (L^2 - π -MOSV)

2SK2789

Chopper Regulator, DC-DC Converter and Motor Drive Applications

- 4-V gate drive
- Low drain-source ON resistance : $R_{DS\ (ON)} = 66\ m\Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 16\ S$ (typ.)
- Low leakage current : $I_{DSS} = 100\ \mu A$ (max) ($V_{DS} = 100\ V$)
- Enhancement mode : $V_{th} = 0.8$ to $2.0\ V$ ($V_{DS} = 10\ V$, $I_D = 1\ mA$)

Absolute Maximum Ratings ($T_a = 25^\circ C$)

Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	100	V
Drain-gate voltage ($R_{GS} = 20\ k\Omega$)	V_{DGR}	100	V
Gate-source voltage	V_{GSS}	± 20	V
Drain current	DC (Note 1)	I_D	A
	Pulse (Note 1)	I_{DP}	A
Drain power dissipation ($T_c = 25^\circ C$)	P_D	60	W
Single pulse avalanche energy (Note 2)	E_{AS}	193	mJ
Avalanche current	I_{AR}	27	A
Repetitive avalanche energy (Note 3)	E_{AR}	6	mJ
Channel temperature	T_{ch}	150	$^\circ C$
Storage temperature range	T_{stg}	-55 to 150	$^\circ C$

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

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th\ (ch-c)}$	2.08	$^\circ C / W$
Thermal resistance, channel to ambient	$R_{th\ (ch-a)}$	83.3	$^\circ C / W$

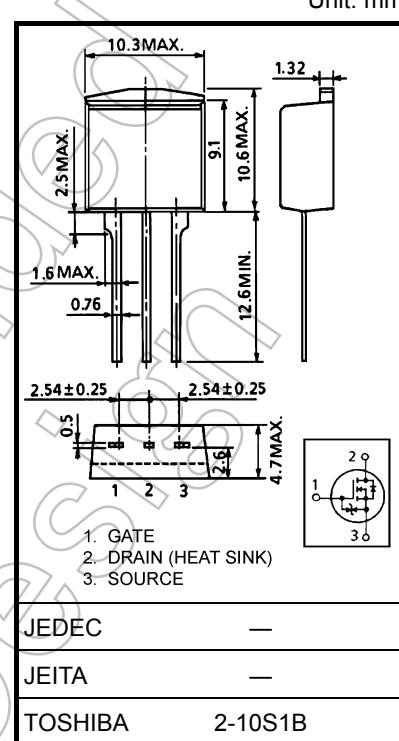
Note 1: Ensure that the channel temperature does not exceed $150^\circ C$.

Note 2: $V_{DD} = 25\ V$, $T_{ch} = 25^\circ C$ (initial), $L = 428\ \mu H$, $I_{AR} = 27\ A$, $R_G = 25\ \Omega$

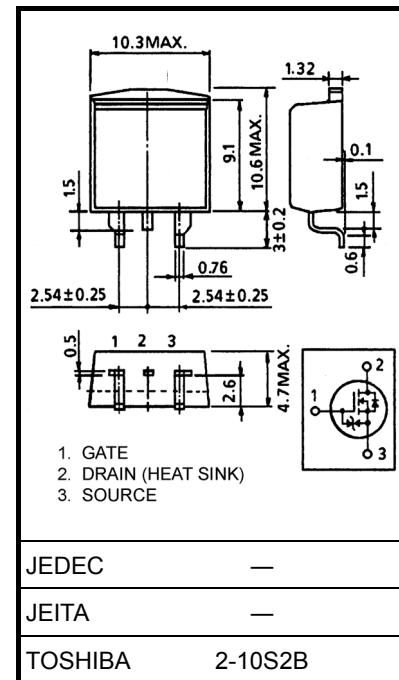
Note 3: Repetitive rating: pulse width limited by maximum channel temperature

This transistor is an electrostatic-sensitive device.

Please handle with caution.

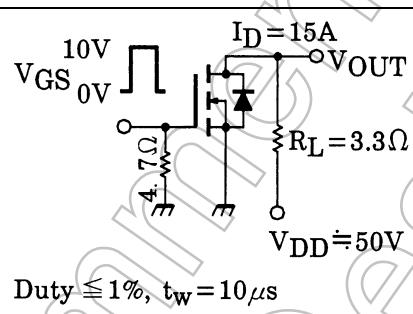


Weight: 1.5 g (typ.)



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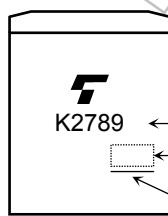
Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0 V	—	—	±10	µA
Drain cut-off current	I _{DS}	V _{DS} = 100 V, V _{GS} = 0 V	—	—	100	µA
Drain-source breakdown voltage	V (BR) DSS	I _D = 10 mA, V _{GS} = 0 V	100	—	—	V
Gate threshold voltage	V _{th}	V _{DS} = 10 V, I _D = 1 mA	0.8	—	2.0	V
Drain-source ON resistance	R _{DS} (ON)	V _{GS} = 4 V, I _D = 15 A V _{GS} = 10 V, I _D = 15 A	— —	0.09 0.066	0.13 0.085	Ω
Forward transfer admittance	Y _{fs}	V _{DS} = 10 V, I _D = 15 A	8	16	—	S
Input capacitance	C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	—	1100	—	pF
Reverse transfer capacitance	C _{rss}		—	180	—	
Output capacitance	C _{oss}		—	400	—	
Rise time	t _r	 Duty ≤ 1%, t _w = 10 µs	—	20	—	ns
Turn-on time	t _{on}		—	30	—	
Fall time	t _f		—	50	—	
Turn-off time	t _{off}		—	140	—	
Total gate charge (gate-source plus gate-drain)	Q _g	V _{DD} ≈ 80 V, V _{GS} = 10 V, I _D = 27 V	—	50	—	nC
Gate-source charge	Q _{gs}		—	34	—	
Gate-drain ("miller") Charge	Q _{gd}		—	16	—	

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I _{DR}	—	—	—	27	A
Pulse drain reverse current (Note 1)	I _{DRP}	—	—	—	108	A
Forward voltage (diode)	V _{DSF}	I _{DR} = 27 A, V _{GS} = 0 V	—	—	-1.7	V
Reverse recovery time	t _{rr}	I _{DR} = 27 A, V _{GS} = 0 V, dI _{DR} / dt = 50 A / µs	—	155	—	ns
Reverse recovery charge	Q _{rr}		—	0.31	—	µC

Marking



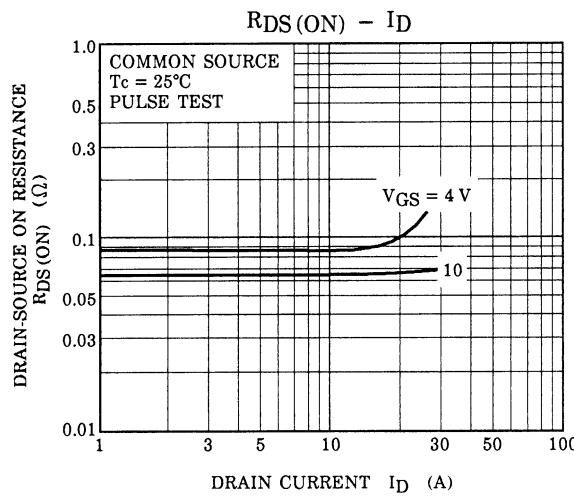
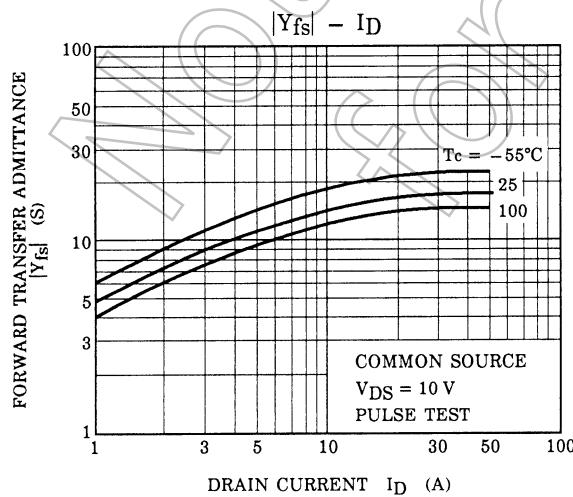
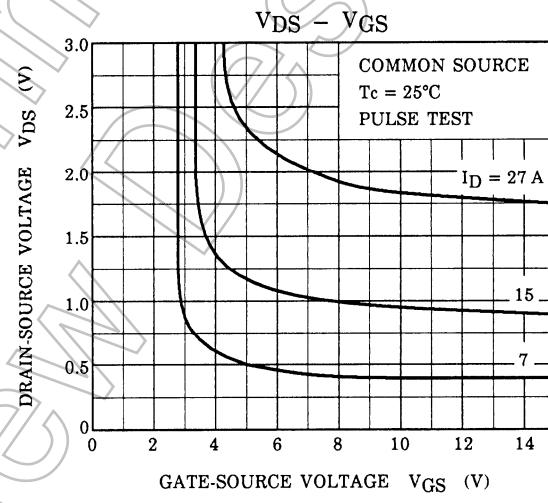
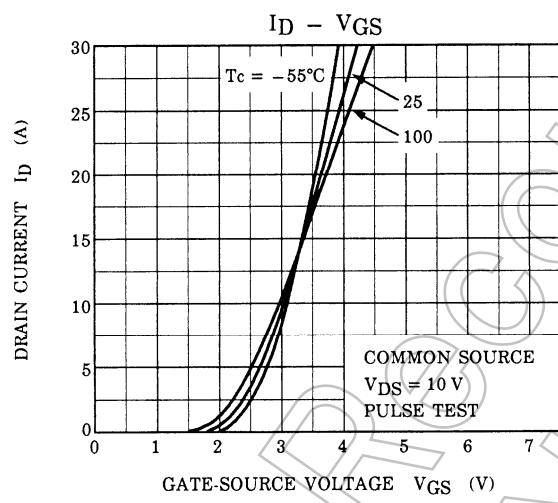
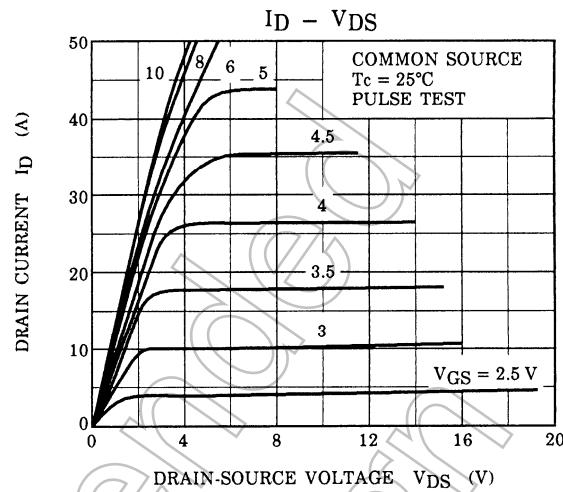
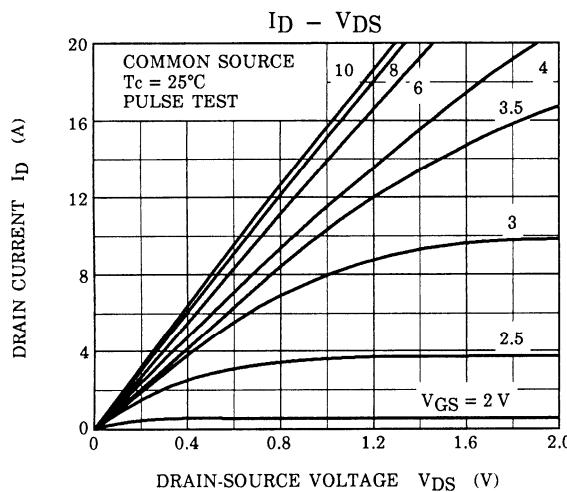
Part No. (or abbreviation code)
Lot No.
Note 4

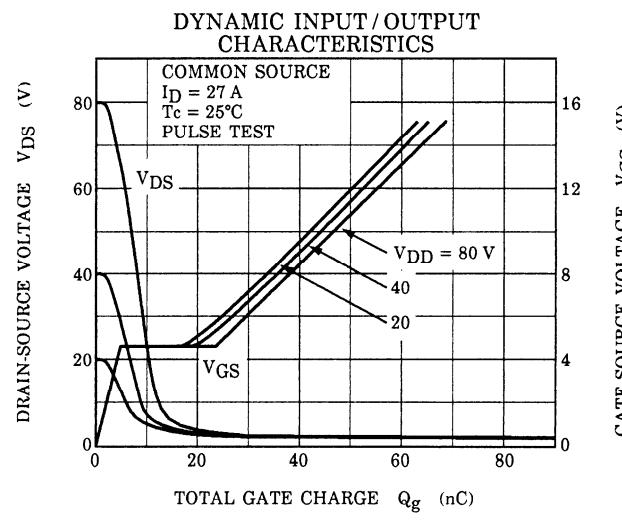
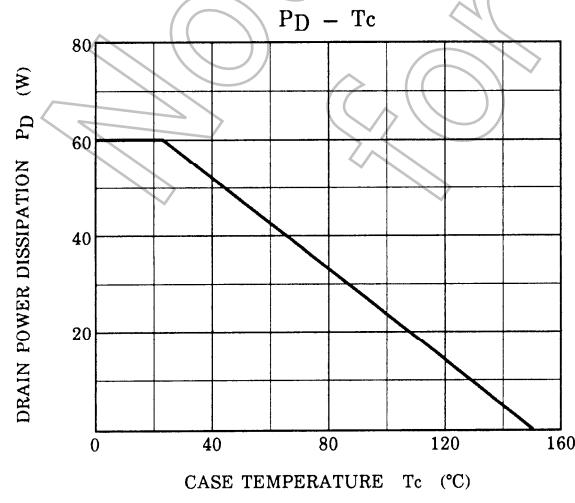
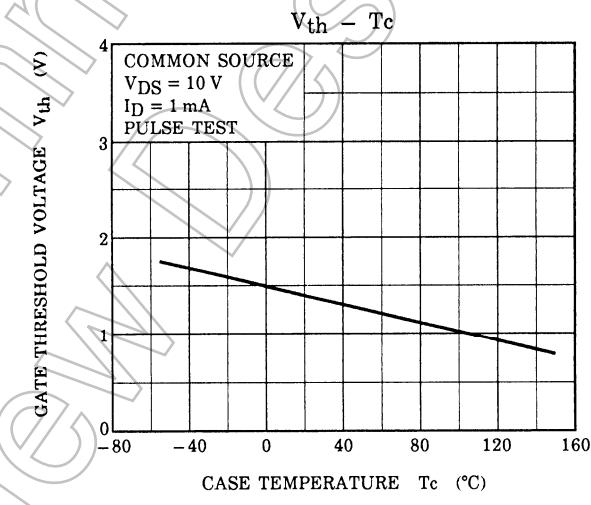
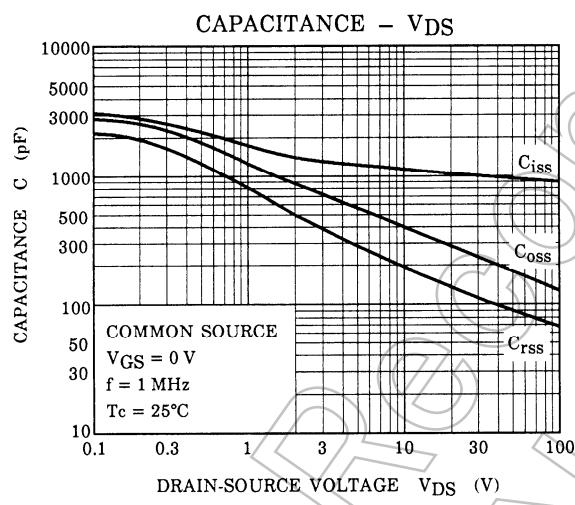
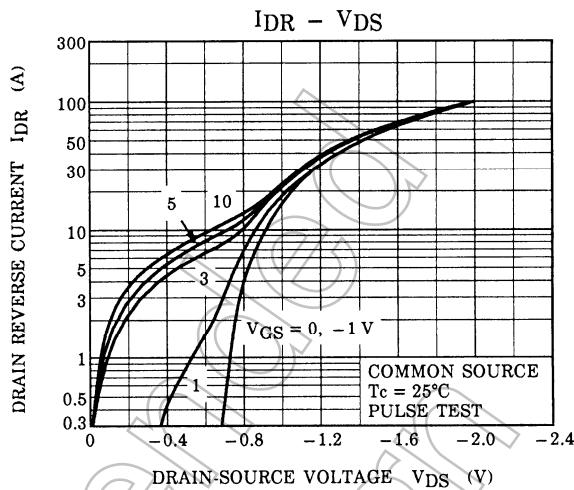
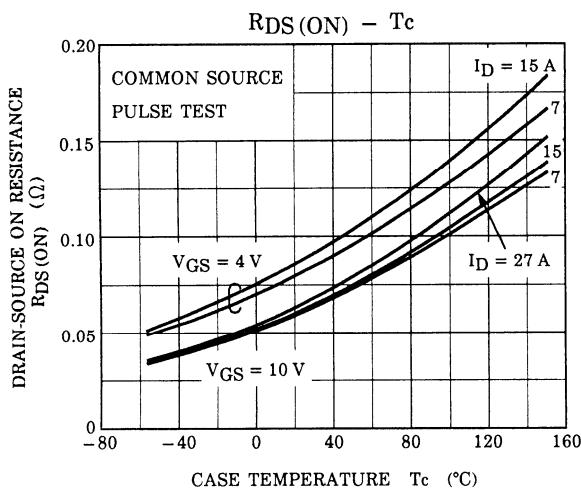
Note 4: A line under a Lot No. identifies the indication of product Labels.

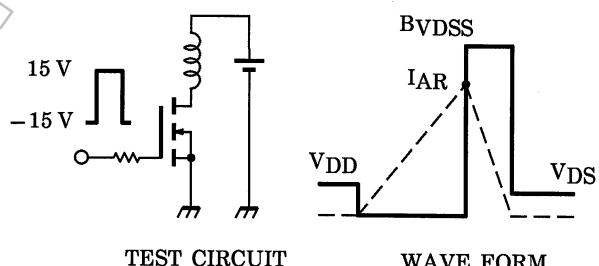
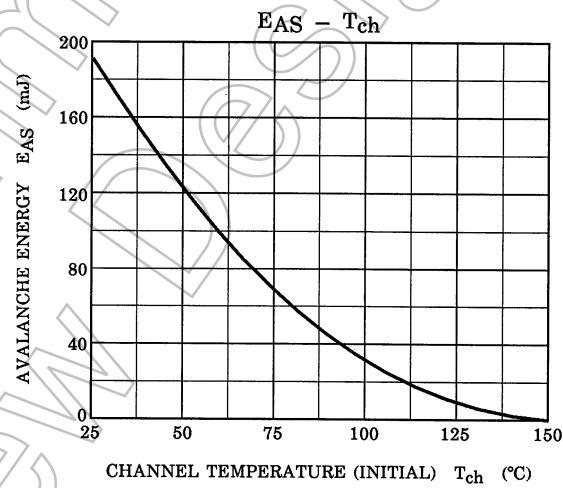
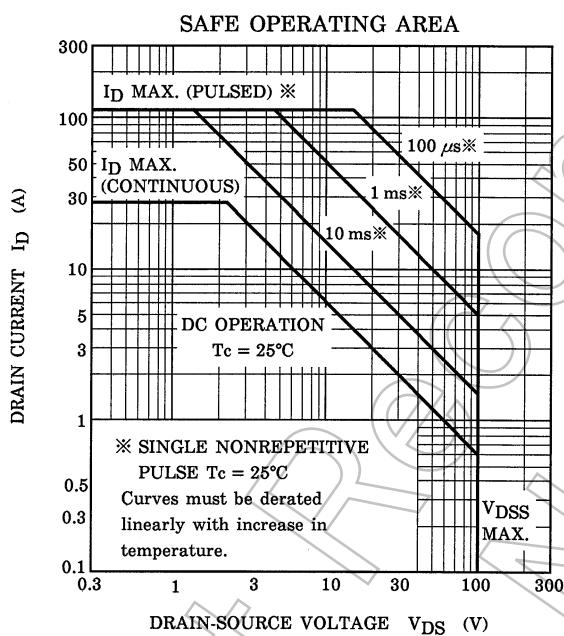
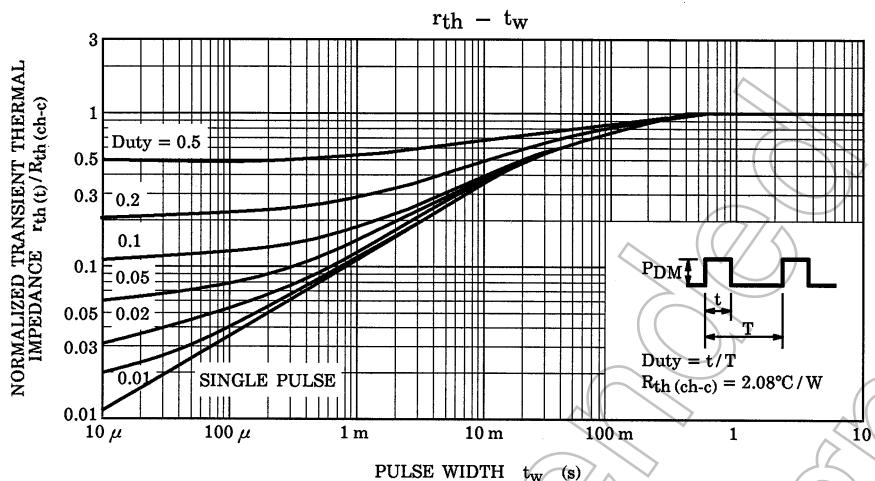
Not underlined: [[Pb]]/INCLUDES > MCV

Underlined: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

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$$R_G = 25\ \Omega$$

$$V_{DD} = 25\ \text{V}, L = 428\ \mu\text{H}$$

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

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