

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

2SK2507

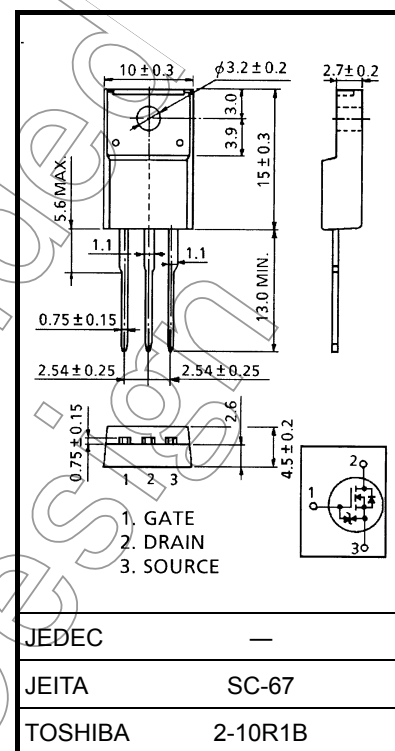
Chopper Regulator, DC-DC Converter and Motor Drive Applications

Unit: mm

- 4-V gate drive
- Low drain-source ON resistance : $R_{DS(ON)} = 0.034 \Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 16 S$ (typ.)
- Low leakage current : $I_{DSS} = 100 \mu A$ (max) ($V_{DS} = 50 V$)
- 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}	50	V
Drain-gate voltage ($R_{GS} = 20 k\Omega$)		V_{DGR}	50	V
Gate-source voltage		V_{GSS}	± 20	V
Drain current	DC (Note 1)	I_D	25	A
	Pulse (Note 1)	I_{DP}	75	
Drain power dissipation ($T_c = 25^\circ C$)		P_D	30	W
Single pulse avalanche energy (Note 2)		E_{AS}	138	mJ
Avalanche current		I_{AR}	25	A
Repetitive avalanche energy (Note 3)		E_{AR}	3	mJ
Channel temperature		T_{ch}	150	$^\circ C$
Storage temperature range		T_{stg}	-55 to 150	$^\circ C$



Weight: 1.9 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

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th(ch-c)}$	4.17	$^\circ C / W$
Thermal resistance, channel to ambient	$R_{th(ch-a)}$	62.5	$^\circ C / W$

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

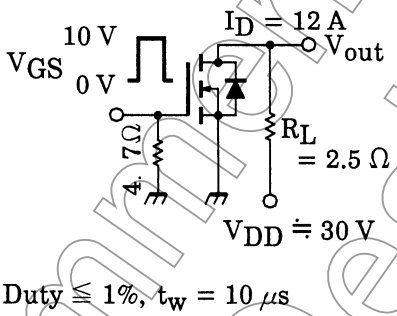
Note 2: $V_{DD} = 25 V$, $T_{ch} = 25^\circ C$ (initial), $L = 272 \mu H$, $R_G = 25 \Omega$, $I_{AR} = 25 A$

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

This transistor is an electrostatic-sensitive device.

Please handle with caution.

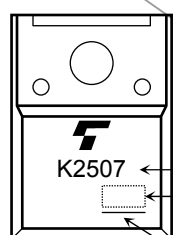
Electrical Characteristics (Ta = 25°C)

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 _{DSS}	V _{DS} = 50 V, V _{GS} = 0 V	—	—	100	μA
Drain-source breakdown voltage		V _(BR) DSS	I _D = 10 mA, V _{GS} = 0 V	50	—	—	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 = 6 A	—	0.058	0.08	Ω
			V _{GS} = 10 V, I _D = 12 A	—	0.034	0.046	
Forward transfer admittance		Y _{fs}	V _{DS} = 10 V, I _D = 12 A	8.0	16	—	S
Input capacitance		C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	—	900	—	pF
Reverse transfer capacitance		C _{rss}		—	130	—	
Output capacitance		C _{oss}		—	370	—	
Switching time	Rise time	t _r		—	15	—	ns
	Turn-on time	t _{on}		—	25	—	
	Fall time	t _f		—	30	—	
	Turn-off time	t _{off}		—	110	—	
Total gate charge (Gate-source plus gate-drain)		Q _g	V _{DD} ≈ 40 V, V _{GS} = 10 V, I _D = 25 A	—	25	—	nC
Gate-source charge		Q _{gs}		—	19	—	
Gate-drain ("miller") charge		Q _{gd}		—	6	—	

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I _{DR}	—	—	—	25	A
Pulse drain reverse current (Note 1)	I _{DRP}	—	—	—	75	A
Forward voltage (diode)	V _{DSF}	I _{DR} = 25 A, V _{GS} = 0 V	—	—	-1.6	V
Reverse recovery time	t _{rr}	I _{DR} = 25 A, V _{GS} = 0 V, dI _{DR} / dt = 50 A / μs	—	60	—	ns
Reverse recovery charge	Q _{rr}		—	45	—	μC

Marking



Part No. (or abbreviation code)
Lot No.

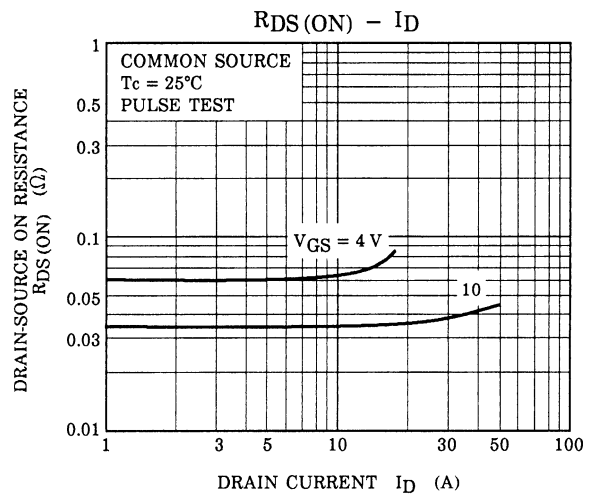
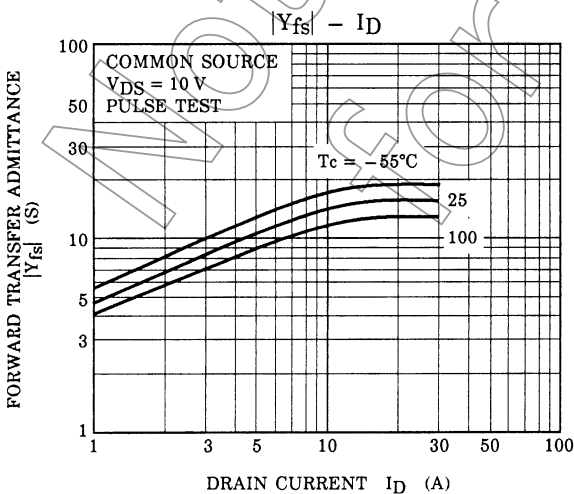
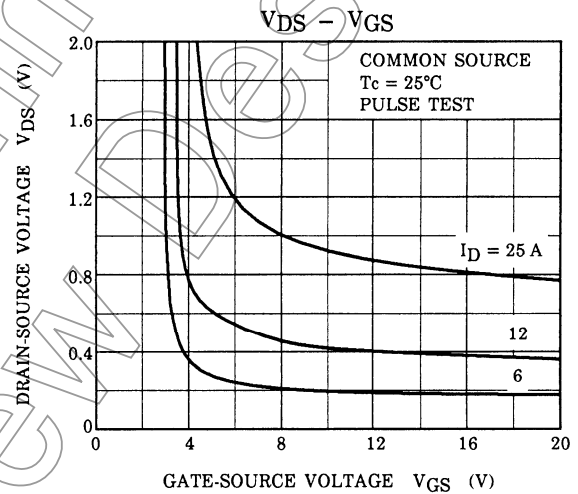
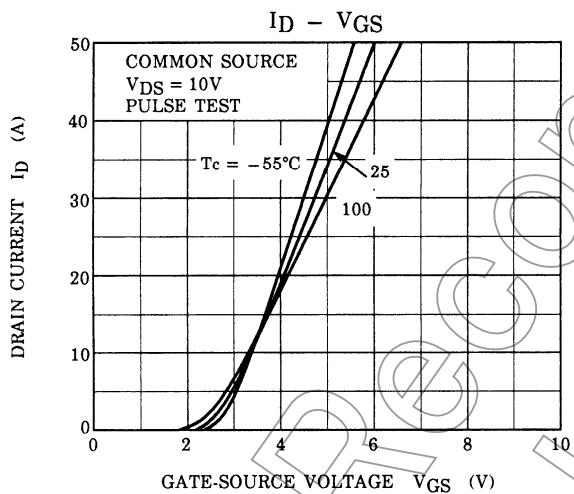
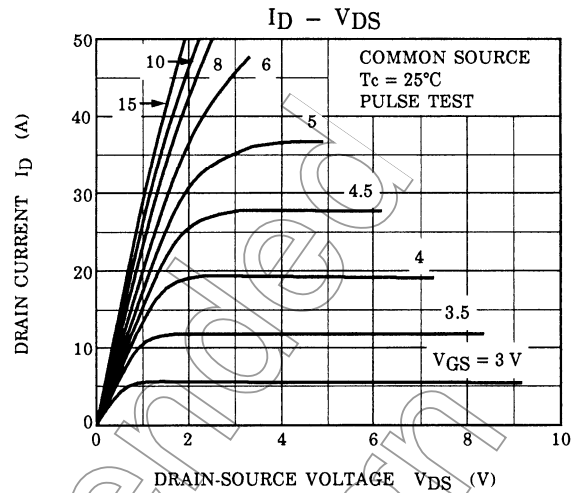
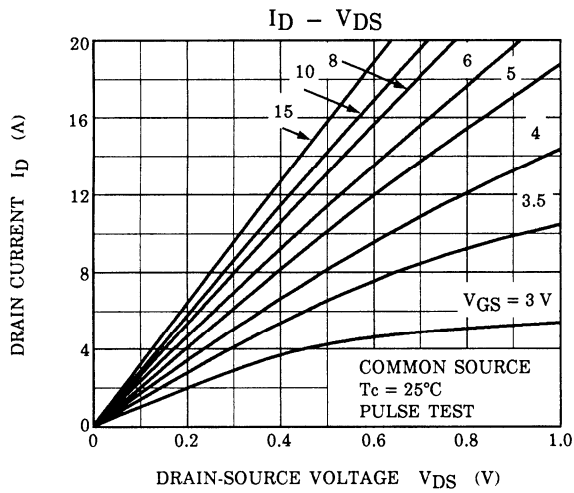
Note 4

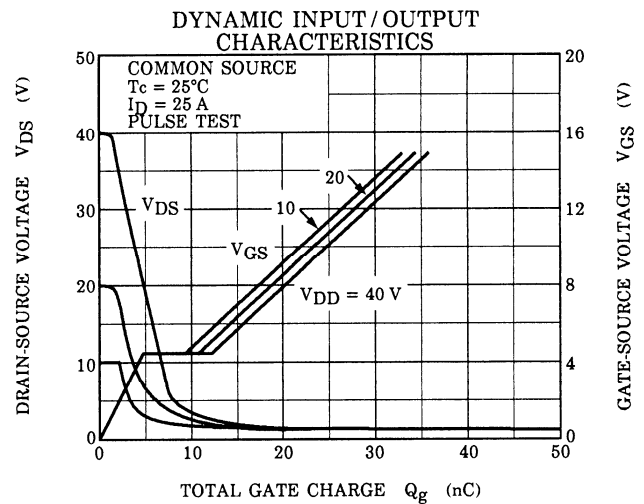
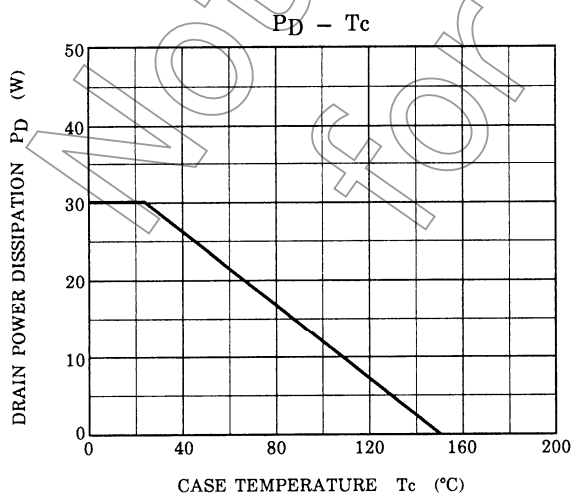
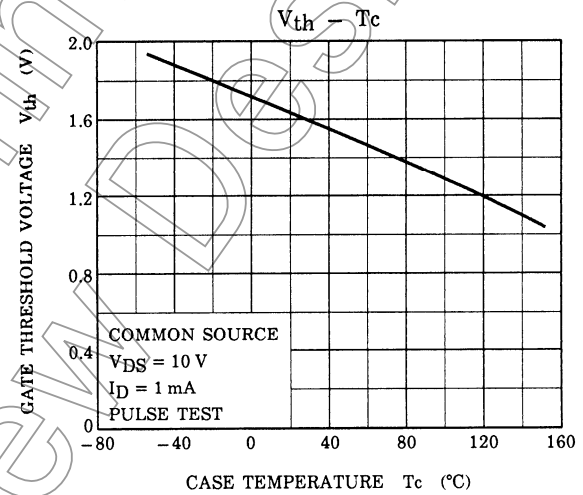
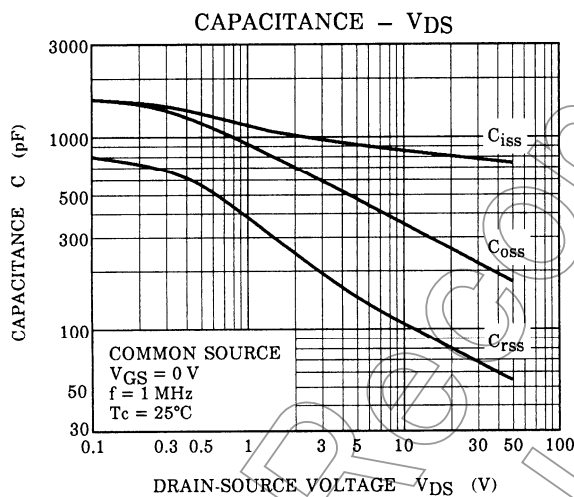
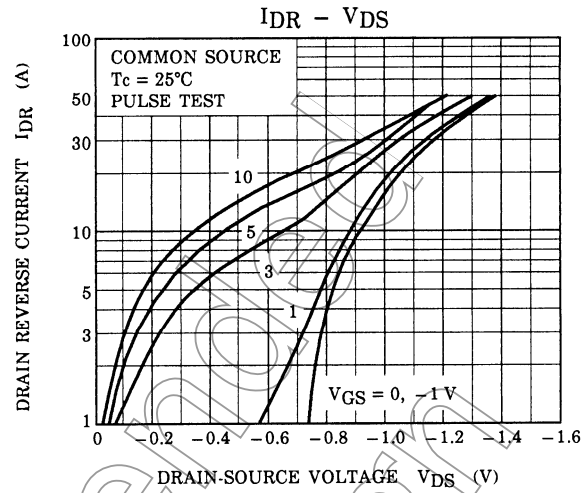
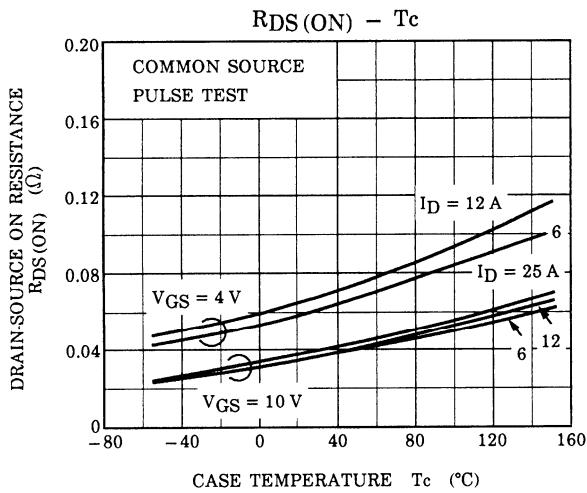
Note 4: A line under a Lot No. identifies the indication of product Labels.

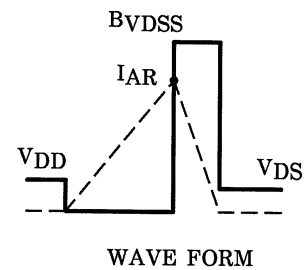
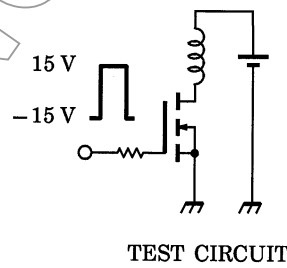
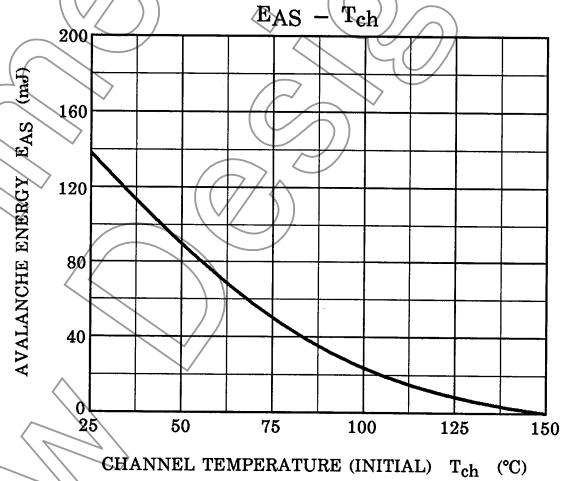
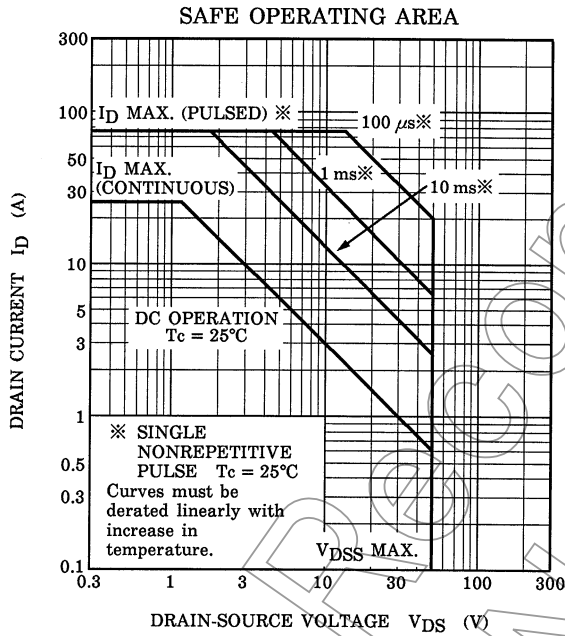
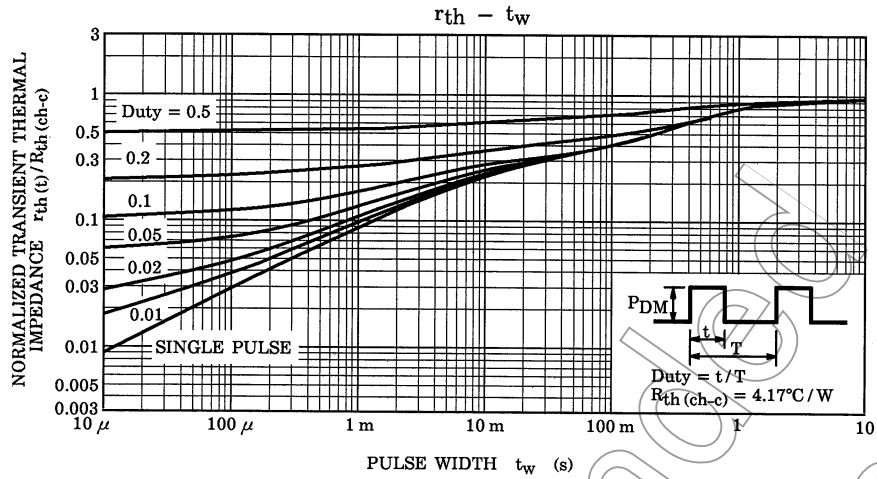
Not underlined: [[Pb]]/INCLUDES > MCV

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

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$$R_G = 25 \, \Omega$$

$$V_{DD} = 25 \, \text{V}, L = 272 \, \mu\text{H}$$

$$EAS = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{BVDSS}{BVDSS - V_{DD}} \right)$$

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