

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

2SK2782

Chopper Regulator, DC-DC Converter and Motor Drive Applications

- 4 V gate drive
- Low drain-source ON resistance : $R_{DS(ON)} = 0.039 \Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 11 S$ (typ.)
- Low leakage current : $I_{DSS} = 100 \mu A$ (max) ($V_{DS} = 60 V$)
- Enhancement-mode : $V_{th} = 0.8 \sim 2.0 V$ ($V_{DS} = 10 V, I_D = 1 mA$)

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

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	60	V
Drain-gate voltage ($R_{GS} = 20 k\Omega$)		V_{DGR}	60	V
Gate-source voltage		V_{GSS}	± 20	V
Drain current	DC (Note 1)	I_D	20	A
	Pulse (Note 1)	I_{DP}	50	A
Drain power dissipation ($T_c = 25^\circ C$)		P_D	40	W
Single pulse avalanche energy (Note 2)		E_{AS}	156	mJ
Avalanche current		I_{AR}	20	A
Repetitive avalanche energy (Note 3)		E_{AR}	4	mJ
Channel temperature		T_{ch}	150	$^\circ C$
Storage temperature range		T_{stg}	$-55 \sim 150$	$^\circ C$

Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th(ch-c)}$	3.125	$^\circ C / W$
Thermal resistance, channel to ambient	$R_{th(ch-a)}$	125	$^\circ C / W$

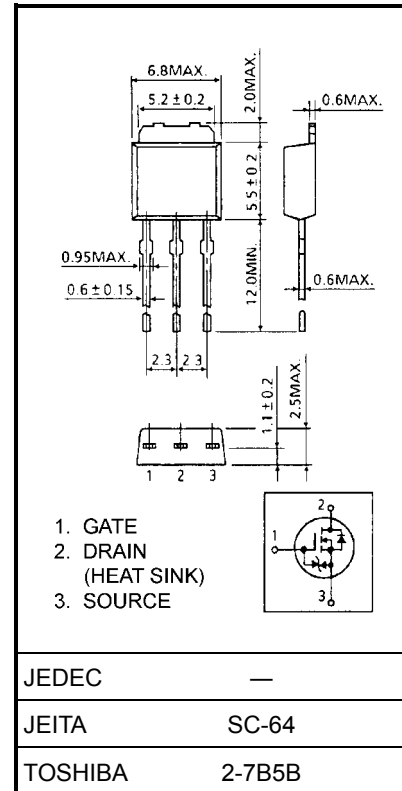
Note 1: Please use devices on condition that the channel temperature is below $150^\circ C$.

Note 2: $V_{DD} = 25 V, T_{ch} = 25^\circ C$ (initial), $L = 530 \mu H, R_G = 25 \Omega, I_D = 20 A$

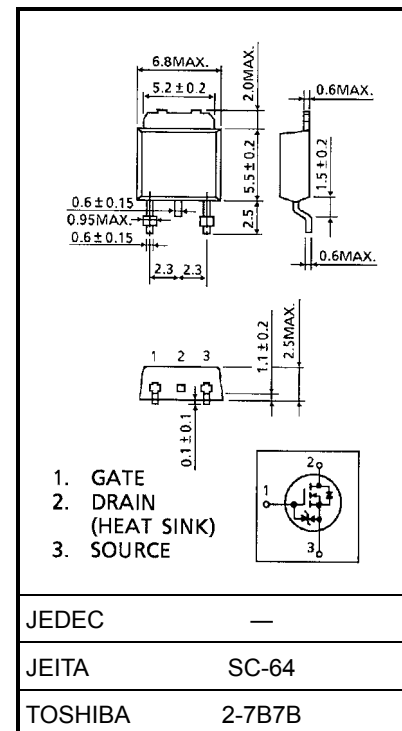
Note 3: Repetitive rating: Pulse width limited by maximum channel temperature

This transistor is an electrostatic sensitive device. Please handle with caution.

Unit: mm



Weight: 0.36 g (typ.)



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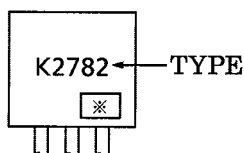
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 16 \text{ V}, V_{DS} = 0 \text{ V}$	—	—	± 10	μA
Drain cut-off current		I_{DSS}	$V_{DS} = 60 \text{ V}, V_{GS} = 0 \text{ V}$	—	—	100	μA
Drain-source breakdown voltage		$V_{(BR)DSS}$	$I_D = 10 \text{ mA}, V_{GS} = 0 \text{ V}$	60	—	—	V
Gate threshold voltage		V_{th}	$V_{DS} = 10 \text{ V}, I_D = 1 \text{ mA}$	0.8	—	2.0	V
Drain-source ON resistance		$R_{DS(ON)}$	$V_{DS} = 4 \text{ V}, I_D = 5 \text{ A}$	—	0.06	0.09	Ω
			$V_{DS} = 10 \text{ V}, I_D = 10 \text{ A}$	—	0.039	0.055	
Forward transfer admittance		$ Y_{fs} $	$V_{DS} = 10 \text{ V}, I_D = 10 \text{ A}$	7	11	—	S
Input capacitance		C_{iss}	$V_{DS} = 10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	—	880	—	pF
Reverse transfer capacitance		C_{rss}		—	90	—	
Output capacitance		C_{oss}		—	330	—	
Switching time	Rise time	t_r	<p>$I_D = 10 \text{ A}$ $V_{GS} = 10 \text{ V}$ 0 V 4.7Ω $R_L = 3.0 \Omega$ $V_{DD} \approx 30 \text{ V}$ V_{OUT} Duty $\leq 1\%$, $t_W = 10 \mu\text{s}$</p>	—	15	—	ns
	Turn-on time	t_{on}		—	25	—	
	Fall time	t_f		—	30	—	
	Turn-off time	t_{off}		—	100	—	
Total gate charge (gate-source plus gate-drain)		Q_g	$V_{DD} \approx 48 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 20 \text{ A}$	—	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}	—	—	—	20	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	50	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 20 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	-2.0	V
Reverse recovery time	t_{rr}	$I_{DR} = 20 \text{ A}, V_{GS} = 0 \text{ V}, dI_{DR} / dt = 50 \text{ A} / \mu\text{s}$	—	60	—	ns
Reverse recovery charge	Q_{rr}		—	45	—	μC

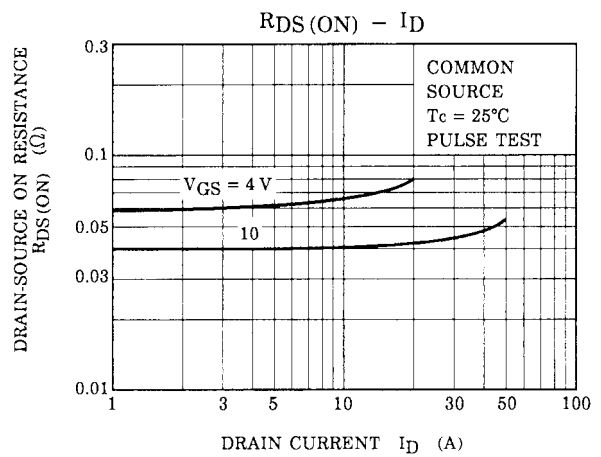
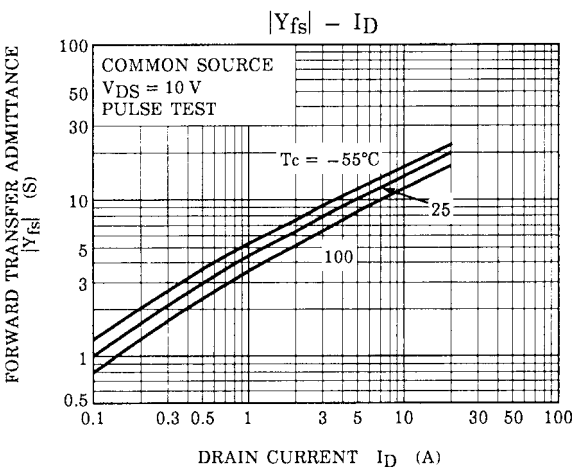
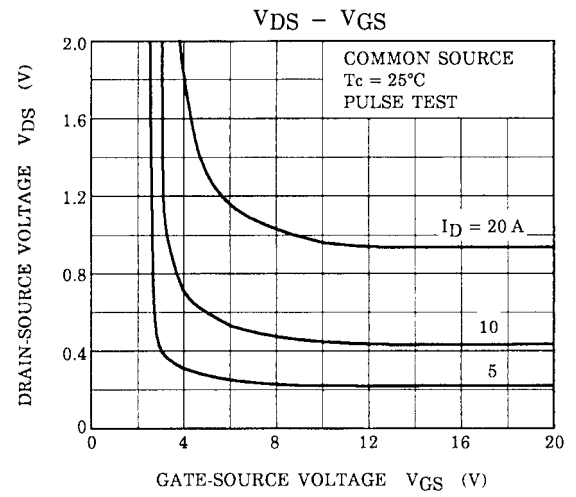
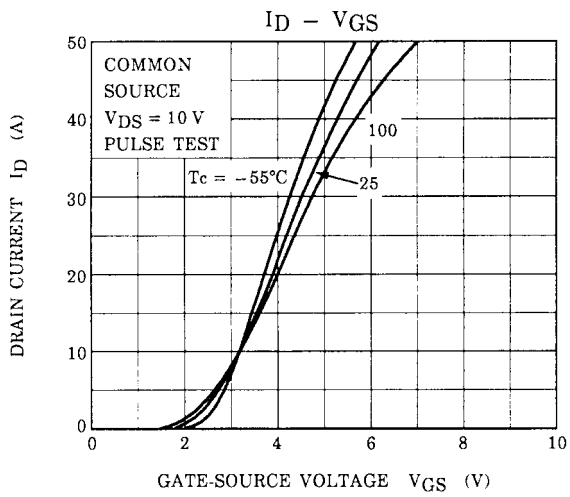
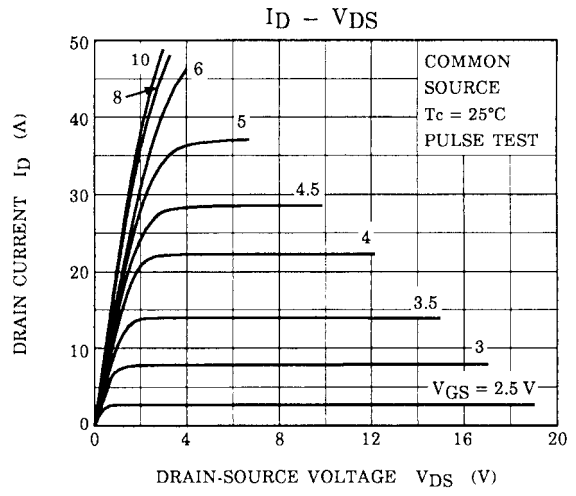
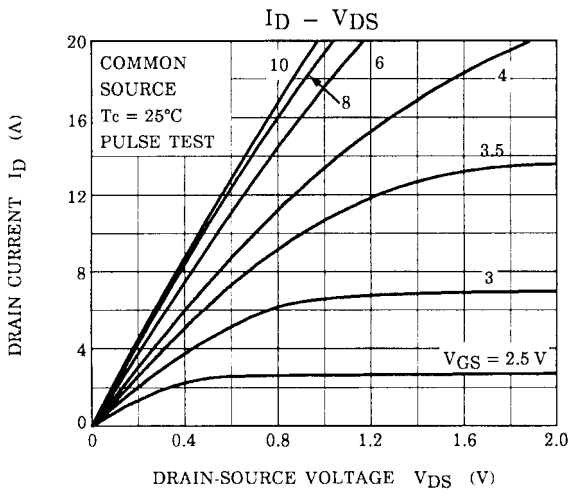
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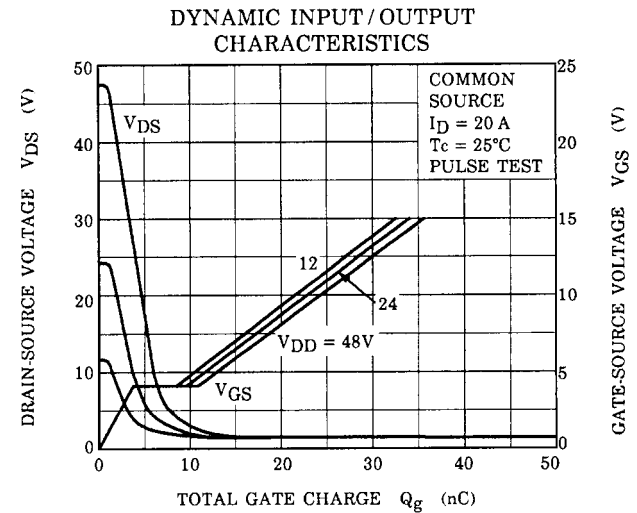
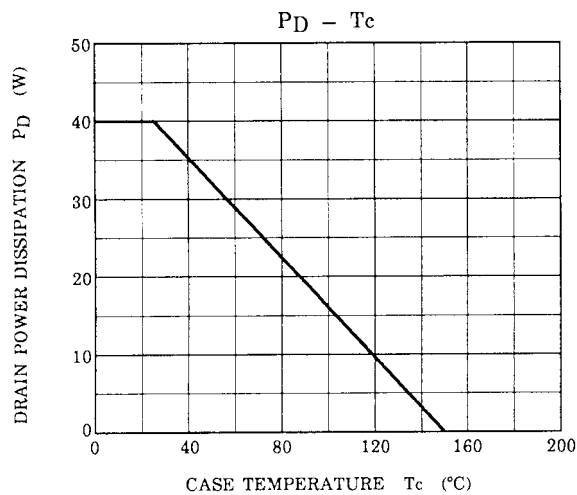
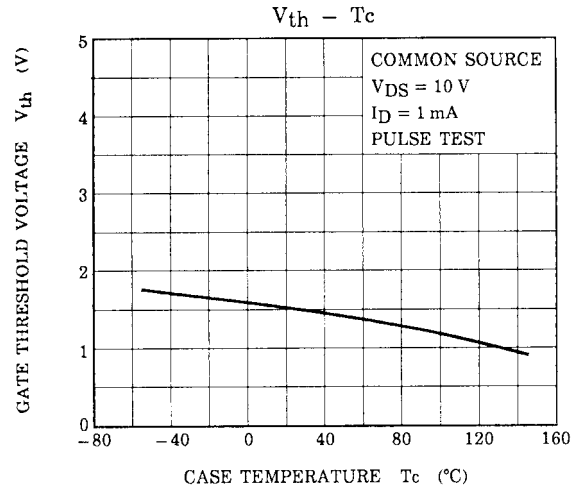
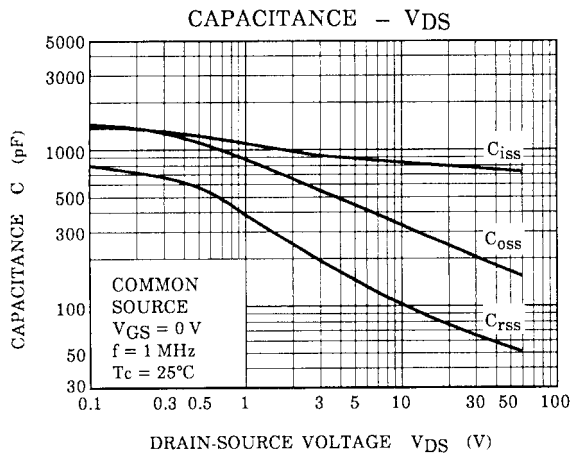
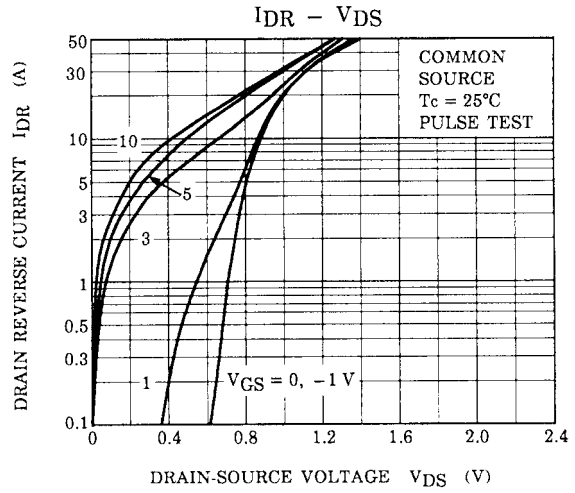
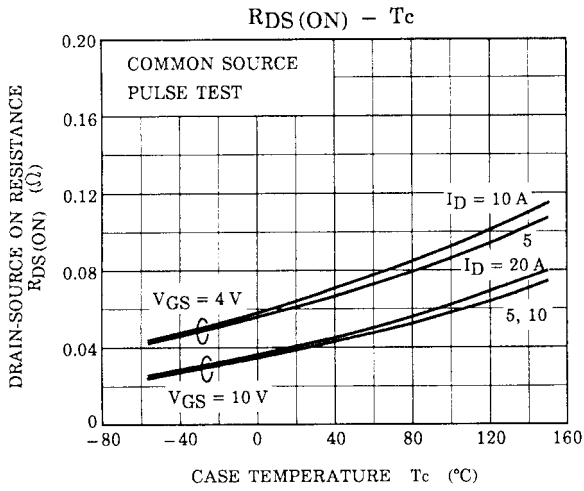


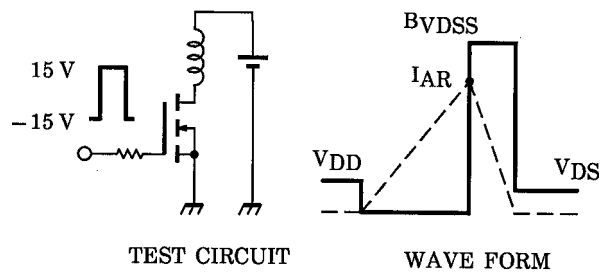
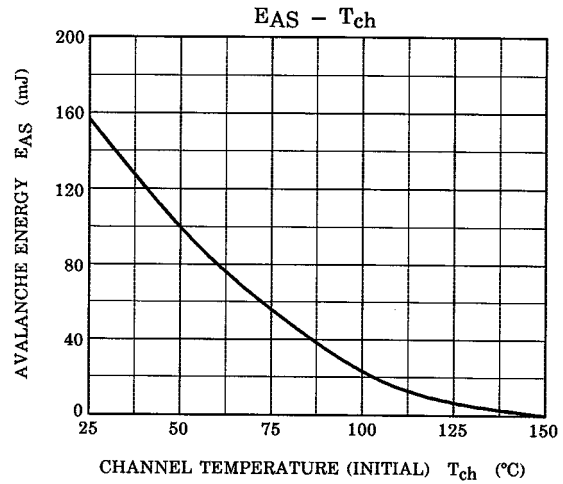
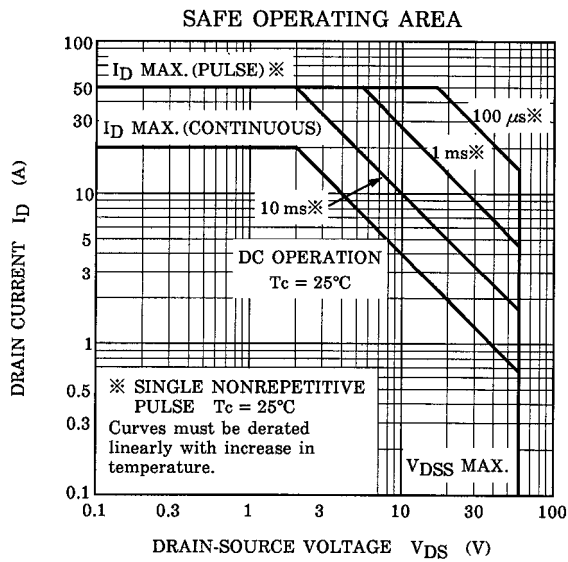
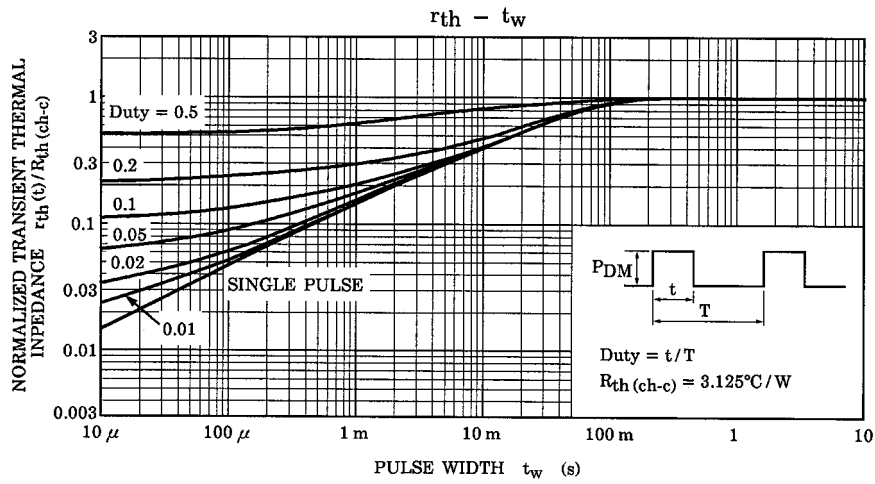
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







$R_G = 25 \Omega$
 $V_{DD} = 25 \text{ V}, L = 530 \mu\text{H}$

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

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