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

2SK2777

Chopper Regulator, DC-DC Converter and Motor Drive Applications

 $\begin{array}{ll} \bullet & \text{Low drain-source ON resistance} & : R_{DS \ (ON)} = 0.9 \ \Omega \ (\text{typ.}) \\ \bullet & \text{High forward transfer admittance} & : |Y_{fs}| = 5.5 \ S \ (\text{typ.}) \\ \bullet & \text{Low leakage current} & : I_{DSS} = 100 \ \mu\text{A} \ (\text{max}) \ (\text{V}_{DS} = 600 \ \text{V}) \\ \bullet & \text{Enhancement-mode} & : V_{th} = 2.0 \ \sim 4.0 \ V \ (\text{V}_{DS} = 10 \ \text{V}, I_{D} = 1 \ \text{mA}) \\ \end{array}$

Maximum Ratings (Ta = 25°C)

Characteri	stics	Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	600	V
Drain-gate voltage (R _{GS} = 20 kΩ)		V_{DGR}	600	V
Gate-source voltage		V _{GSS}	±30	V
Drain current	DC (Note 1)	I _D	6	Α
	Pulse (Note 1)	I_{DP}	24	Α
Drain power dissipatio	n (Tc = 25°C)	P_{D}	65	W
Single pulse avalanche	e energy (Note 2)	E _{AS}	345	mJ
Avalanche current		I _{AR}	6	Α
Repetitive avalanche	energy (Note 3)	E _{AR}	6.5	mJ
Channel temperature		T _{ch}	150	°C
Storage temperature range		T _{stg}	-55~150	°C

Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	R _{th (ch-c)}	1.92	°C / W
Thermal resistance, channel to ambient	R _{th (ch-a)}	83.3	°C/W

Note 1: Please use devices on condition that the channel temperature is below 150°C.

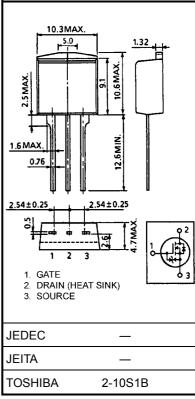
Note 2: V_{DD} = 90 V, T_{ch} = 25°C (initial), L = 16.8 mH, R_G = 25 Ω , I_{AR} = 6 A

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

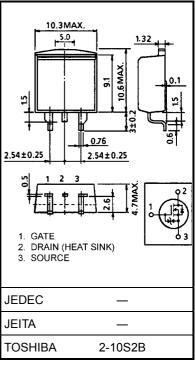
This transistor is an electrostatic sensitive device.

Please handle with caution.





Weight: 1.5 g (typ.)



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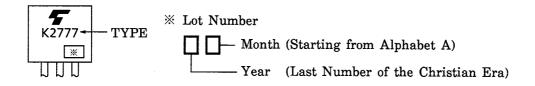
Electrical Characteristics (Ta = 25°C)

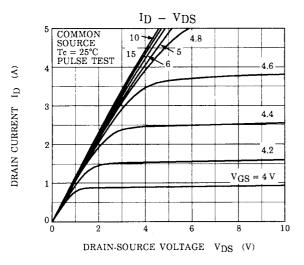
Charac	eteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Gate leakage cu	rrent	I _{GSS}	V _{GS} = ±25 V, V _{DS} = 0 V		_	±10	μΑ
Gate-source bre	eakdown voltage	V _(BR) GSS	$I_G = \pm 10 \ \mu A, \ V_{DS} = 0 \ V$	±30	_	_	V
Drain cut-off cu	rrent	I _{DSS}	V _{DS} = 600 V, V _{GS} = 0 V	-	_	100	μA
Drain-source br	eakdown voltage	V (BR) DSS	I _D = 10 mA, V _{GS} = 0 V	600	_	_	V
Gate threshold v	oltage	V _{th}	V _{DS} = 10 V, I _D = 1 mA	2.0	_	4.0	V
Drain-source O	N resistance	R _{DS} (ON)	V _{GS} = 10 V, I _D = 3 A	_	0.9	1.25	Ω
Forward transfer	admittance	Y _{fs}	V _{DS} = 10 V, I _D = 3 A	2.0	5.5	_	S
Input capacitano	e	C _{iss}		_	1300	_	
Reverse transfer	Reverse transfer capacitance C_{rss} V_{DS} = 10 V, V_{GS} = 0 V, f = 1 MHz		_	130	_	pF	
Output capacitance		C _{oss}			400		_
Switching time	Rise time	t _r	V_{GS} V_{OUT} V_{OUT} V_{DD} V_{OUT} V_{DD}	_	25	_	ns
	Turn-on time	t _{on}		l	45		
	Fall time	t _f		l	40	_	
	Turn-off time	t _{off}	Duty $\leq 1\%$, $t_{\mathbf{W}} = 10 \mu \text{s}$	_	150	_	
Total gate charge (gate-source plus gate-drain)		Qg			30		
Gate-source charge		Q _{gs}	$V_{DD} \approx 400 \text{ V}, V_{GS} = 10 \text{ V}, I_{D} = 6 \text{ A}$		18	_	nC -
Gate-drain ("miller") Charge		Q_{gd}			12	_	

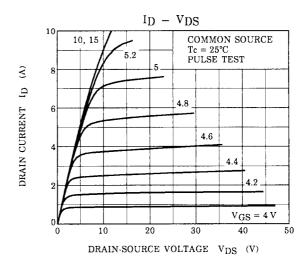
Source-Drain Ratings and Characteristics (Ta = 25°C)

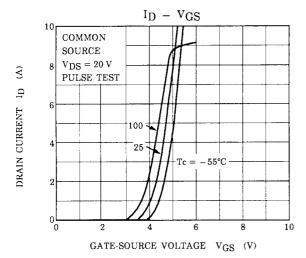
Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Continuous drain reverse current (Note 1)	I _{DR}		_	_	6	Α
Pulse drain reverse current (Note 1)	I _{DRP}		_	_	24	Α
Forward voltage (diode)	V_{DSF}	I _{DR} = 6 A, V _{GS} = 0 V	_	_	-1.7	V
Reverse recovery time	t _{rr}	I_{DR} = 6 A, V_{GS} = 0 V, dI_{DR} / dt = 100 A / μ s	_	1000	_	ns
Reverse recovery charge	Q_{rr}		_	7	_	μC

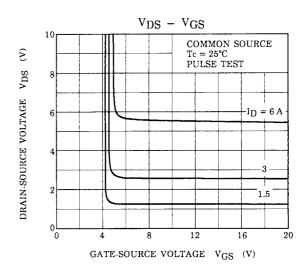
Marking

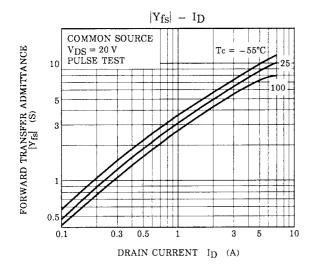


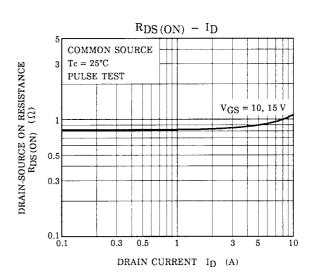




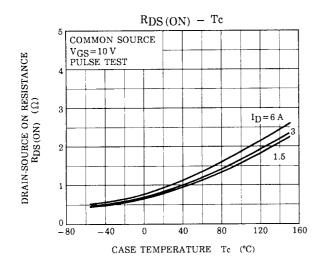


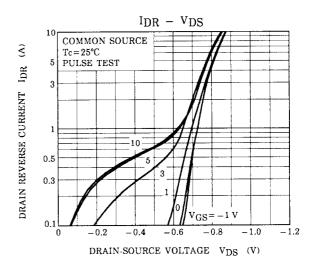


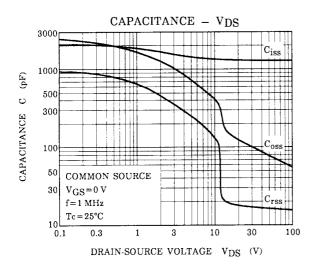


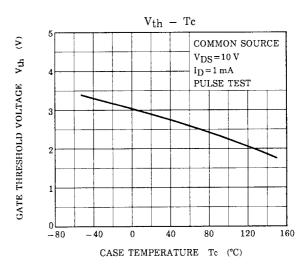


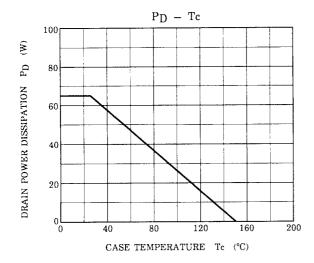
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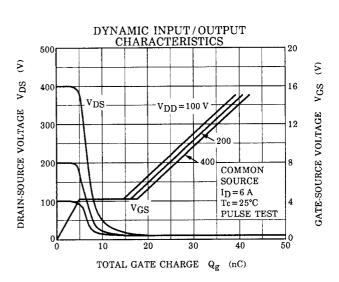


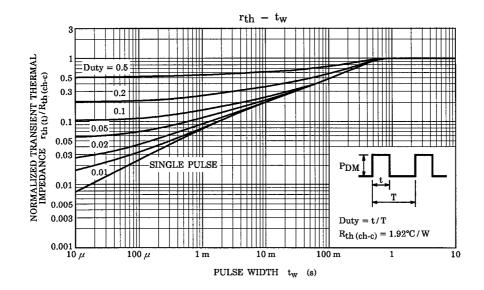


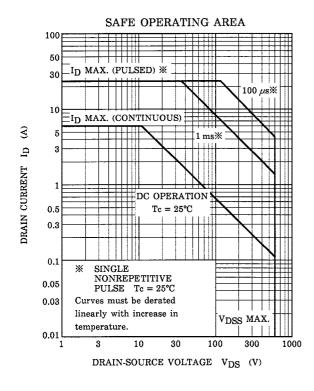


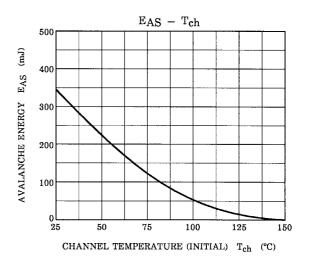


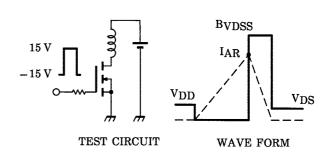












$$R_G$$
 = 25 Ω
 V_{DD} = 90 V, L = 16.8 mH

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

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