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

2SK3797

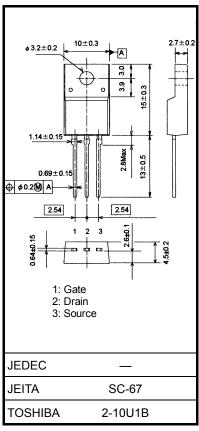
Switching Regulator Applications

Unit: mm

- Low drain-source ON resistance: RDS (ON) = 0.32Ω (typ.)
- High forward transfer admittance: $|Y_{fs}| = 7.5 \text{ S (typ.)}$
- Low leakage current: $I_{DSS} = 100 \, \mu \, A \, (V_{DS} = 600 \, V)$
- Enhancement model: $V_{th} = 2.0 \sim 4.0 \text{ V} \text{ (V}_{DS} = 10 \text{ V}, I_{D} = 1 \text{ mA)}$

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit	
Drain-source voltage		V_{DSS}	600	V	
Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$)		V_{DGR}	600	V	
Gate-source voltage		V_{GSS}	±30	V	
	DC (Note 1)	I _D	13		
Drain current	Pulse (t = 1 ms) (Note 1)	I _{DP}	52	Α	
Drain power dissipati	on (Tc = 25°C)	PD	50	W	
Single pulse avalanche energy (Note 2)		E _{AS}	1033	mJ	
Avalanche current		I _{AR}	13	Α	
Repetitive avalanche	energy (Note 3)	E _{AR}	5.0	mJ	
Channel temperature		T _{ch}	150	°C	
Storage temperature range		T _{stg}	-55~150	°C	

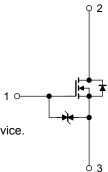


Weight: 1.7 g (typ.)

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 (ch-c)}	2.5	°C/W
Thermal resistance, channel to ambient	R _{th (ch-a)}	62.5	°C/W



- Note 1: Ensure that the channel temperature does not exceed 150°C during use of the device.
- Note 2: $V_{DD} = 90 \text{ V}$, $T_{ch} = 25^{\circ}\text{C}$ (initial), L = 10.7 mH, $I_{AR} = 13 \text{ A}$, $R_G = 25 \Omega$
- Note 3: Repetitive rating: pulse width limited by maximum channel temperature

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



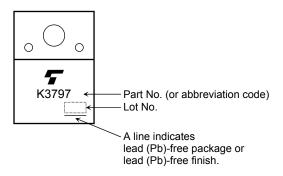
Electrical Characteristics (Ta = 25°C)

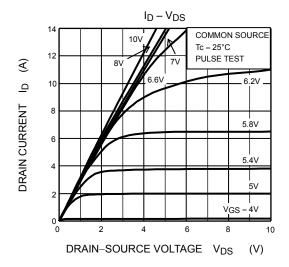
Char	Characteristic Symbol		Test Condition	Min	Тур.	Max	Unit
Gate leakage cur	rent	I _{GSS}	$V_{GS} = \pm 25 \text{ V}, V_{DS} = 0 \text{ V}$	_	_	±10	μА
Gate-source brea	akdown voltage	V (BR) GSS	$I_G = \pm 10 \ \mu A, \ V_{DS} = 0 \ V$	±30	_	_	V
Drain cutoff curre	ent	I _{DSS}	V _{DS} = 600 V, V _{GS} = 0 V	_	_	_ 100	
Drain-source brea	akdown voltage	V (BR) DSS	I _D = 10 mA, V _{GS} = 0 V	600	_	_	V
Gate threshold vo	oltage	V _{th}	V _{DS} = 10 V, I _D = 1 mA	2.0	_	4.0	V
Drain-source ON	resistance	R _{DS} (ON)	V _{GS} = 10 V, I _D = 6.5 A	_	0.32	0.43	Ω
Forward transfer	admittance	Y _{fs}	V _{DS} = 10 V, I _D = 7.0 A	2.1	7.5	_	S
Input capacitance	9	C _{iss}			3100	_	
Reverse transfer capacitance		C _{rss}	V _{DS} = 25 V, V _{GS} = 0 V, f = 1 MHz	_	20	_	pF
Output capacitance		C _{oss}		_	270	_	
Switching time	Rise time	t _r	V_{GS} V_{OV} V	_	60	_	. ns
	Turn-on time	t _{on}			110	_	
	Fall time	t _f			50	_	
	Turn-off time	t _{off}	Duty \leq 1%, $t_W = 10 \mu s$	_	215	_	
Total gate charge		Qg		_	62	_	
Gate-source charge		Q _{gs}	$V_{DD} \simeq 400 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 13 \text{ A}$	_	40	_	nC
Gate-drain charge		Q _{gd}		_	22	_	

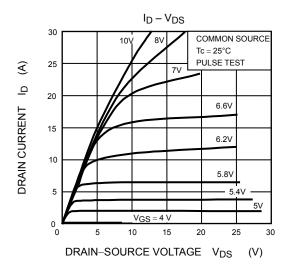
Source-Drain Ratings and Characteristics (Ta = 25°C)

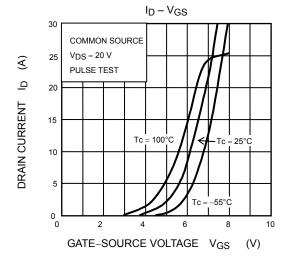
Characteristic		Symbol	Test Condition	Min	Тур.	Max	Unit
Continuous drain reverse current	(Note 1)	I _{DR}	_		_	13	Α
Pulse drain reverse current	(Note 1)	I _{DRP}	_	_	_	52	Α
Forward voltage (diode)		V_{DSF}	$I_{DR} = 13 \text{ A}, V_{GS} = 0 \text{ V}$		_	-1.7	V
Reverse recovery time		t _{rr}	I _{DR} = 13 A, V _{GS} = 0 V,	_	1050	_	ns
Reverse recovery charge		Q _{rr}	dl _{DR} /dt = 100 A/μs	_	15	_	μС

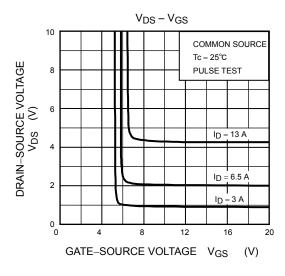
Marking

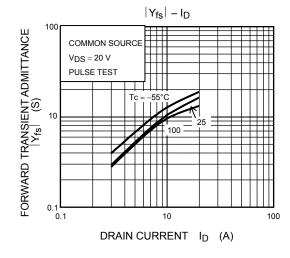


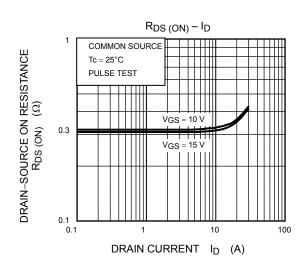




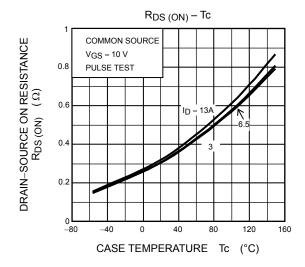


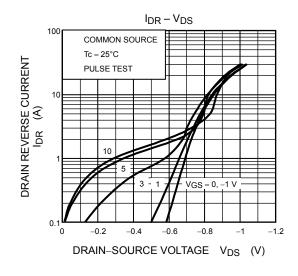


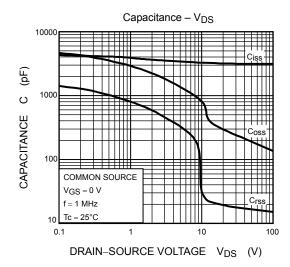


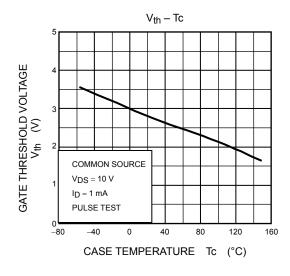


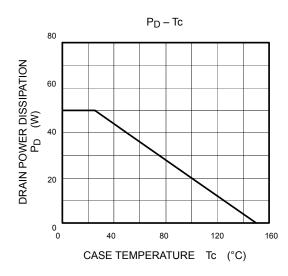
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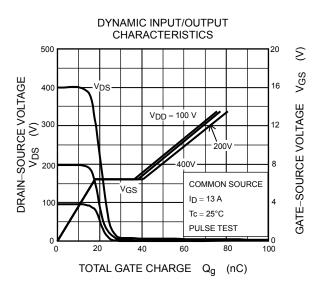




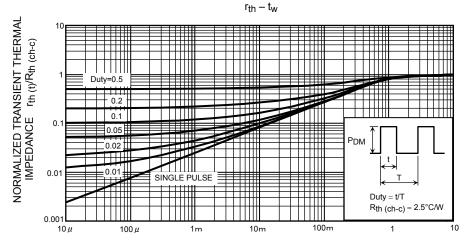




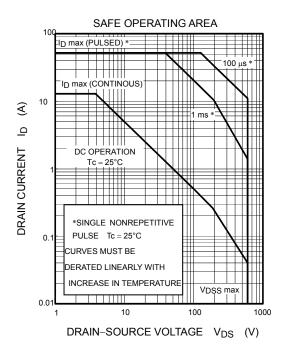


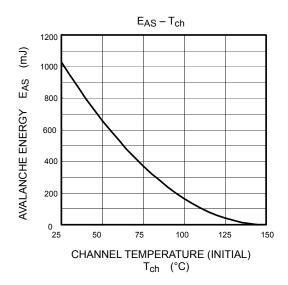


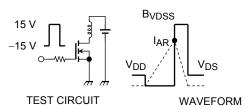
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PULSE WIDTH t_w (s)







$$R_G = 25 \Omega$$

 $V_{DD} = 90 \text{ V, L} = 10.7 \text{mH}$ $EAS = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{BVDSS}{BVDSS - VDD}\right)$

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20070701-EN

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