

TK14A55D



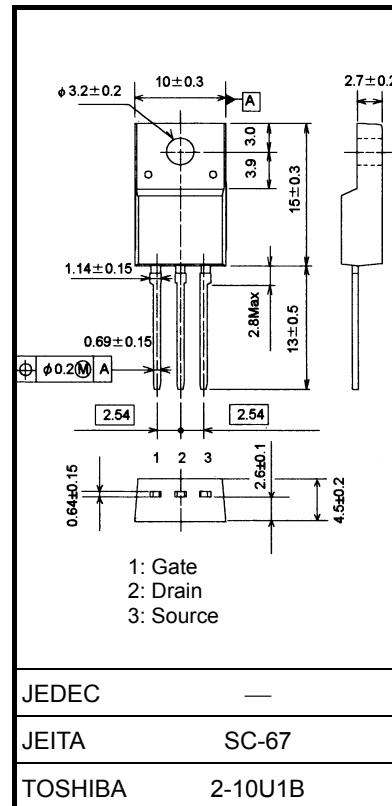
Switching Regulator Applications

Unit: mm

- Low drain-source ON-resistance: $R_{DS\ (ON)} = 0.31\ \Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 6.5\ S$ (typ.)
- Low leakage current: $I_{DSS} = 10\ \mu A$ (max) ($V_{DS} = 550\ V$)
- Enhancement mode: $V_{th} = 2.0$ to $4.0\ V$ ($V_{DS} = 10\ V$, $I_D = 1\ mA$)

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

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	550	V
Gate-source voltage		V_{GSS}	± 30	V
Drain current	DC (Note 1)	I_D	14	A
	Pulse (Note 1)	I_{DP}	56	
Drain power dissipation ($T_c = 25^\circ C$)		P_D	50	W
Single pulse avalanche energy (Note 2)		E_{AS}	521	mJ
Avalanche current		I_{AR}	14	A
Repetitive avalanche energy (Note 3)		E_{AR}	5.0	mJ
Channel temperature		T_{ch}	150	°C
Storage temperature range		T_{stg}	-55 to 150	°C



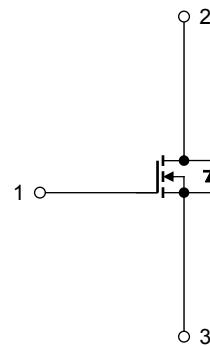
Weight: 1.7 g (typ.)

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

Internal Connection

Characteristics	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.

Note 2: $V_{DD} = 90\ V$, $T_{ch} = 25^\circ C$ (initial), $L = 4.6\ mH$, $R_G = 25\ \Omega$, $I_{AR} = 14\ A$

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)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit	
Gate leakage current	I _{GSS}	V _{GS} = ±30 V, V _{DS} = 0 V	—	—	±1	µA	
Drain cut-off current	I _{DSS}	V _{DS} = 550 V, V _{GS} = 0 V	—	—	10	µA	
Drain-source breakdown voltage	V _{(BR) DSS}	I _D = 10 mA, V _{GS} = 0 V	550	—	—	V	
Gate threshold voltage	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 = 7 A	—	0.31	0.37	Ω	
Forward transfer admittance	Y _{fs}	V _{DS} = 10 V, I _D = 7 A	1.8	6.5	—	S	
Input capacitance	C _{iss}	V _{DS} = 25 V, V _{GS} = 0 V, f = 1 MHz	—	2300	—	pF	
Reverse transfer capacitance	C _{rss}		—	10	—		
Output capacitance	C _{oss}		—	250	—		
Switching time	Rise time	t _r	 10 V V _{GS} 0 V 50 Ω I _D = 7 A V _{OUT} RL = 29 Ω V _{DD} ≈ 200 V Duty ≤ 1%, t _W = 10 µs	—	50	—	ns
	Turn-on time	t _{on}		—	100	—	
	Fall time	t _f		—	25	—	
	Turn-off time	t _{off}		—	140	—	
Total gate charge	Q _g	V _{DD} ≈ 400 V, V _{GS} = 10 V, I _D = 14 A	—	40	—	nC	
Gate-source charge	Q _{gs}		—	25	—		
Gate-drain charge	Q _{gd}		—	15	—		

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I _{DR}	—	—	—	14	A
Pulse drain reverse current (Note 1)	I _{DRP}	—	—	—	56	A
Forward voltage (diode)	V _{DSF}	I _{DR} = 14 A, V _{GS} = 0 V	—	—	-1.7	V
Reverse recovery time	t _{rr}	I _{DR} = 14 A, V _{GS} = 0 V, dI _{DR} /dt = 100 A/µs	—	1600	—	ns
Reverse recovery charge	Q _{rr}		—	20	—	µC

Marking