Unit: mm

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

2SK4115

Switching Regulator Applications

• Low drain-source ON-resistance: $R_{DS (ON)} = 1.6 \Omega (typ.)$

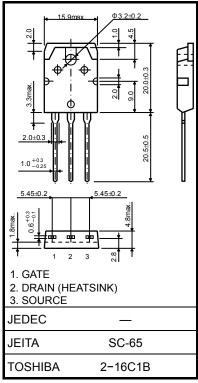
• High forward transfer admittance: $|Y_{fS}| = 5.0 \text{ S (typ.)}$

• Low leakage current: $I_{DSS} = 100 \mu A (max) (V_{DS} = 720 V)$

• Enhancement mode: V_{th} = 2.0 to 4.0 V (V_{DS} = 10 V, I_D = 1 mA)

Absolute Maximum Ratings (Ta = 25°C)

Characteristic			Symbol	Rating	Unit	
Drain-source voltage			V_{DSS}	900	V	
Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$)			V_{DGR}	900	V	
Gate-source voltage			V _{GSS}	±30	V	
Drain current	DC	(Note 1)	I _D	7	Α	
	Pulse	(Note 1)	I _{DP}	21	A	
Drain power dissipation (Tc = 25°C)			PD	150	W	
Single pulse avalanche energy (Note 2)			E _{AS}	491	mJ	
Avalanche current			I _{AR}	7	Α	
Repetitive avalanche energy (Note 3)			E _{AR}	15	mJ	
Channel temperature			T _{ch}	150	°C	
Storage temperature range			T _{stg}	-55 to 150	°C	



Weight: 4.6 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

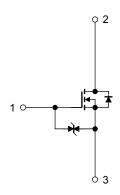
Characteristic	Symbol	Max	Unit
Thermal resistance, channel to case	R _{th (ch-c)}	0.833	°C/W
Thermal resistance, channel to ambient	R _{th (ch-a)}	50	°C/W

Note 1: Ensure that the channel temperature does not exceed 150°C during use of the device.

Note 2: $V_{DD} = 90 \text{ V}$, $T_{ch} = 25^{\circ}\text{C}$, L = 18.4 mH, $R_G = 25 \Omega$, $I_{AR} = 7 \text{ A}$

Note 3: Repetitive rating: pulse width limited by max junction temperature

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



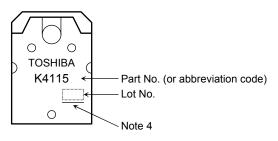
Electrical Characteristics (Ta = 25°C)

Char	acteristic	Symbol	Test Condition	Min	Тур.	Max	Unit
Gate leakage cur	Sate leakage current		$V_{GS} = \pm 30 \text{ V}, V_{DS} = 0 \text{ V}$	_	_	±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} = 720 V, V _{GS} = 0 V	_	_	100	μА
Drain-source brea	rain-source breakdown voltage		$I_D = 10$ mA, $V_{GS} = 0$ V	900	_	_	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 = 3.5 A	_	1.6	2.0	Ω
Forward transfer admittance		Y _{fs}	V _{DS} = 10 V, I _D = 3.5 A	2.6	5.0	_	S
Input capacitance		C _{iss}		_	1650	_	pF
Reverse transfer capacitance		C _{rss}	$V_{DS} = 25 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	_	30	_	
Output capacitance		C _{oss}		_	140	_	
Switching time	Rise time	t _r	$V_{GS}^{10 \text{ V}} V_{GS}^{10 \text{ V}} V_{OUT}^{10 \text{ S}} R_{L} = 114 \Omega$		50	_	ns
	Turn-on time	t _{on}		_	90	_	
	Fall time	t _f		_	70	_	
	Turn-off time	t _{off}	Duty \leq 1%, t _W = 10 μs	_	240	_	
Total gate charge (gate-source plus gate-drain)		Qg			45		nC
Gate-source charge		Q _{gs}	$V_{DD} \approx 400 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 7 \text{ A}$	_	24		
Gate-drain ("Miller") charge		Q _{gd}		_	21		

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

Characteristic	Symbol	Test Condition	Min	Тур.	Max	Unit
Continuous drain reverse current (Note 1)	I _{DR}	_	_	_	7	Α
Pulse drain reverse current (Note 1)	I _{DRP}	_	_	_	21	Α
Forward voltage (diode)	V _{DSF}	I _{DR} = 7 A, V _{GS} = 0 V	_	_	-1.7	V
Reverse recovery time	t _{rr}	$I_{DR} = 7 \text{ A}, V_{GS} = 0 \text{ V},$	_	1400	_	ns
Reverse recovery charge	Q _{rr}	dI _{DR} /dt = 100 A/μs		12	_	μС

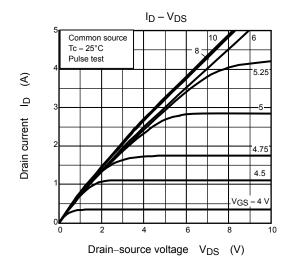
Marking

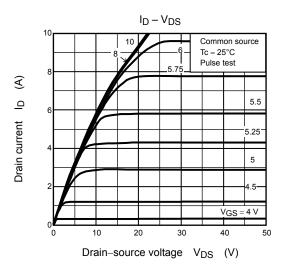


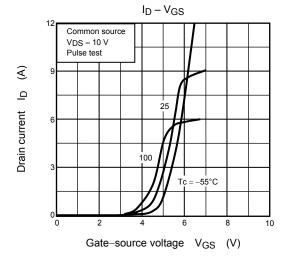
Note 4: A line under a Lot No. identifies the indication of product Labels.

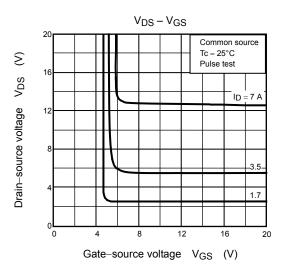
[[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

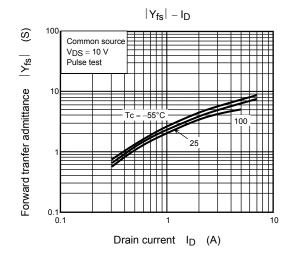
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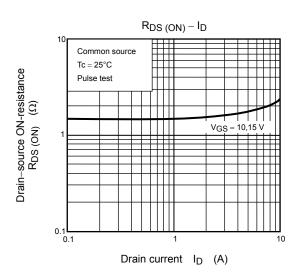




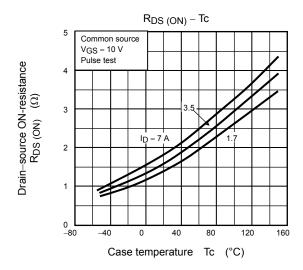


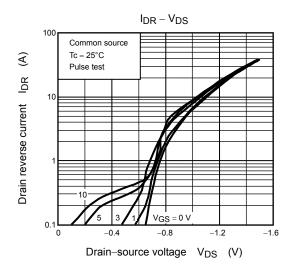


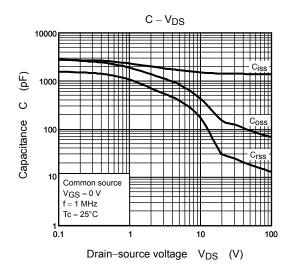


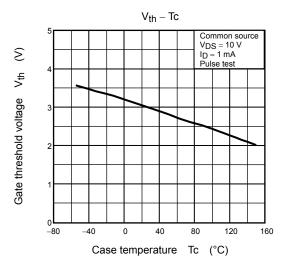


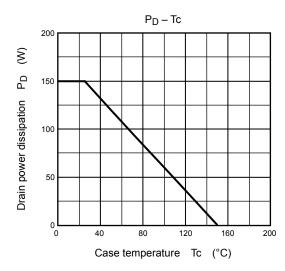
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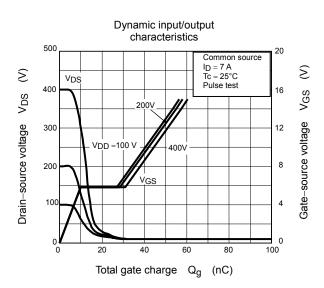


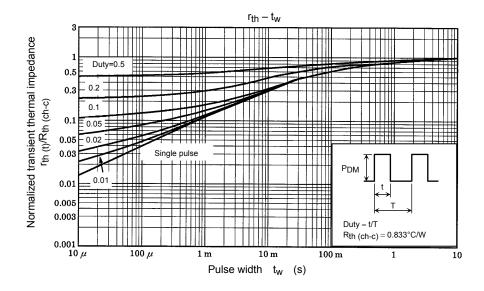


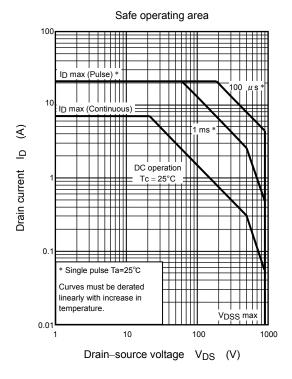


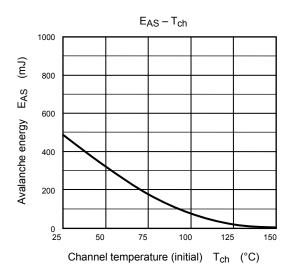


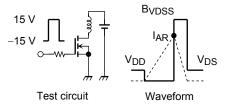












$$\begin{aligned} &R_G = 25~\Omega \\ &V_{DD} = 90~V,~L = 18.4~mH \end{aligned} \qquad E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{BVDSS}{BVDSS - V_{DD}} \right)$$

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