

TOSHIBA Field Effect Transistor Silicon N-Channel MOS Type (L²-π-MOSV)

2SK2614

Chopper Regulator, DC/DC Converter and Motor Drive Applications

- 4 V gate drive
- Low drain-source ON-resistance : $R_{DS(ON)} = 0.032 \Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 13S$ (typ.)
- Low leakage current : $I_{DSS} = 100 \mu A$ (max) ($V_{DS} = 50 V$)
- Enhancement mode : $V_{th} = 0.8\sim 2.0 V$ ($V_{DS} = 10 V, I_D = 1 mA$)

Absolute Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit	
Drain-source voltage	V_{DSS}	50	V	
Drain-gate voltage ($R_{GS} = 20 k\Omega$)	V_{DGR}	50	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	
Channel temperature	T_{ch}	150	°C	
Storage temperature range	T_{stg}	-55~150	°C	

Note 1: Ensure that the channel temperature does not exceed 150°C.

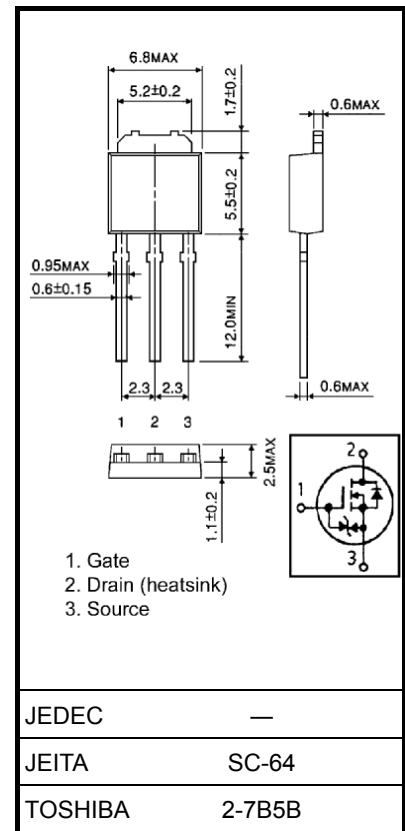
Note 2: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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

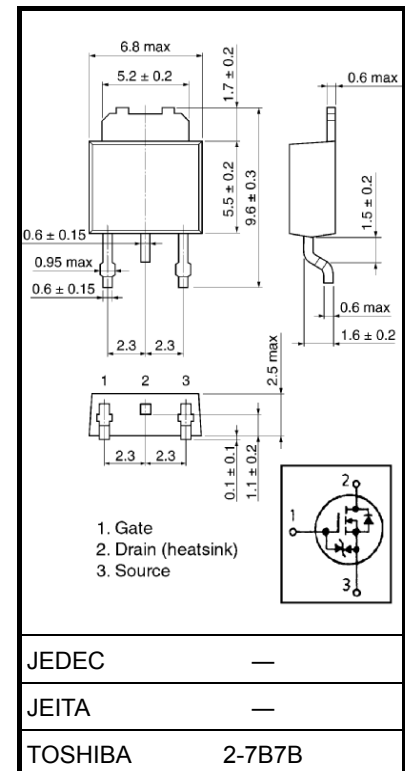
Characteristic	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th(ch-c)}$	3.125	°C / W
Thermal resistance, channel to ambient	$R_{th(ch-a)}$	125	°C / W

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

Unit: mm



Weight: 0.36 g (typ.)



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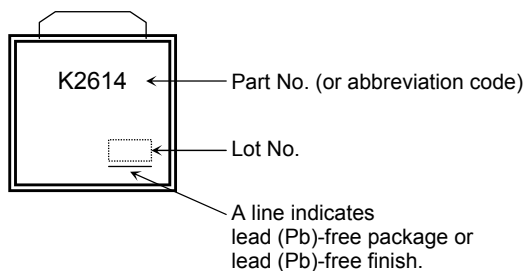
Electrical Characteristics (Ta = 25°C)

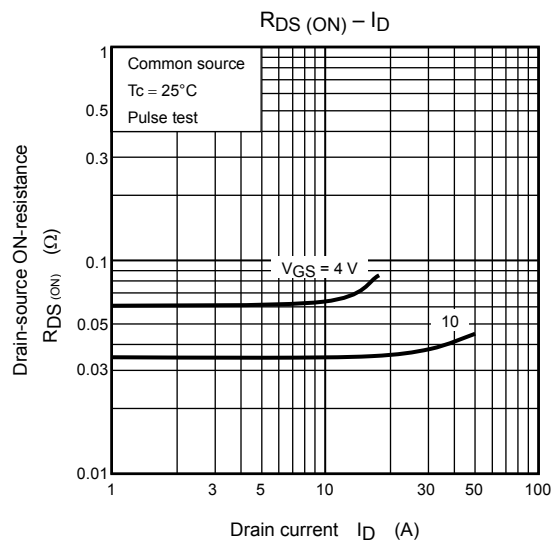
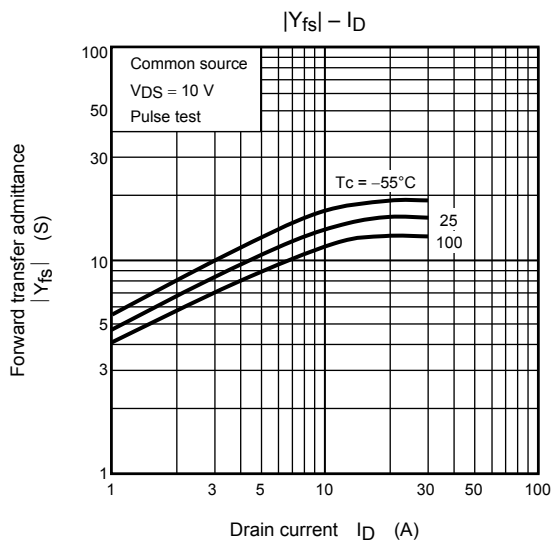
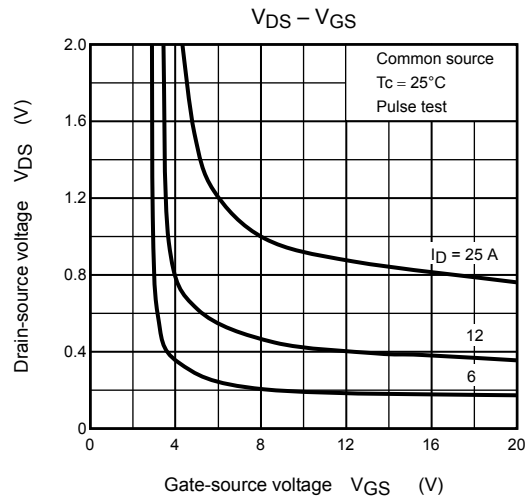
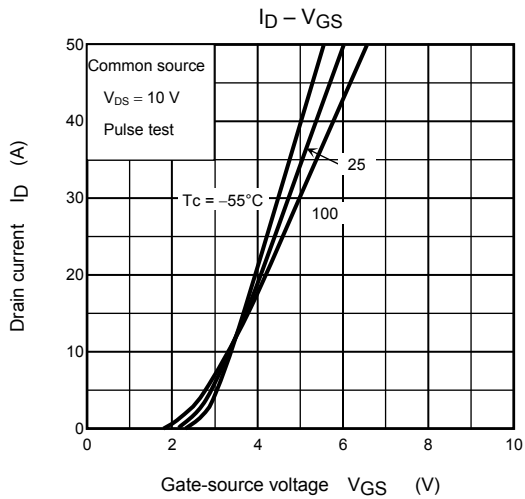
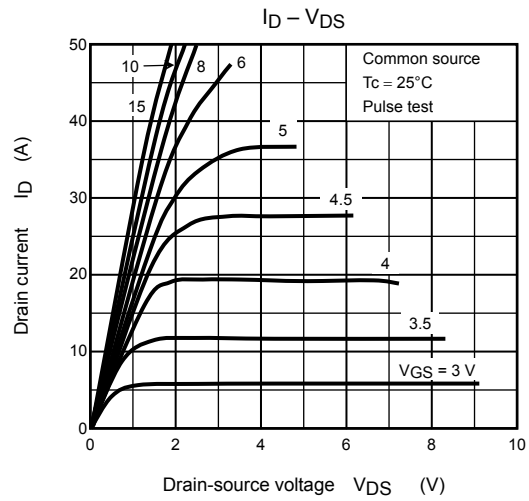
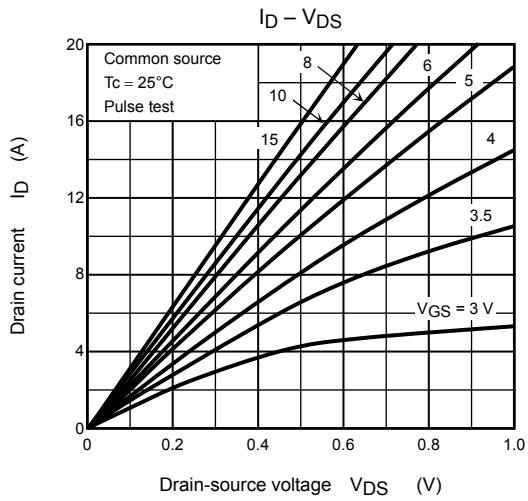
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 16\text{ V}, V_{DS} = 0\text{ V}$	—	—	± 10	μA
Drain cutoff current		I_{DSS}	$V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V}$	—	—	100	μA
Drain-source breakdown voltage		$V_{(BR)DSS}$	$I_D = 10\text{ mA}, V_{GS} = 0\text{ V}$	50	—	—	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		$R_{DS(ON)}$	$V_{DS} = 4\text{ V}, I_D = 5\text{ A}$	—	0.055	0.08	Ω
			$V_{DS} = 10\text{ V}, I_D = 10\text{ A}$	—	0.032	0.046	
Forward transfer admittance		$ Y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 10\text{ A}$	7	13	—	S
Input capacitance		C_{iss}	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	900	—	pF
Reverse transfer capacitance		C_{rss}		—	130	—	
Output capacitance		C_{oss}		—	370	—	
Switching time	Rise time	t_r		—	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	$V_{DD} \approx 40\text{ V}, V_{GS} = 10\text{ V}, I_D = 20\text{ A}$	—	25	—	nC
Gate-source charge		Q_{gs}		—	19	—	
Gate-drain ("Miller") charge		Q_{gd}		—	6	—	

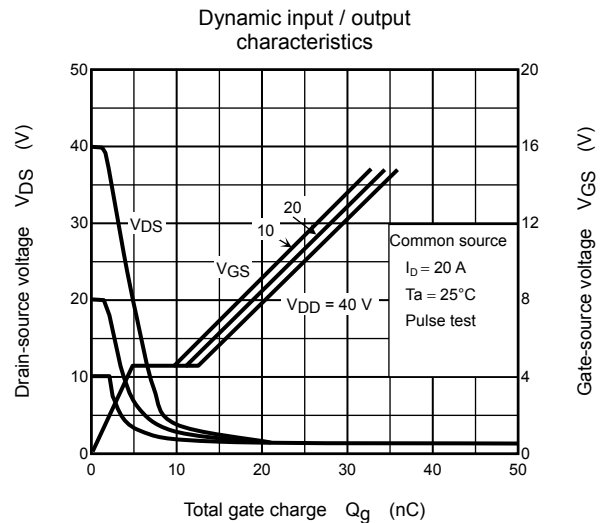
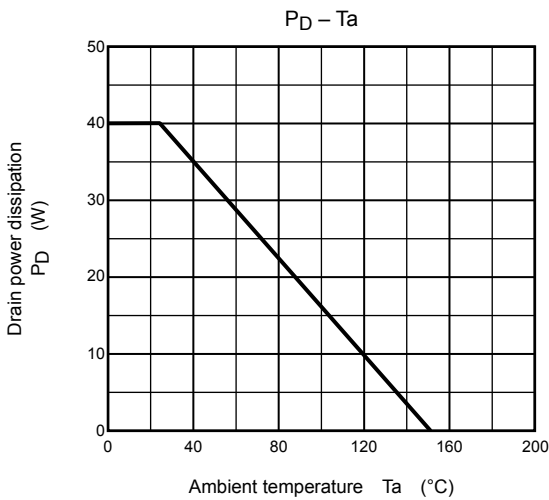
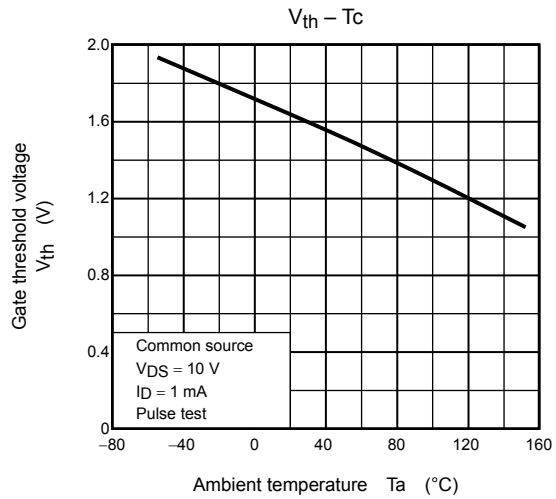
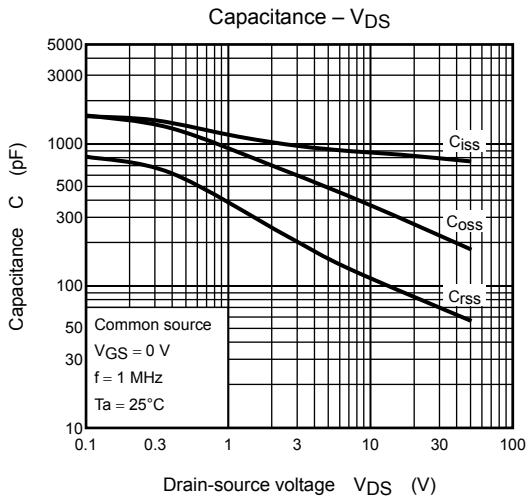
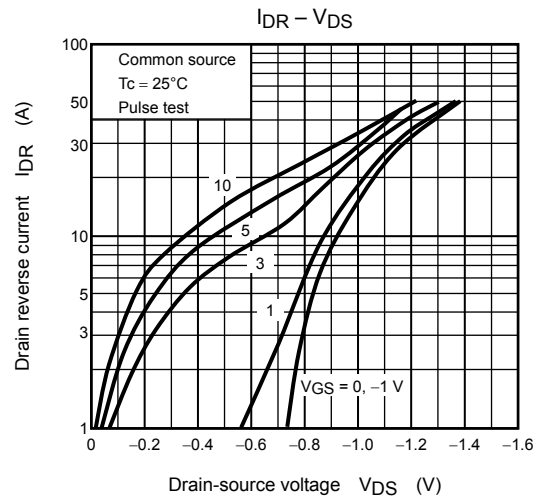
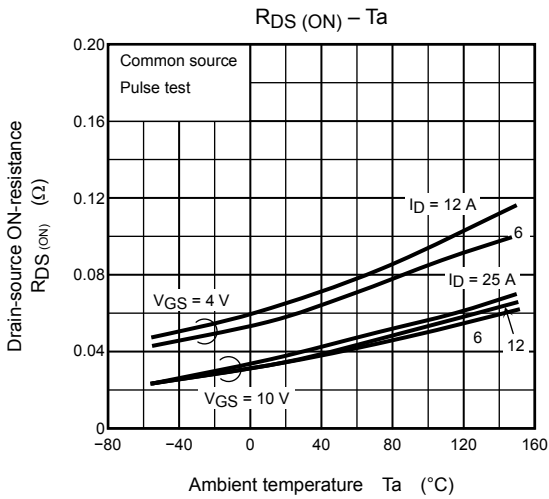
Source-Drain Ratings and Characteristics (Ta = 25°C)

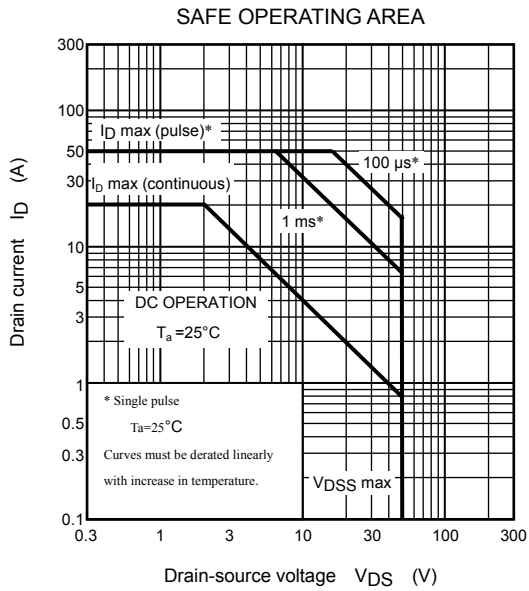
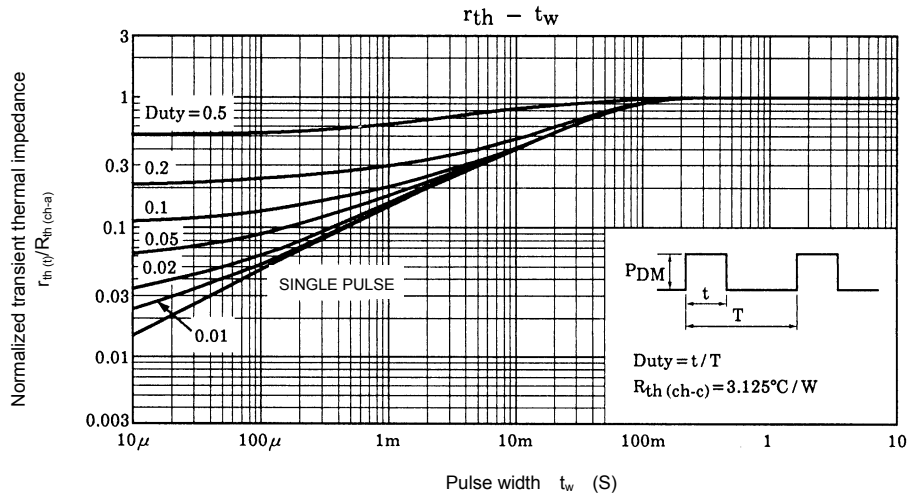
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	20	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	50	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 20\text{ A}, V_{GS} = 0\text{ V}$	—	—	-1.7	V
Reverse recovery time	t_{rr}	$I_{DR} = 20\text{ A}, V_{GS} = 0\text{ V}, dI_{DR} / dt = 50\text{ A} / \mu\text{s}$	—	60	—	ns
Reverse recovery charge	Q_{rr}		—	45	—	μC

Marking









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