

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (π -MOS V)

2SK3117

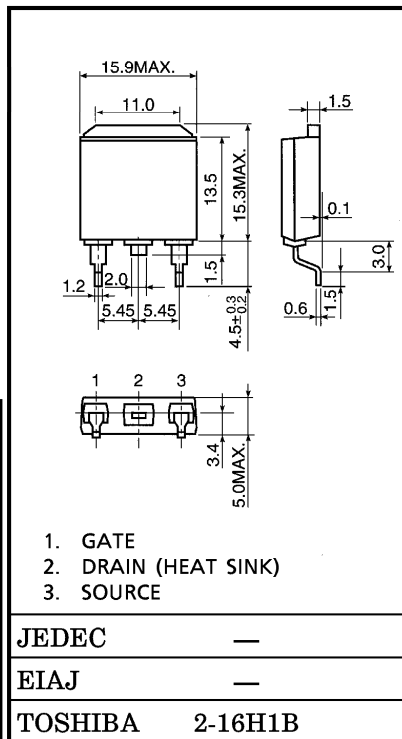
HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

INDUSTRIAL APPLICATIONS

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 0.21 \Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 17 S$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100 \mu A$ (Max.) ($V_{DSS} = 500 V$)
- Enhancement-Mode : $V_{th} = 2.0 \sim 4.0 V$
($V_{DS} = 10 V, I_D = 1 mA$)



MAXIMUM RATINGS ($T_a = 25^\circ C$)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	V_{DSS}	500	V
Drain-Gate Voltage ($R_{GS} = 20 k\Omega$)	V_{DGR}	500	V
Gate-Source Voltage	V_{GSS}	± 30	V
Drain Current	DC	I_D	20 A
	Pulse	I_{DP}	80 A
Drain Power Dissipation ($T_c = 25^\circ C$)	P_D	150	W
Single Pulse Avalanche Energy**	E_{AS}	960	mJ
Avalanche Current	I_{AR}	20	A
Repetitive Avalanche Energy*	E_{AR}	15	mJ
Channel Temperature	T_{ch}	150	$^\circ C$
Storage Temperature Range	T_{stg}	$-55 \sim 150$	$^\circ C$

Weight : 4.6 g

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	0.833	$^\circ C / W$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	50	$^\circ C / W$

Note ;

* Repetitive rating ; Pulse Width Limited by Max. junction temperature.

** $V_{DD} = 90 V$, Starting $T_{ch} = 25^\circ C$, $L = 4.08 mH$
 $R_G = 25 \Omega$, $I_{AR} = 20 A$

**This transistor is an electrostatic sensitive device.
Please handle with caution.**

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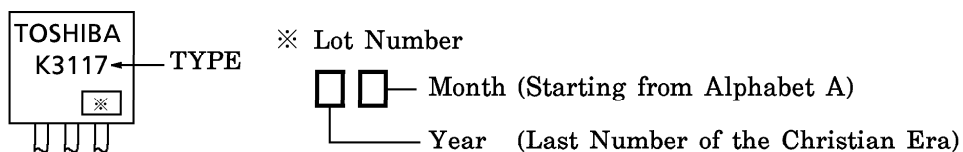
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

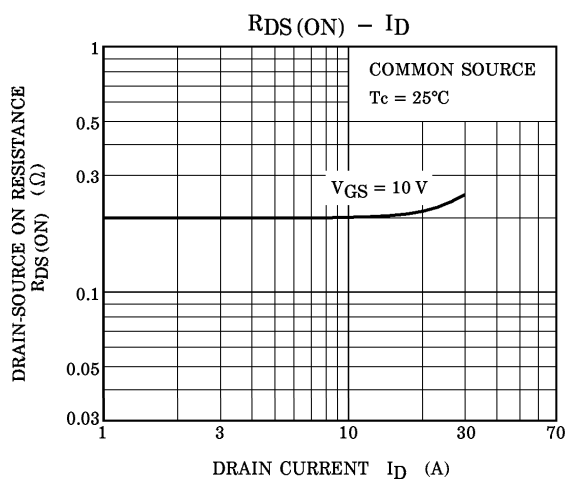
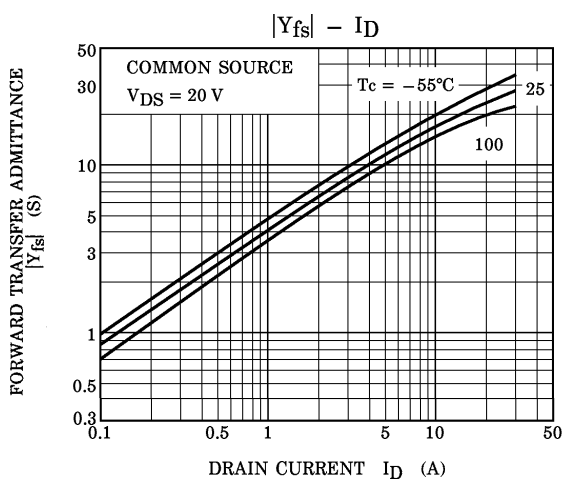
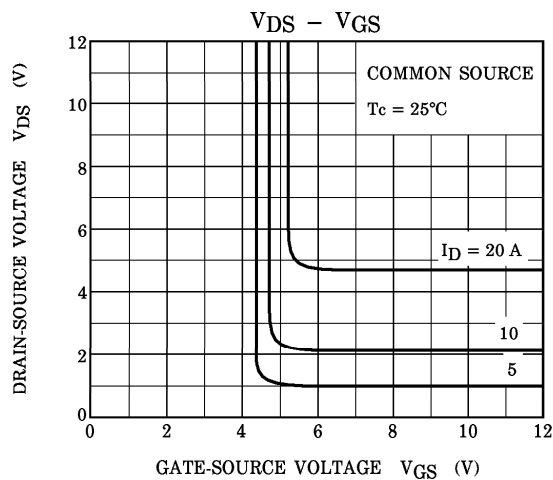
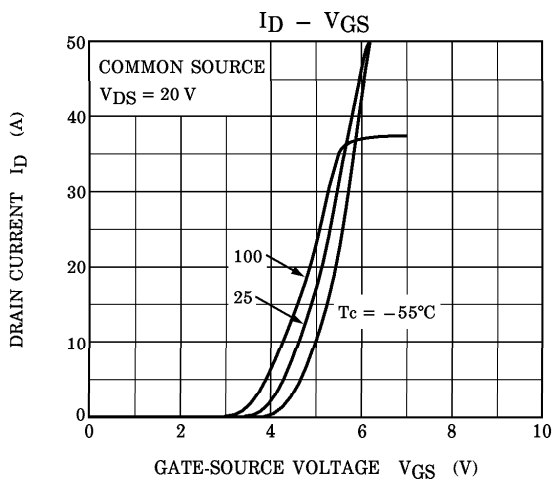
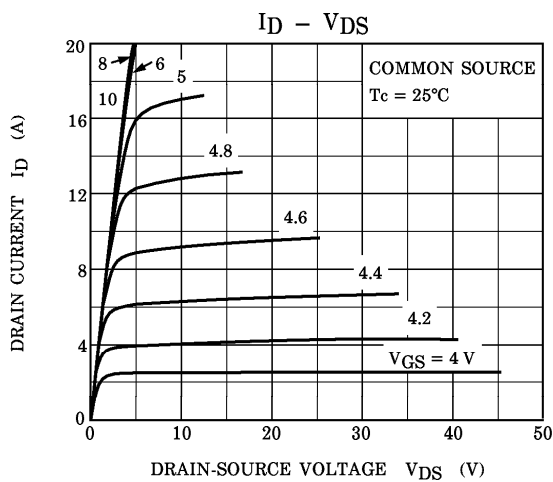
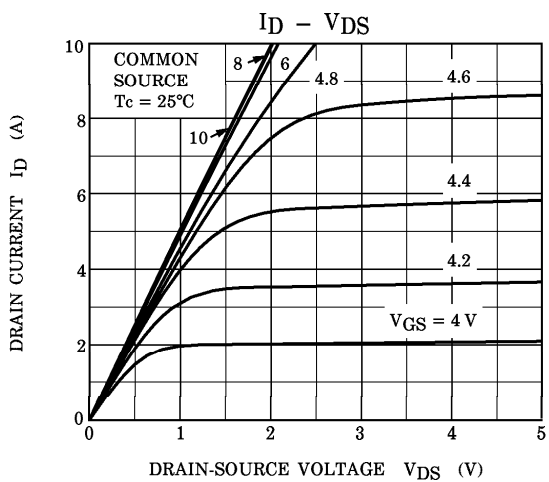
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Gate Leakage Current	I _{GSS}	V _{GS} = ±25 V, V _{DS} = 0 V	—	—	±10	μA	
Gate-Source Breakdown Voltage	V _{(BR)GSS}	I _G = ±10 μA, V _{DS} = 0 V	±30	—	—	V	
Drain Cut-off Current	I _{DSS}	V _{DS} = 500 V, V _{GS} = 0 V	—	—	100	μA	
Drain-Source Breakdown Voltage	V _{(BR)DSS}	I _D = 10 mA, V _{GS} = 0 V	500	—	—	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 = 10 A	—	0.21	0.27	Ω	
Forward Transfer Admittance	Y _{fs}	V _{DS} = 10 V, I _D = 10 A	10	17	—	S	
Input Capacitance	C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	—	3720	—	pF	
Reverse Transfer Capacitance	C _{rss}		—	340	—		
Output Capacitance	C _{oss}		—	1165	—		
Switching Time	Rise Time	t _r		—	30	—	ns
	Turn-on Time	t _{on}		—	70	—	
	Fall Time	t _f		—	50	—	
	Turn-off Time	t _{off}		V _{IN} : t _r , t _f < 5 ns, Duty ≤ 1%, t _w = 10 μs	—	290	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Q _g	V _{DD} ≐ 400 V, V _{GS} = 10 V, I _D = 6 A	—	80	—	nC	
Gate-Source Charge	Q _{gs}		—	48	—		
Gate-Drain ("Miller") Charge	Q _{gd}		—	32	—		

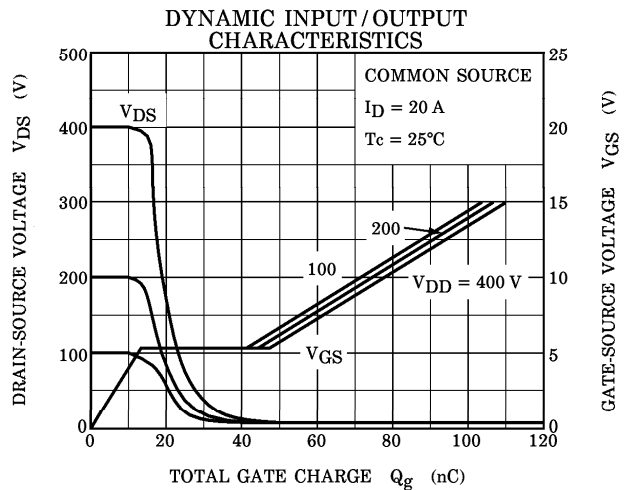
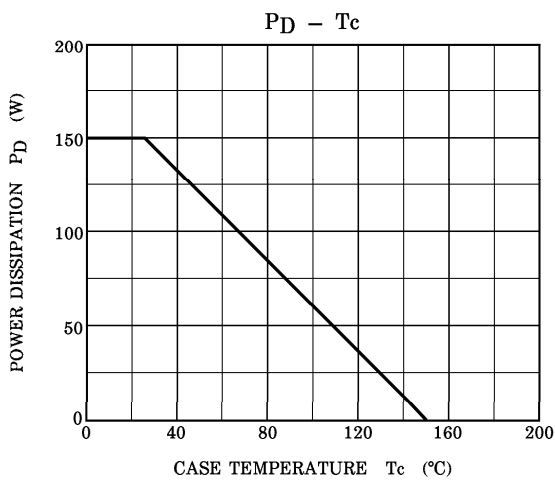
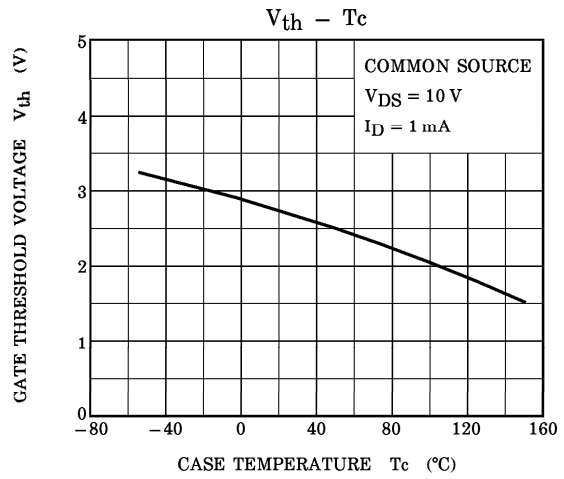
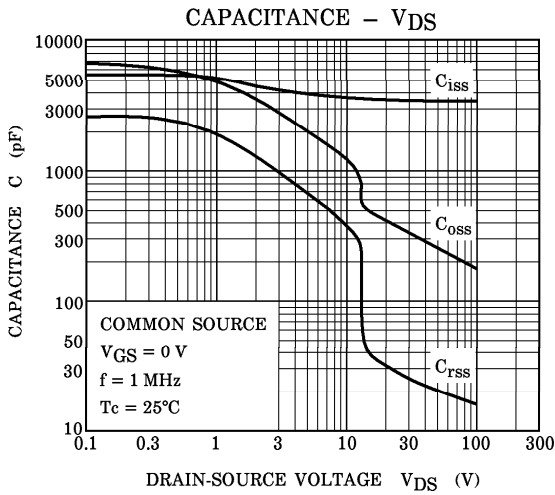
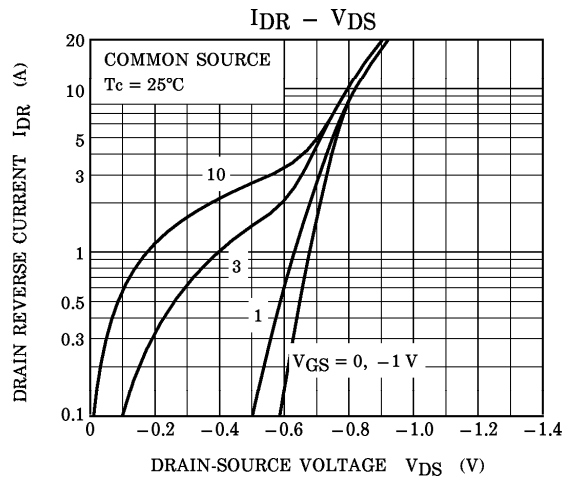
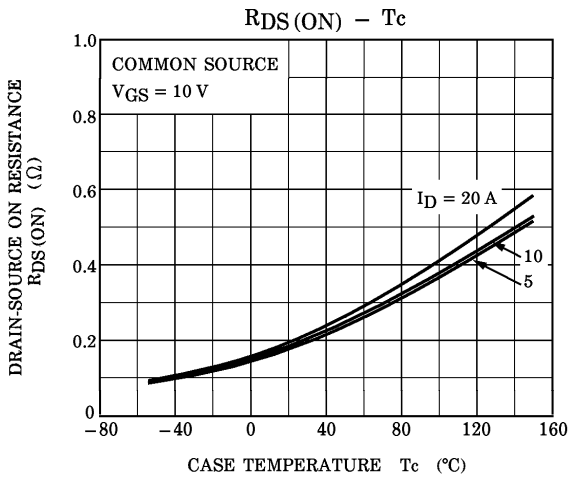
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

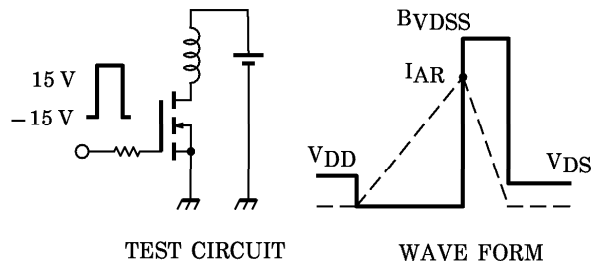
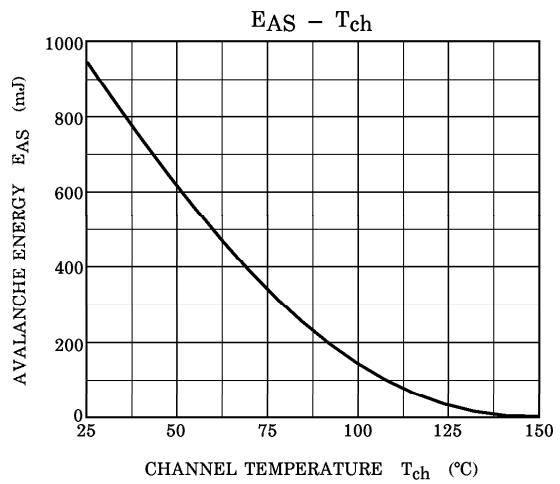
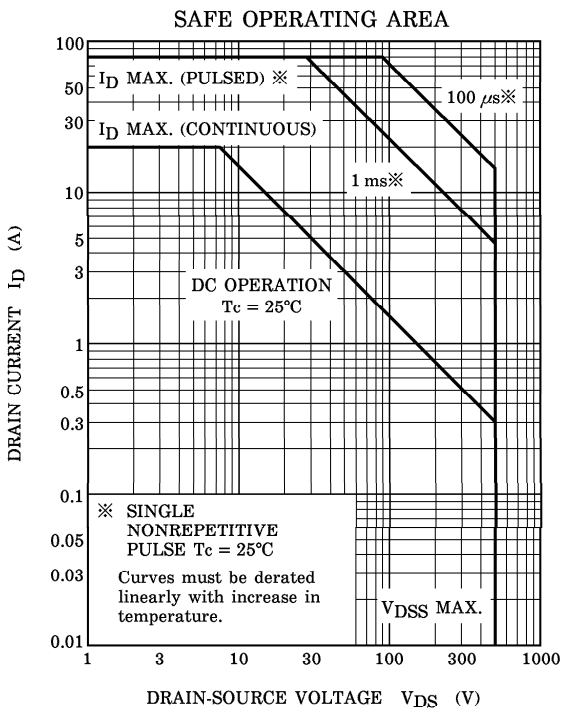
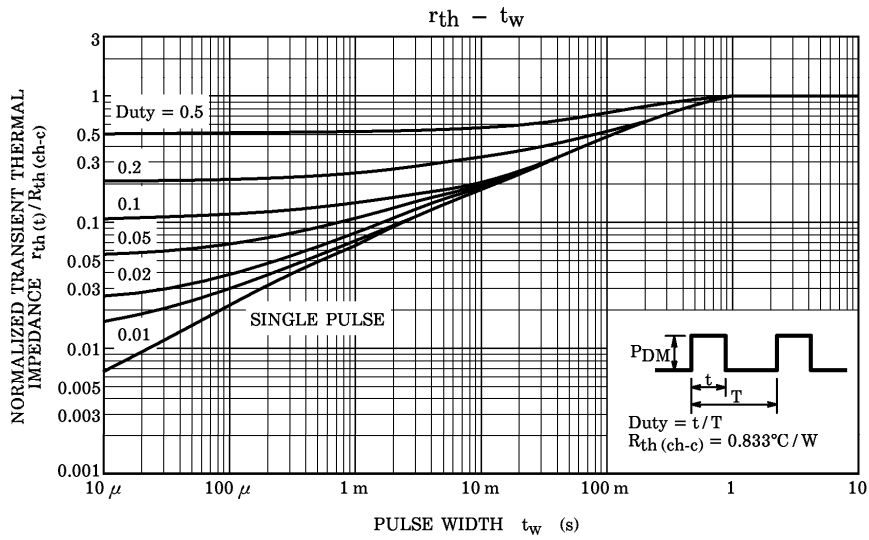
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I _{DR}	—	—	—	20	A
Pulse Drain Reverse Current	I _{DRP}	—	—	—	80	A
Diode Forward Voltage	V _{DSF}	I _{DR} = 20 A, V _{GS} = 0 V	—	—	-1.7	V
Reverse Recovery Time	t _{rr}	I _{DR} = 20 A, V _{GS} = 0 V dI _{DR} /dt = 100 A/μs	—	540	—	ns
Reverse Recovery Charge	Q _{rr}		—	5.4	—	μC

MARKING









Peak $I_{AR} = 20 \text{ A}$, $R_G = 25 \Omega$, $E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{B_{VDSS}}{B_{VDSS} - V_{DD}} \right)$
 $V_{DD} = 90 \text{ V}$, $L = 4.08 \text{ mH}$