

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (L^2 - π -MOSV)

2SK3387

High Speed Switching Applications

Switching Regulator, DC-DC Converter and Motor Drive Applications

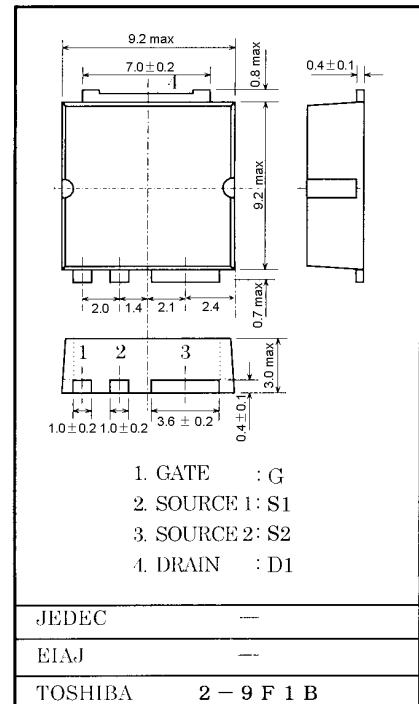
- 4 V gate drive
- Low drain-source ON resistance: $R_{DS(ON)} = 0.08 \Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 17 S$ (typ.)
- Low leakage current: $I_{DSS} = 100 \mu A$ ($V_{DS} = 150 V$)
- Enhancement mode: $V_{th} = 0.8 \sim 2.0 V$ ($V_{DS} = 10 V$, $I_D = 1 mA$)

Maximum Ratings ($T_c = 25^\circ C$)

Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	150	V
Drain-gate voltage ($R_{GS} = 20 k\Omega$)	V_{DGR}	150	V
Gate-source voltage	V_{GSS}	± 20	V
Drain current	DC	I_D	A
	Pulse	I_{DP}	
Drain power dissipation ($T_c = 25^\circ C$)	P_D	100	W
Single pulse avalanche energy**	E_{AS}	176	mJ
Repetitive avalanche energy*	E_{AR}	10	mJ
Channel temperature	T_{ch}	150	$^\circ C$
Storage temperature range	T_{stg}	$-55 \sim 150$	$^\circ C$

Industrial Applications

Unit in mm



Notice:

S1: Input signal pin
S2: Source current

Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th(ch-c)}$	1.25	$^\circ C/W$

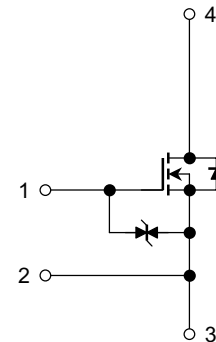
Note1:

* Repetitive rating; pulse width limited by max junction temperature.

** $V_{DD} = 50 V$, $T_{ch} = 25^\circ C$ (initial), $L = 800 \mu H$, $R_G = 25 \Omega$, $I_{AR} = 18 A$

This transistor is an electrostatic sensitive device.

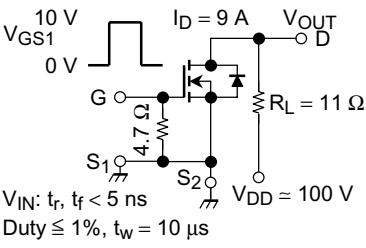
Please handle with caution.



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Electrical Characteristics (Note2) (Tc = 25°C)

Characteristics	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 cut-off current	I_{DSS}	$V_{DS} = 150 \text{ V}$, $V_{GS} = 0 \text{ V}$	—	—	100	μA
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 10 \text{ mA}$, $V_{GS} = 0 \text{ V}$	150	—	—	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	$R_{DS(ON)}$	$V_{GS} = 4 \text{ V}$, $I_D = 9 \text{ A}$	—	0.09	0.18	Ω
		$V_{GS} = 10 \text{ V}$, $I_D = 9 \text{ A}$	—	0.08	0.12	
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 10 \text{ V}$, $I_D = 9 \text{ A}$	10	17	—	S
Input capacitance	C_{iss}	$V_{DS} = 10 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$	—	1380	—	pF
Reverse transfer capacitance	C_{rss}		—	200	—	pF
Output capacitance	C_{oss}		—	610	—	pF
Switching time	Rise time		—	12	—	ns
	Turn-on time		—	20	—	
	Fall time		—	12	—	
	Turn-off time		—	68	—	
Total gate charge (gate-source plus gate-drain)	Q_g	$V_{DD} = 120 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 18 \text{ A}$	—	57	—	nC
Gate-source charge	Q_{gs}		—	43	—	nC
Gate-drain ("miller") charge	Q_{gd}		—	14	—	nC

Note2: Please connect the S1 pin and S2 pin, and then ground the connected pin.
(However, while switching times are measured, please don't connect and ground it.)

Source-Drain Diode Ratings and Characteristics (Note3) (Tc = 25°C)

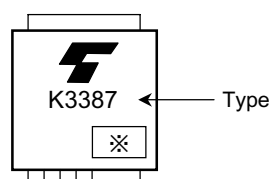
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current ***	I_{DR1}	—	—	—	18	A
Pulse drain reverse current ***	I_{DRP1}	—	—	—	54	A
Continuous drain reverse current ***	I_{DR2}	—	—	—	1	A
Pulse drain reverse current ***	I_{DRP2}	—	—	—	4	A
Diode forward voltage	V_{DS2F}	$I_{DR1} = 18 \text{ A}$, $V_{GS} = 0 \text{ V}$	—	—	-1.7	V
Reverse recovery time	t_{rr}	$I_{DR} = 18 \text{ A}$, $V_{GS} = 0 \text{ V}$,	—	185	—	ns
Reverse recovery charge	Q_{rr}	$dI_{DR}/dt = 100 \text{ A}/\mu\text{s}$	—	1.3	—	μC

Note 3:

*** drain, flowing current value between the S2 pin, open the S1 pin
drain, flowing current value between the S1 pin, open the S2 pin

Unless otherwise specified, please connect the S1 and S2 pins, and then ground the connected pin.

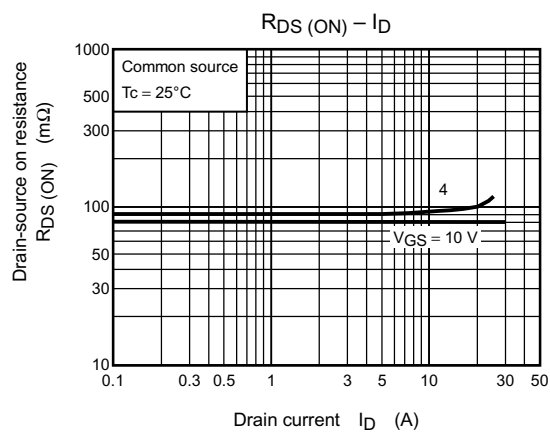
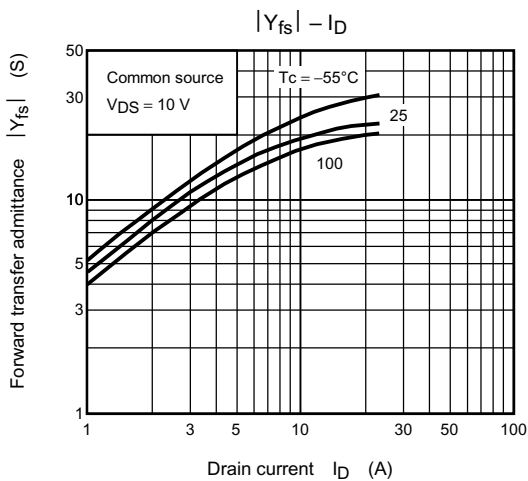
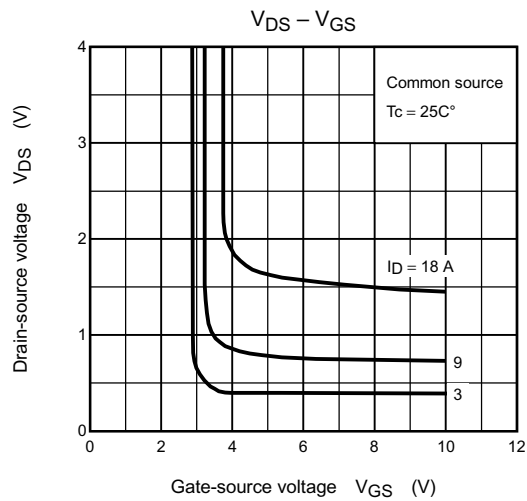
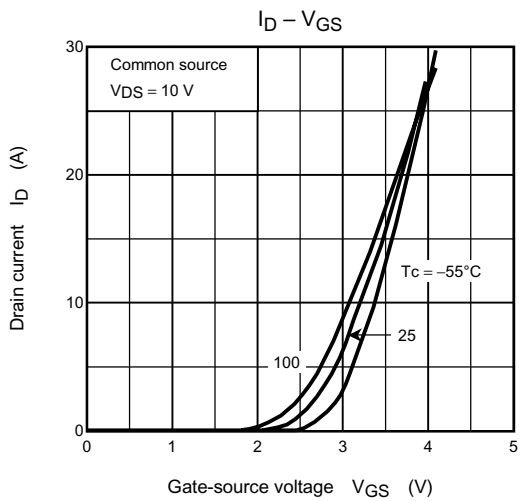
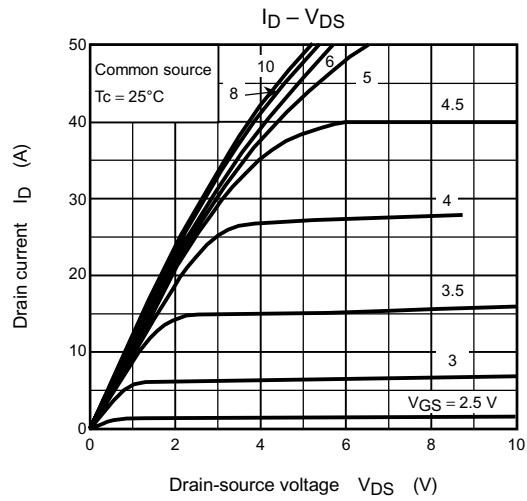
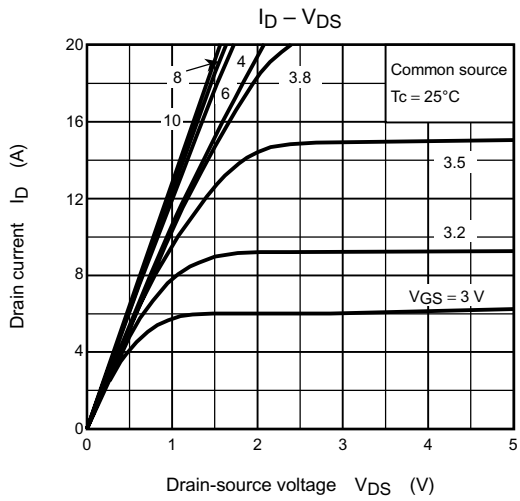
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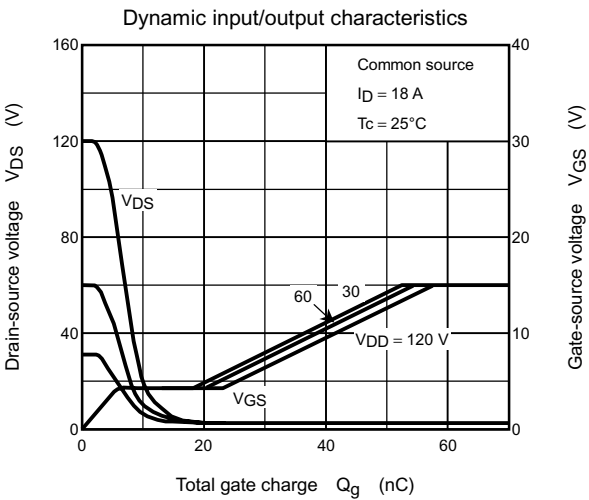
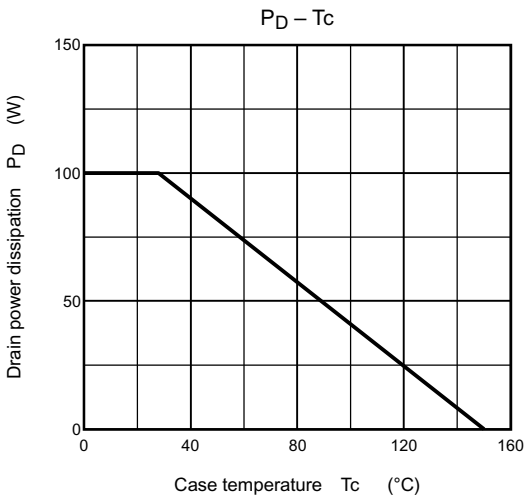
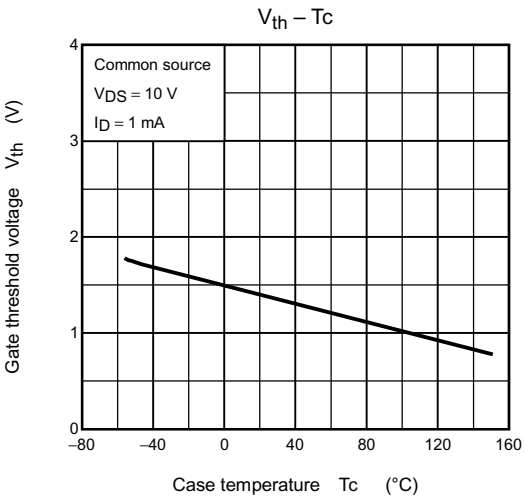
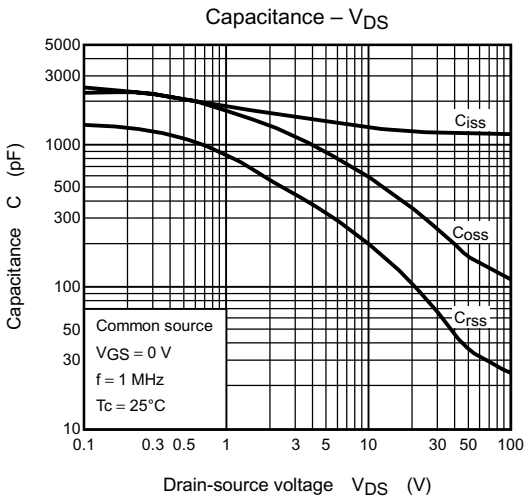
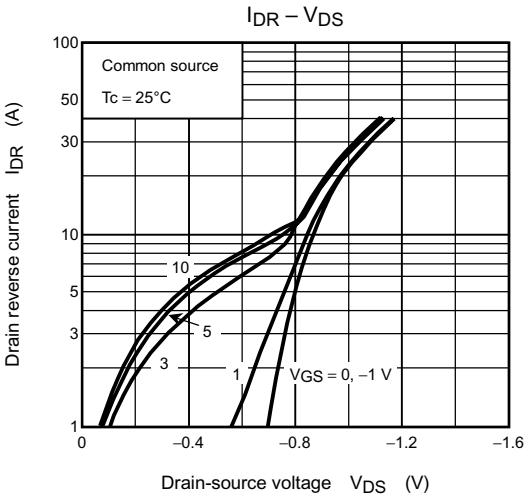
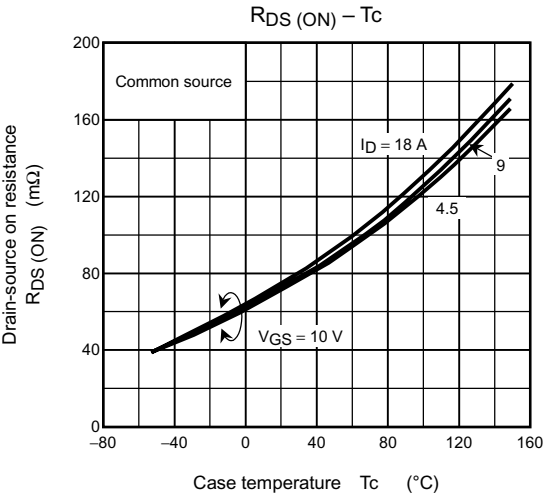


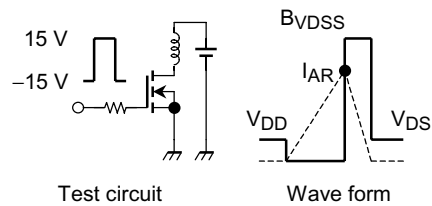
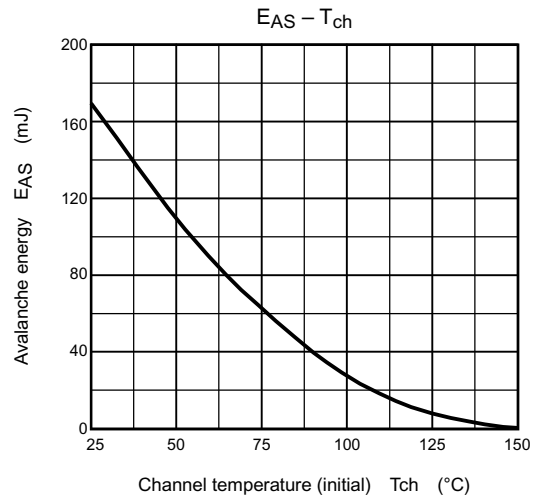
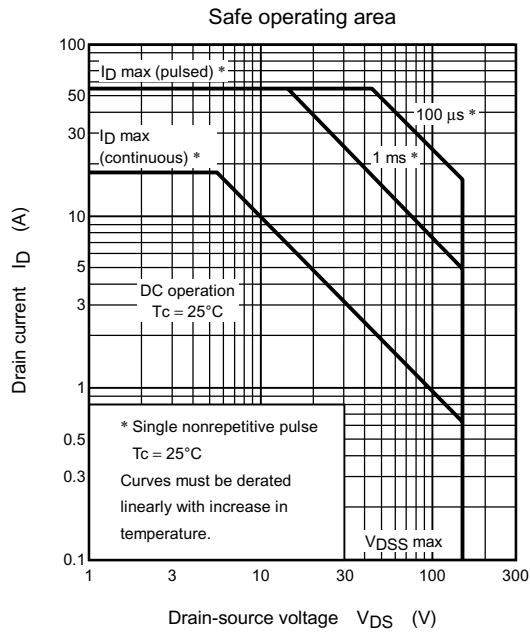
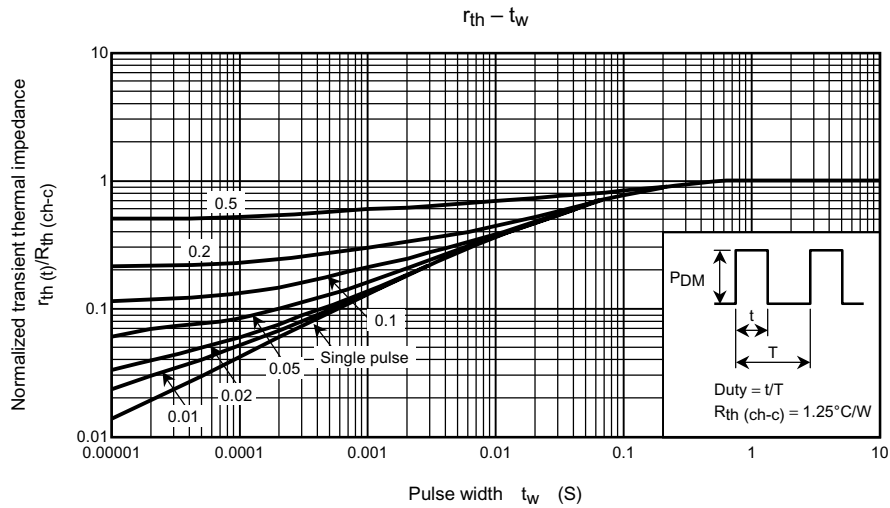
※ Lot Number

Month (starting from alphabet A)

Year (last number of the christian era)







Peak $I_{AR} = 18\text{ A}$, $R_G = 25\ \Omega$
 $V_{DD} = 50\text{ V}$, $L = 0.8\text{ mH}$

$$E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{B_{VDSS}}{B_{VDSS} - V_{DD}} \right)$$