

Small switching (60V, 2A)

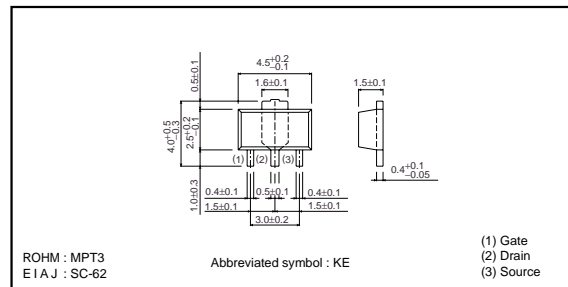
●Features

- 1) Low on resistance.
- 2) High-speed switching.
- 3) Optimum for a pocket resource etc. because of undervoltage actuation (2.5V actuation).
- 4) Driving circuit is easy.
- 5) Easy to use parallel.
- 6) It is strong to an electrostatic discharge.

●Structure

Silicon N-channel
MOS FET transistor

●External dimensions (Units : mm)

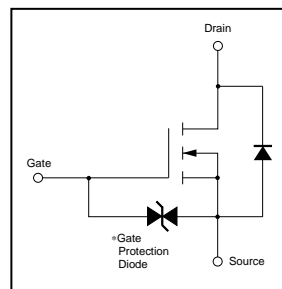


●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Drain-source voltage	V _{DS}	60	V
Gate-source voltage	V _{GS}	±20	V
Drain current	Continuous	I _D	2 A
	Pulsed	I _D ^{*1}	8 A
Reverse drain current	Continuous	I _{DR}	2 A
	Pulsed	I _{DR} ^{*1}	8 A
Total power dissipation (Tc=25°C)	P _D	0.5	W
Channel temperature	T _{ch}	150	°C
Storage temperature	T _{stg}	-55~+150	°C

*1 P_w ≤ 10μs, Duty cycle ≤ 1%
*2 When mounted on a 40 × 40 × 0.7 mm alumina board.

●Internal equivalent circuit



* A protection diode has been built in between the gate and the source to protect against static electricity when the product is in use. Use the protection circuit when rated voltages are exceeded.

●Electrical characteristics (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Gate-source leakage	I _{GSS}	-	-	±10	μA	V _{GS} = ±20V, V _{DS} = 0V
Drain-source breakdown voltage	V _{(BR)DSS}	60	-	-	V	I _D = 1mA, V _{GS} = 0V
Zero gate voltage drain current	I _{DSS}	-	-	10	μA	V _{DS} = 60V, V _{GS} = 0V
Gate threshold voltage	V _{GS(th)}	0.8	-	1.5	V	V _{DS} = 10V, I _D = 1mA
Static drain-source on-state resistance	R _{DS(on)}	-	0.25	0.32	Ω	I _D = 1A, V _{GS} = 4V
	R _{DS(on)}	-	0.35	0.45	Ω	I _D = 1A, V _{GS} = 2.5V
Forward transfer admittance	Y _{fs} *	1.5	-	-	S	I _D = 1A, V _{DS} = 10V
Input capacitance	C _{iss}	-	160	-	pF	V _{DS} = 10V
Output capacitance	C _{oss}	-	85	-	pF	V _{GS} = 0V
Reverse transfer capacitance	C _{iss}	-	25	-	pF	f = 1MHz
Turn-on delay time	t _{d(on)}	-	20	-	ns	I _D = 1A, V _{DD} ≒ 30V
Rise time	t _r	-	50	-	ns	V _{GS} = 4V
Turn-off delay time	t _{d(off)}	-	120	-	ns	R _L = 30Ω
Fall time	t _f	-	70	-	ns	R _G = 10Ω

* P_w ≤ 300μs, Duty cycle ≤ 1%

●Electrical characteristic curves

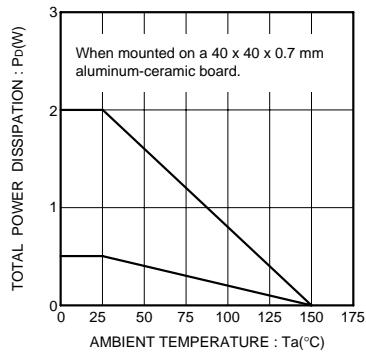


Fig.1 Total Power Dissipation vs. Case Temperature

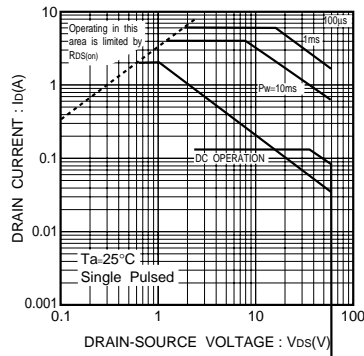


Fig.2 Maximum Safe Operating Area

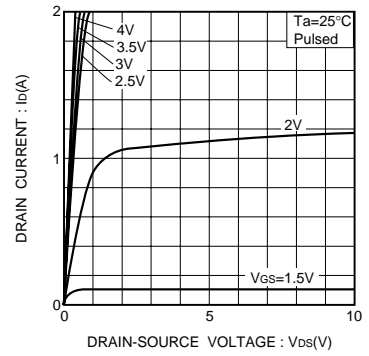


Fig.3 Typical Output Characteristics

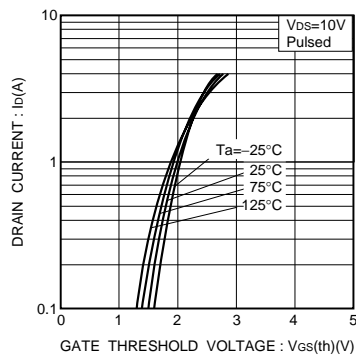


Fig.4 Typical Transfer Characteristics

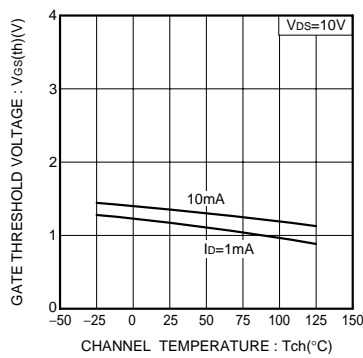


Fig.5 Gate Threshold Voltage vs. Channel Temperature

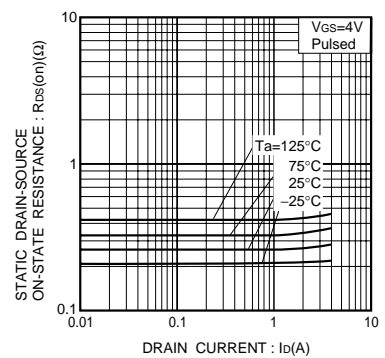


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current(I)

Transistors

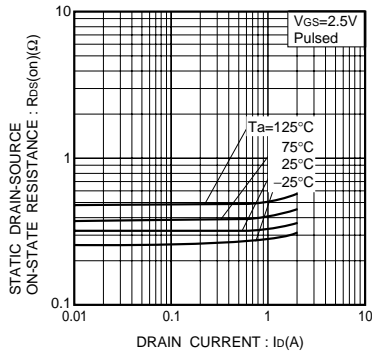


Fig. 7 Static Drain-Source On-State Resistance vs. Drain Current(I)

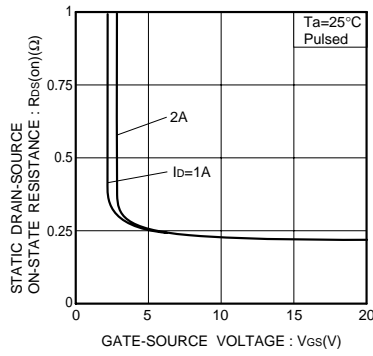


Fig. 8 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

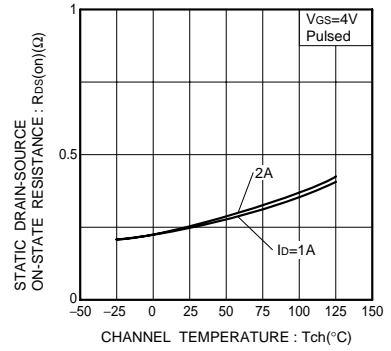


Fig. 9 Static Drain-Source On-State Resistance vs. Channel Temperature

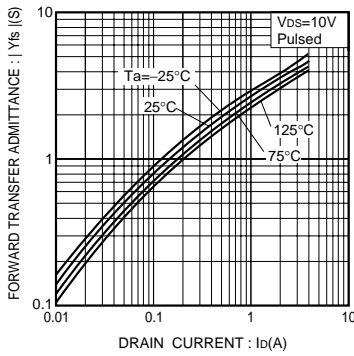


Fig. 10 Forward Transfer Admittance vs. Drain Current

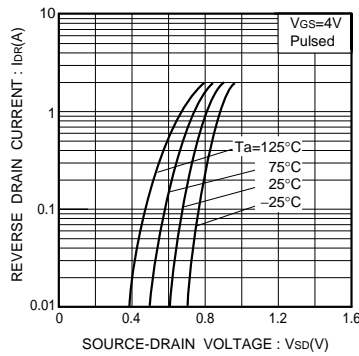


Fig. 11 Reverse Drain Current vs. Source-Drain Voltage(I)

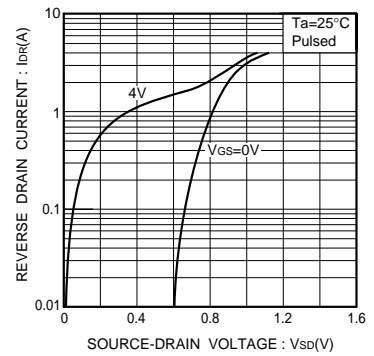


Fig. 12 Reverse Drain Current vs. Source-Drain Voltage(II)

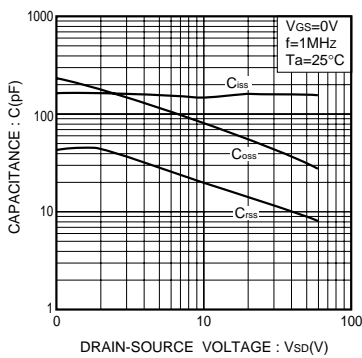


Fig. 13 Typical Capacitance vs. Drain-Source Voltage

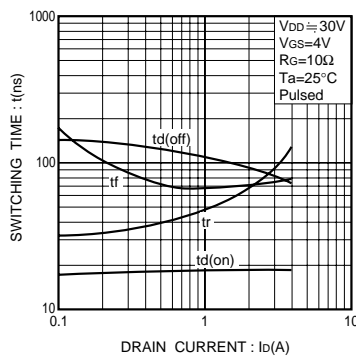


Fig. 14 Switching Characteristics (a measurement circuit diagram Fig.17, it refers 18 times)

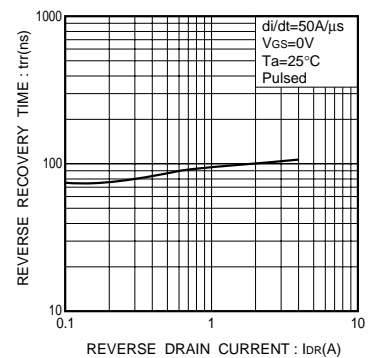


Fig. 15 Reverse Recovery Time vs. Reverse Drain Current

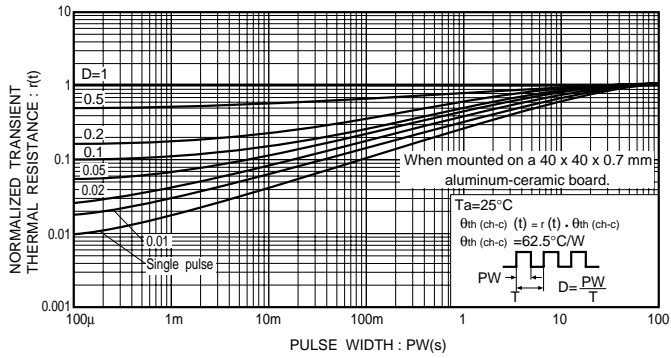


Fig.16 Normalized Transient Thermal Resistance vs. Pulse Width

● Switching characteristics measurement circuit

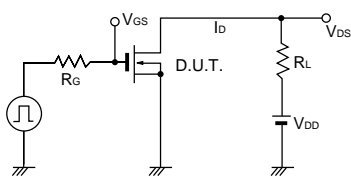


Fig.17 Switching Time Test Circuit

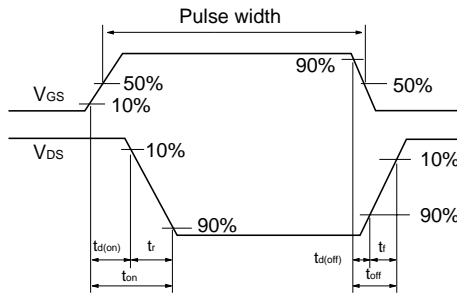


Fig.18 Switching Time Waveforms