

F5020

FUJI Intelligent Power MOSFET

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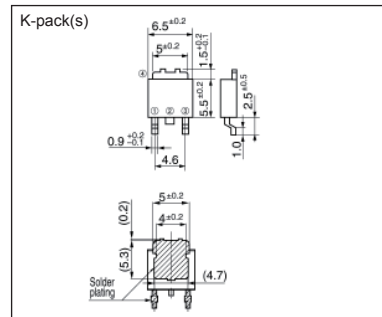
■ Features

- Over temperature protection
- Short circuit protection
- Low on-resistance
- High speed switching

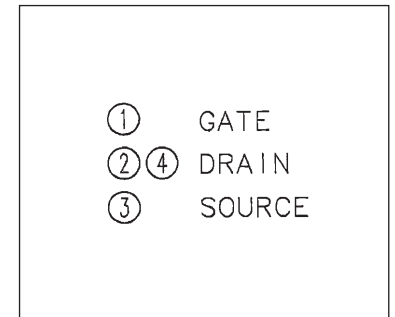
■ Applications

- Solenoid driver
- Lamp driver
- Replacements for fuse and relay

■ Outline drawings [mm]



■ Connection



■ Maximum ratings and characteristics

● Absolute maximum ratings (at Tc=25°C, unless otherwise specified)

Description	Symbol	Characteristics	Unit	Remarks
Drain-source voltage	V _{DS}	40	V	DC
Gate-source voltage	V _{GS}	-0.3~7.0	V	DC
Continuous drain current	I _D	3	A	T _c =25°C
Maximum power dissipation	P _D	1.5	W	T _c =25°C
Operating junction temperature	T _J	150	°C	-
Storage temperature range	T _{stg}	-55 ~ 150	°C	-
Single pulse inductive load switch-off energy dissipation	E _{CL}	50	mJ	T _J =150°C, L=10mH Single pulse, dv/dt≤10V/μs

● Electrical characteristics (at Tc=25°C unless otherwise specified)

Description	Symbol	Conditions	min.	typ.	max.	Unit
Drain-source clamp voltage	V _{DS}	I _D =1mA, V _{GS} =0V	40	-	60	V
Gate threshold voltage	V _{GS(th)}	I _D =10mA, V _{DS} =13V	1.0	-	2.8	V
Operation gate voltage (protection circuit operates)	V _{GS(p)}	-	3.0	-	7.0	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =13V, V _{GS} =0V	-	-	100	μA
Gate-source leakage current	I _{GS(m)*}	V _{GS} =5V	-	-	500	μA
	I _{GS(un)**}		-	-	800	μA
Drain-source on-state resistance	R _{DS(on)}	I _D =1A, V _{GS} =5V	-	-	400	mΩ
		I _D =1A, V _{GS} =3V	-	-	600	
Turn-on time	t _{on}	V _{DS} =13V, R _L =13Ω, V _{GS} =5V	-	-	100	μs
Turn-off time	t _{off}		-	-	100	μs
Over-temperature protection	T _{trip}	V _{GS} =5V	150	-	-	°C
Short circuit protection	I _{OC}	V _{GS} =5V	5	-	-	A

Note * : Under normal operation

Note ** : Under self protection

● Electrical characteristics (at Tc=-40~105°C unless otherwise specified)

Description	Symbol	Conditions	min.	typ.	max.	Unit
Drain-source clamp voltage	V _{DS}	I _D =1mA, V _{GS} =0V	38	-	62	V
Gate threshold voltage	V _{GS(th)}	I _D =10mA, V _{DS} =13V	0.9	-	3.0	V
Operation gate voltage	V _{GS(p)}	-	3.0	-	6.7	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =13V, V _{GS} =0V	-	-	170	μA
		V _{DS} =30V, V _{GS} =0V	-	-	1.6	mA
Gate-source leakage current	I _{GS(m)}	V _{GS} =5V*	-	-	600	μA
	I _{GS(un)}	V _{GS} =5V, T _J >150°C**	-	-	960	μA
Drain-source on-state resistance	R _{DS(on)}	I _D =1A, V _{GS} =5V	-	-	600	mΩ
		I _D =1A, V _{GS} =3V	-	-	900	mΩ
Turn-on time	t _{on}	V _{DS} =13V, R _L =13Ω, V _{GS} =5V	-	-	120	μs
Turn-off time	t _{off}		-	-	120	μs
Short circuit protection	I _{OC}	V _{GS} =13V	3.4	-	-	A

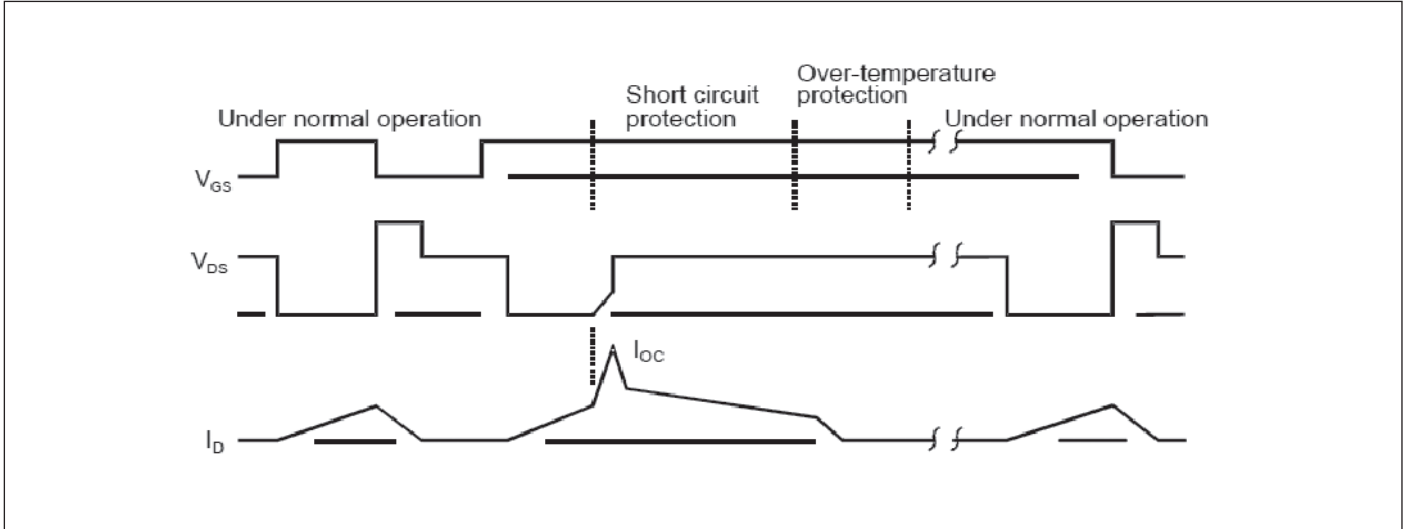
Note * : Under normal operation

Note ** : Under self protection (Short circuit ~ Short circuit protection ~ Over-temperature protection)

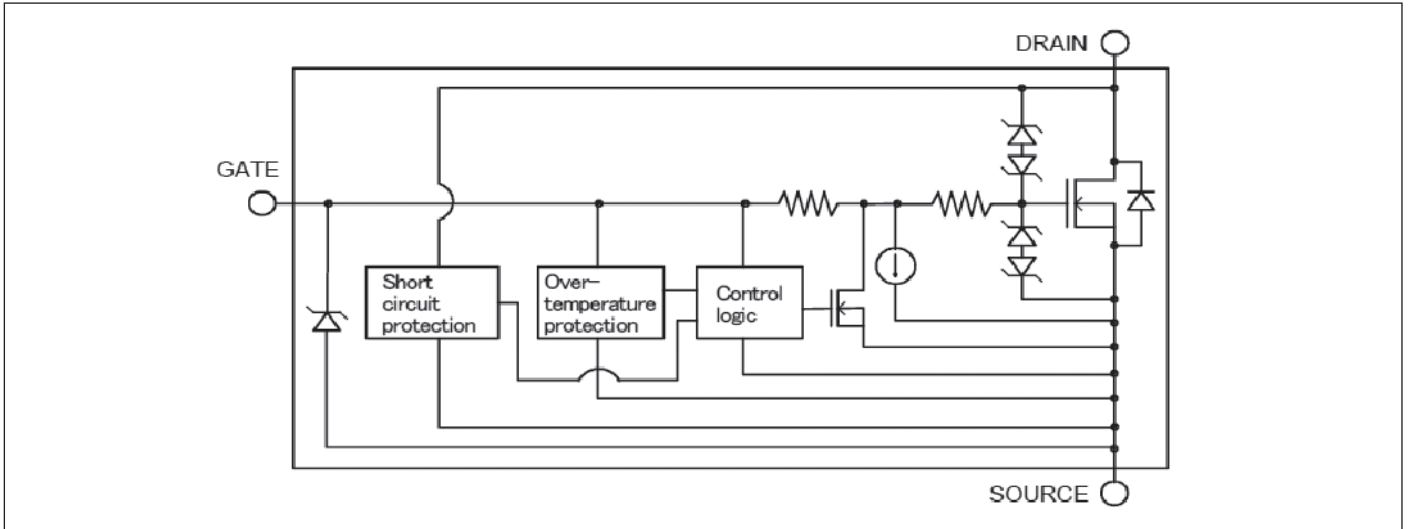
● Thermal resistance

Description	Symbol	Test conditions	min.	typ.	max.	Unit
Thermal resistance	R _{th(j-c)}	Junction-case	-	-	12.5	°C/W
	R _{th(j-a)}	Junction-ambient	-	-	125	°C/W

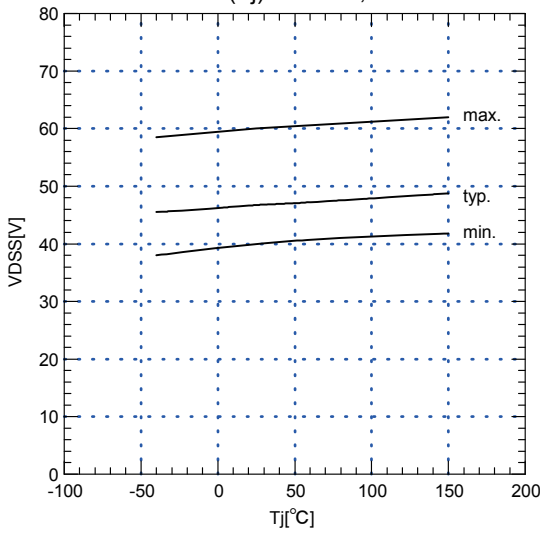
■ Timing chart



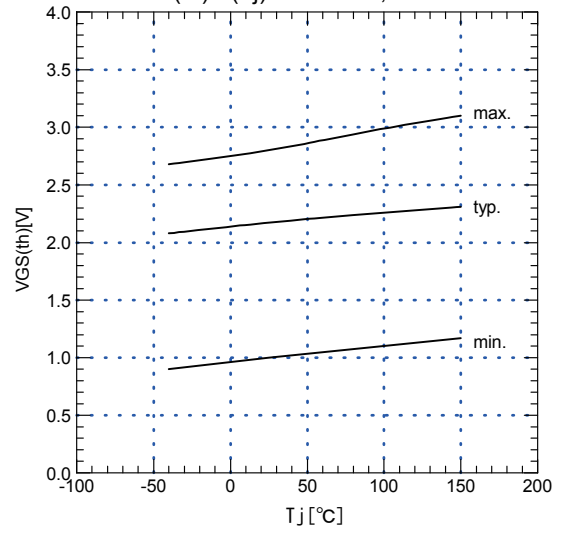
■ Circuit block diagram



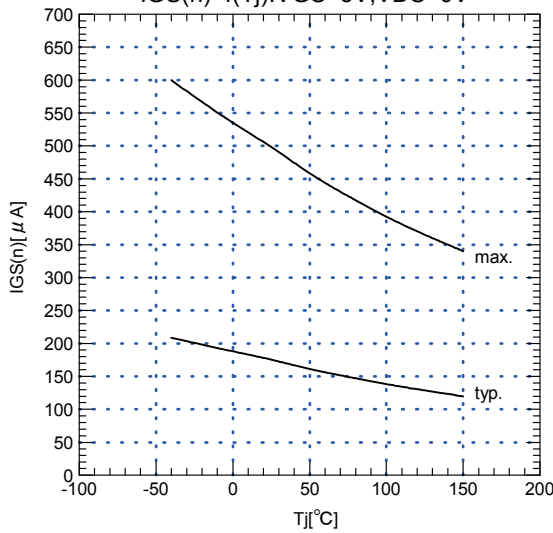
Drain-source clamp voltage
 $V_{DSS}=f(T_j): I_D=1\text{mA}, V_{GS}=0\text{V}$



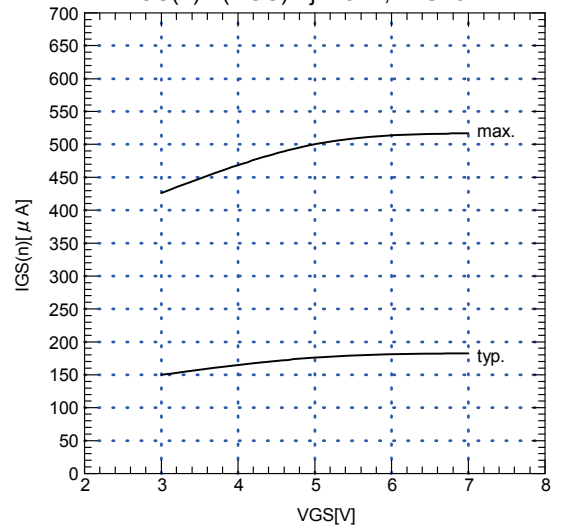
Gate threshold voltage
 $V_{GS(th)}=f(T_j): V_{DS}=13\text{V}, I_D=10\text{mA}$



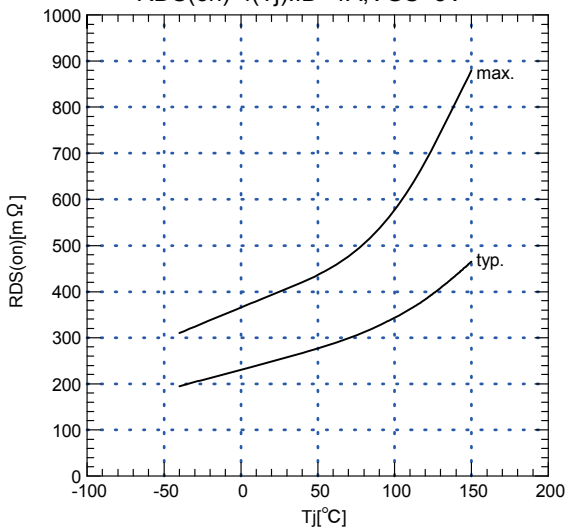
Gate-source leakage current
 $I_{GS(n)}=f(T_j): V_{GS}=5\text{V}, V_{DS}=0\text{V}$



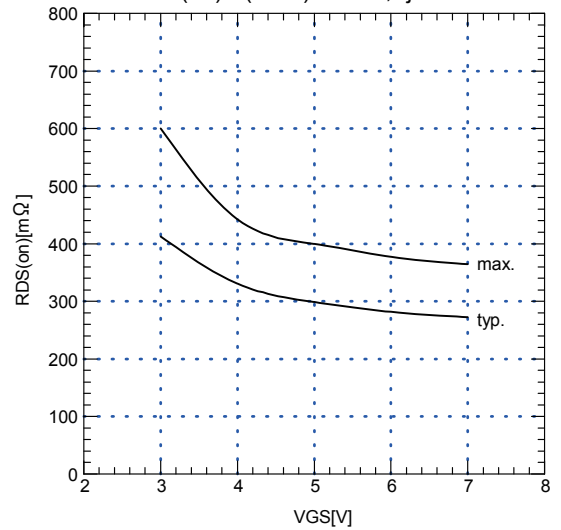
Gate-source leakage current
 $I_{GS(n)}=f(V_{GS}): T_j=25^\circ\text{C}, V_{DS}=0\text{V}$

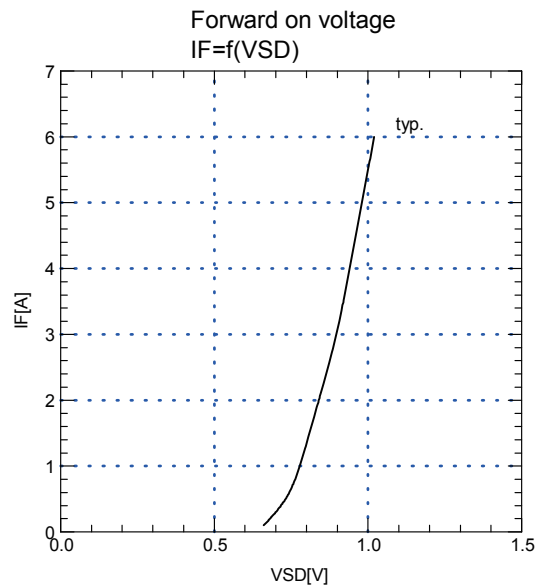
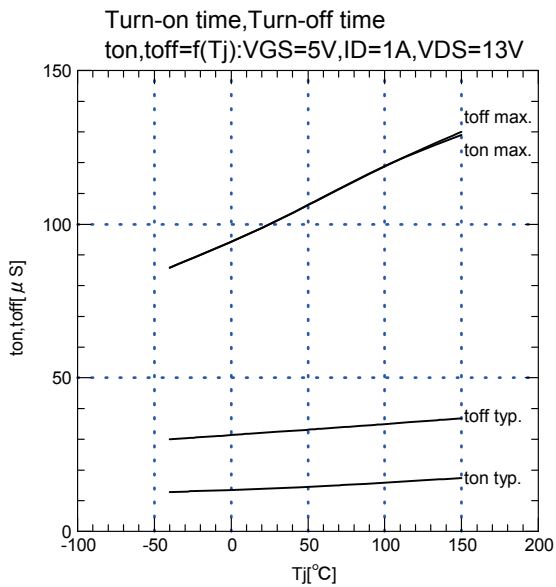
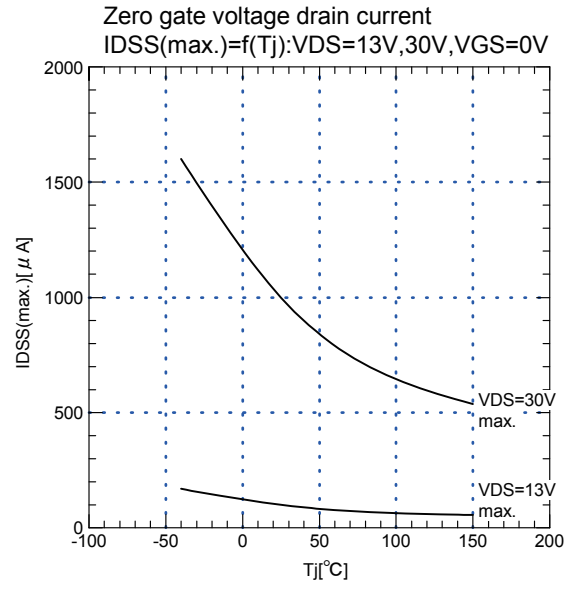
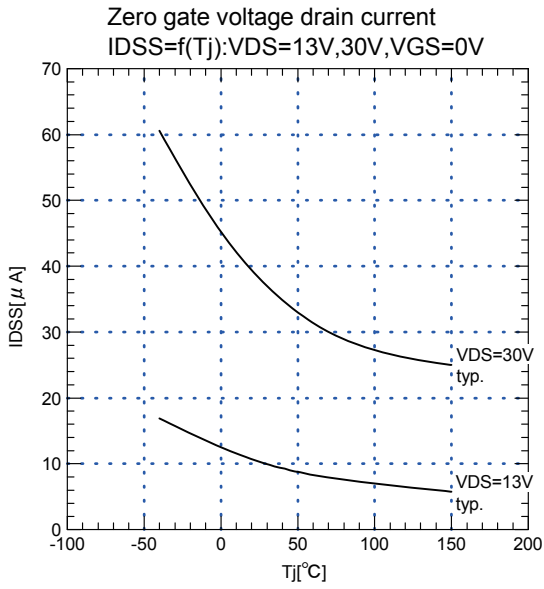
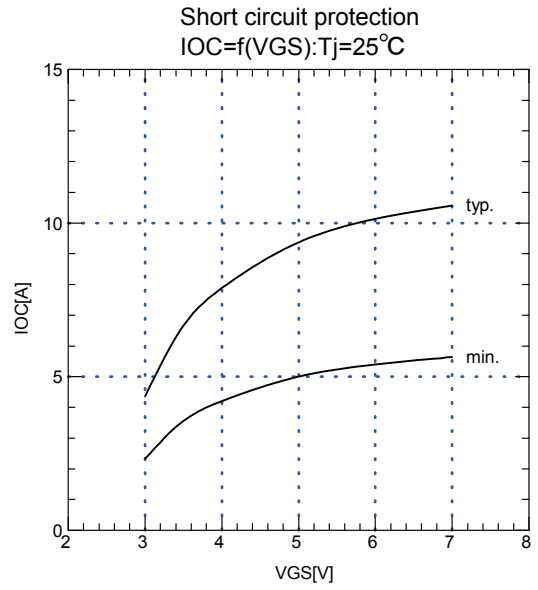
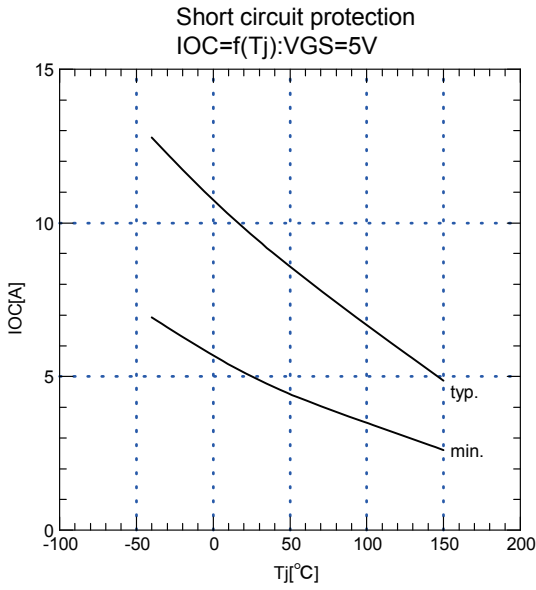


Drain-source on-state resistance
 $R_{DS(on)}=f(T_j): I_D=1\text{A}, V_{GS}=5\text{V}$



Drain-source on-state resistance
 $R_{DS(on)}=f(V_{GS}): I_D=1\text{A}, T_j=25^\circ\text{C}$





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