F5019

FUJI Intelligent Power MOSFET

Intelligent Power MOSFET

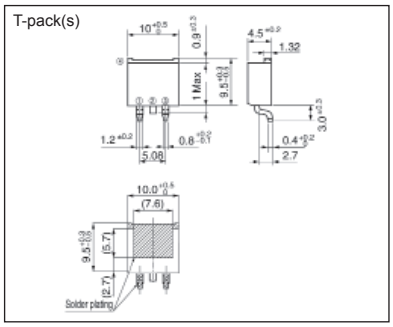
Features

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

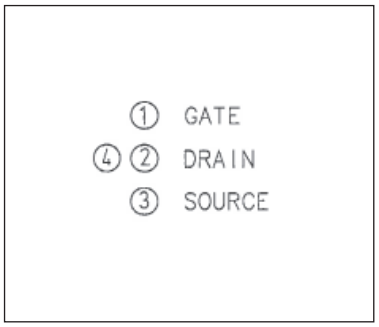
Applications

- 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_{DSS}	40	V	DC
Gate-source voltage	V_{GSS}	DC-0.3~7.0	V	DC
Continuous drain current	I_D	12	A	Tc=25˚C
Maximum power dissipation	P_D	30	W	Tc=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}	100	mJ	T_J=150°C, L=5mH, I_D=8A 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_{DSS}	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	$V_{GS\ (p)}$	–	3.0	–	7.0	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=30V, V_{GS}=0V	–	–	1.0	mA
Gate-sourse leakage current	$I_{GS\ (n)}$*	V_{GS}=5V	–	–	500	μA
	$I_{GS\ (un)}$**		–	–	800	μA
Drain-source on-state resistance	$R_{DS\ (on)}$	I_D=5A, V_{GS}=5V	–	–	140	mΩ
Turn-on time	t_{on}	V_{DS}=13V, R_L=2.6Ω, V_{GS}=5V	–	–	200	μs
Turn-off time	t_{off}		–	–	200	μs
Over-temperature protection	T_{trip}	V_{CC}=13V, V_{GS}=5V	150	–	–	˚C
Short circuit protection	I_{OC}	V_{CC}=13V, V_{GS}=5V	12	–	–	A

Note * : Under normal operation
Note ** : Under self protection

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

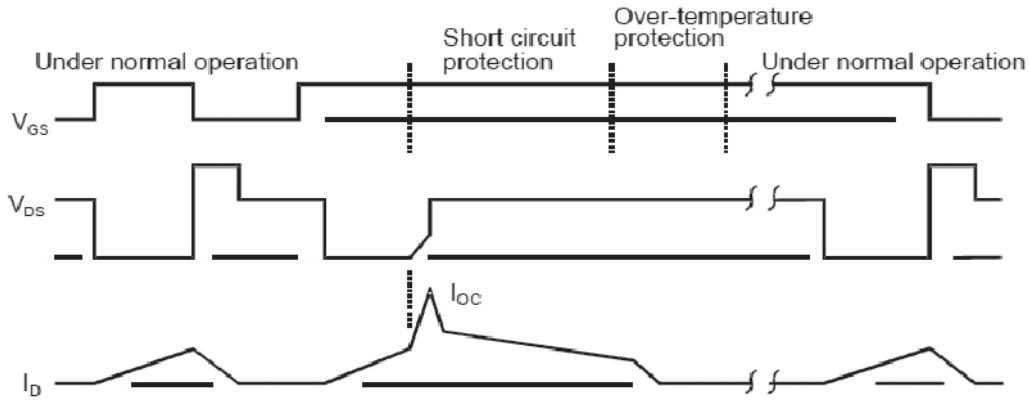
Description	Symbol	Conditions	min.	typ.	max.	Unit
Drain-source clamp voltage	V_{DSS}	I_D=1mA, V_{GS}=0V	38	–	62	V
Gate threshold voltage	$V_{GS\ (th)}$	I_D=10mA, V_{DS}=13V	1.0	–	3.0	V
Operation gate voltage (protection circuit operates)	$V_{GS\ (p)}$	–	3.0	–	6.7	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=13V, V_{GS}=0V	–	–	170	μA
		V_{DS}=30V, V_{GS}=0V	–	–	1.6	mA
Gate-sourse leakage current	$I_{GS\ (n)}$	V_{GS}=5V*	–	–	600	μA
	$I_{GS\ (un)}$	V_{GS}=5V, Tj>150˚C**	–	–	940	μA
Drain-source on-state resistance	$R_{DS\ (on)}$	I_D=5A, V_{GS}=5V	–	–	205	mΩ
Turn-on time	t_{on}	V_{DS}=13V, I_D=5A, V_{GS}=5V	–	–	240	μs
Turn-off time	t_{off}		–	–	220	μs
Short circuit protection	I_{OC}	V_{GS}=5V	8.4	–	–	A

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

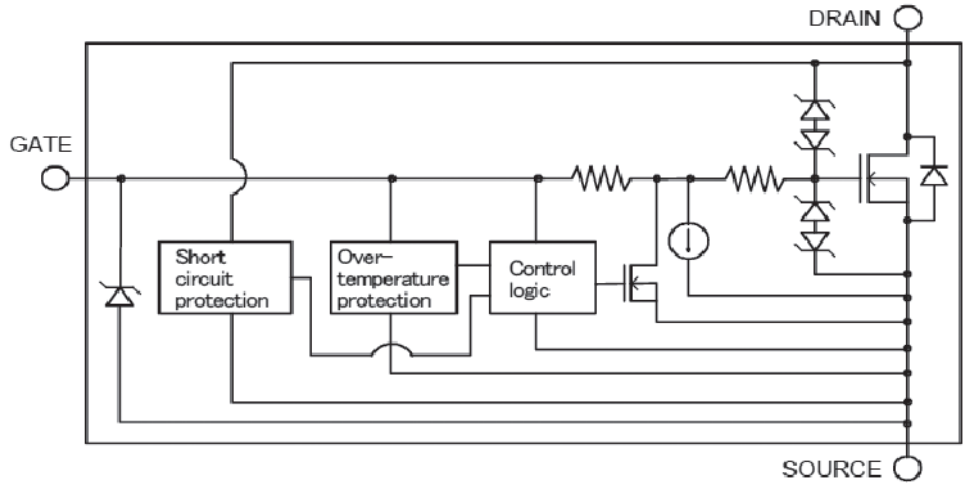
Thermal resistance

Description	Symbol	Test conditions	min.	typ.	max.	Unit
Thermal resistance	$R_{th\ (j-c)}$	Junction-case	–	–	4.2	°C/W
	$R_{th\ (j-a)}$	Junction-ambient	–	–	100	°C/W

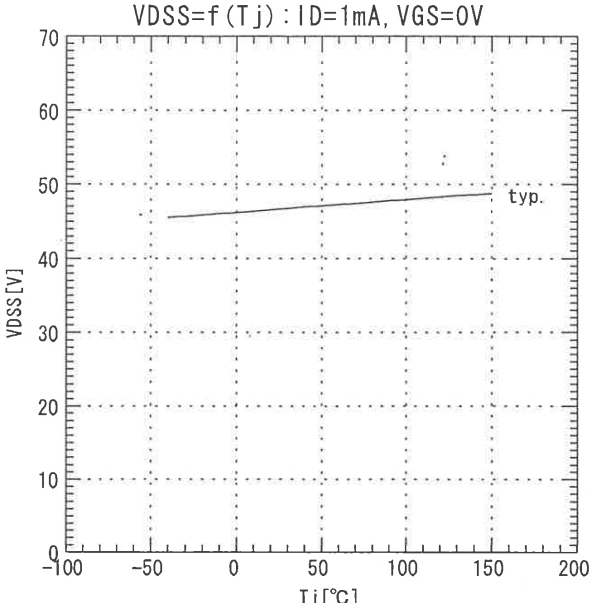
■ Timing chart



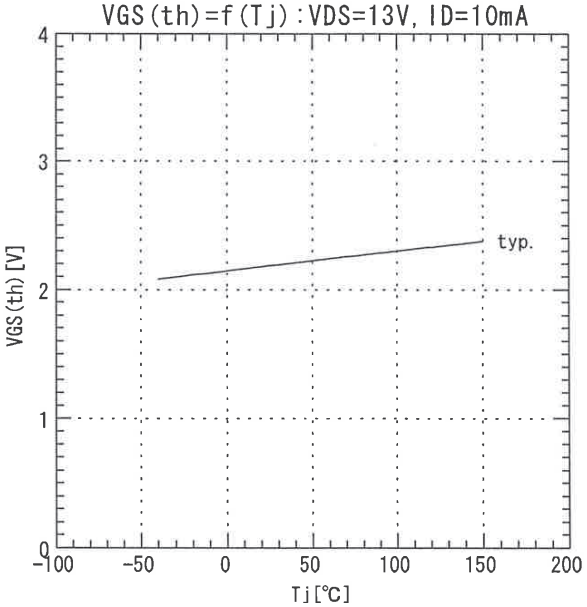
■ Circuit block diagram



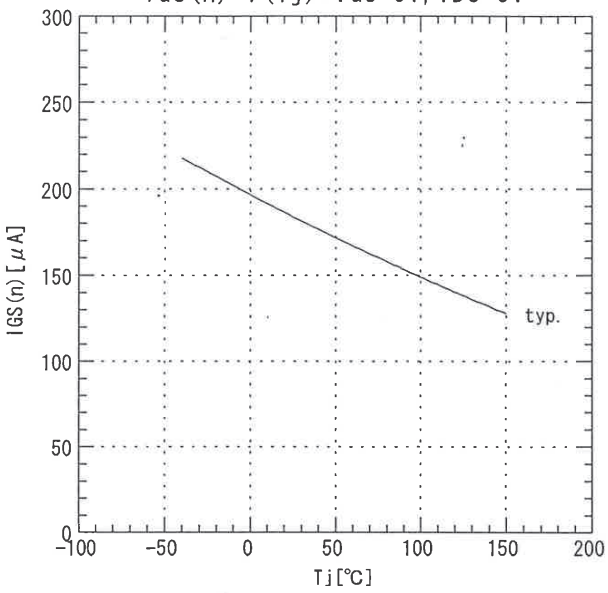
Drain-source clamp voltage
VDSS=f(Tj):ID=1mA, VGS=0V



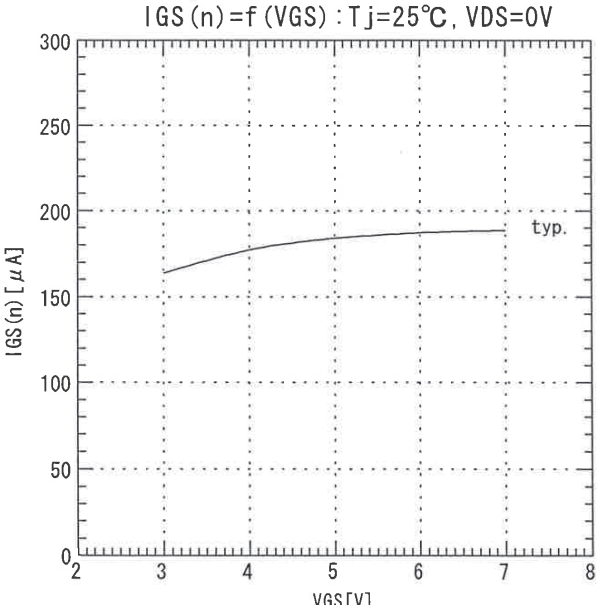
Gate threshold voltage
VGS(th)=f(Tj):VDS=13V, ID=10mA



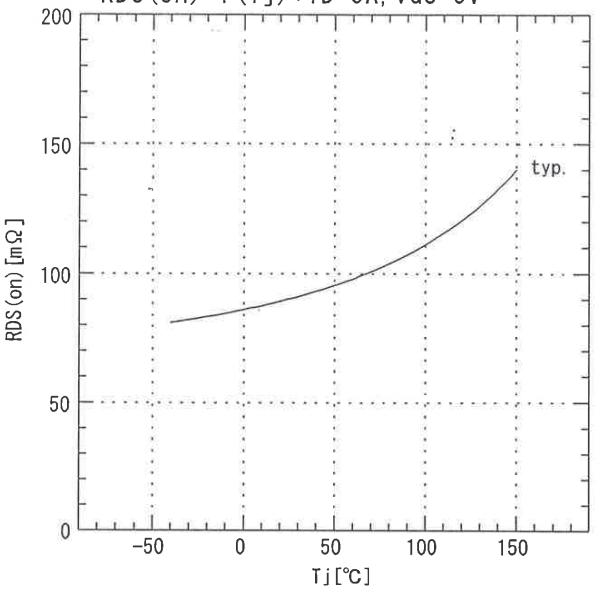
Gate-source leakage current
IGS(n)=f(Tj):VGS=5V, VDS=0V



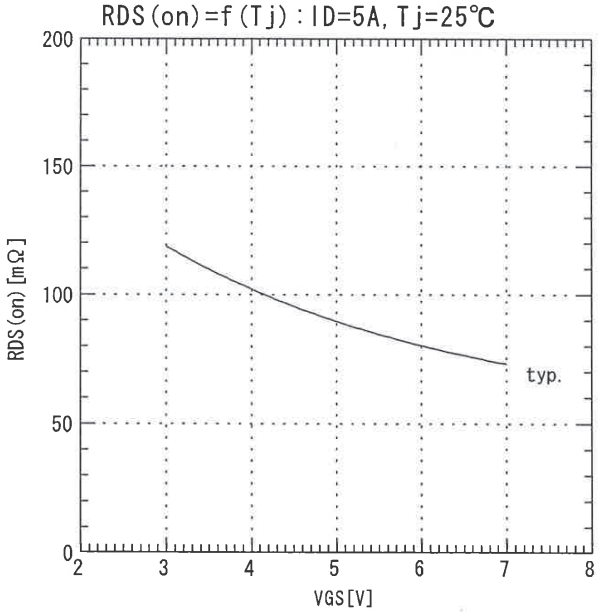
Gate-source leakage current
IGS(n)=f(VGS):Tj=25℃, VDS=0V



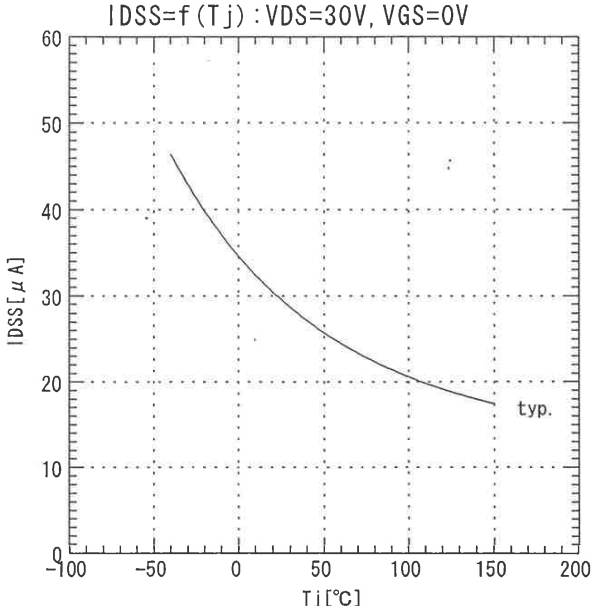
Drain-source on-state resistance
RDS(on)=f(Tj):ID=5A, VGS=5V



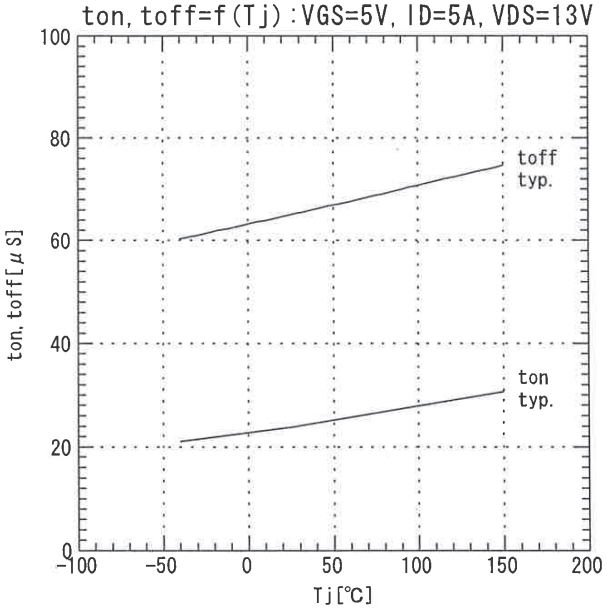
Drain-source on-state resistance
RDS(on)=f(Tj):ID=5A, Tj=25℃



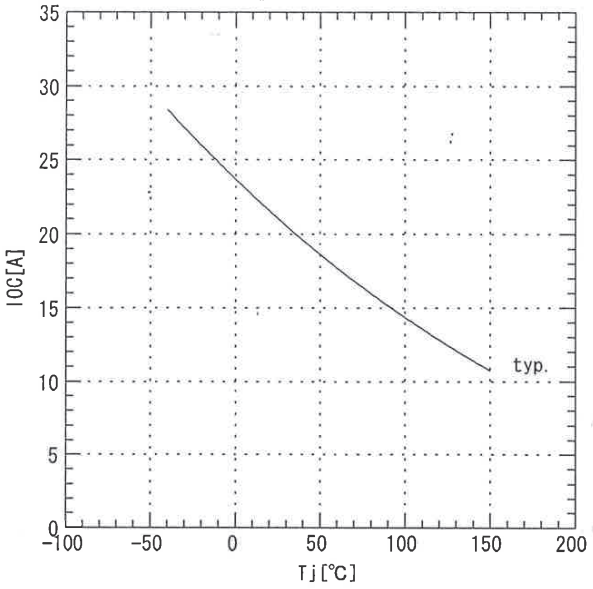
Zero gate voltage drain current
IDSS=f(Tj):VDS=30V, VGS=0V



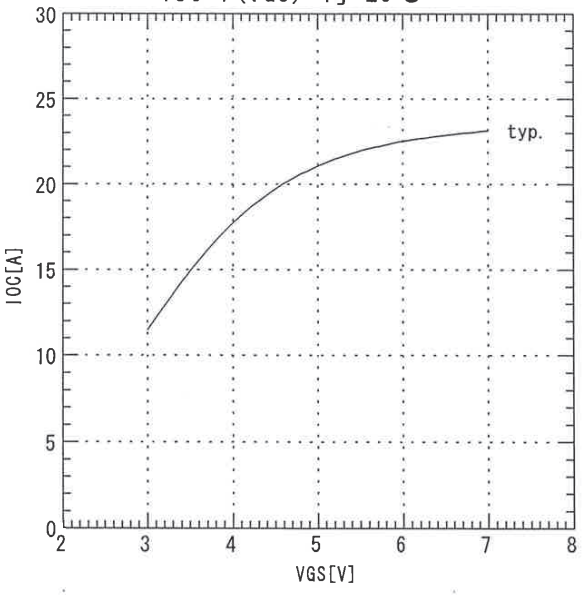
Turn-on time, Turn-off time
ton, toff=f(Tj):VGS=5V, ID=5A, VDS=13V



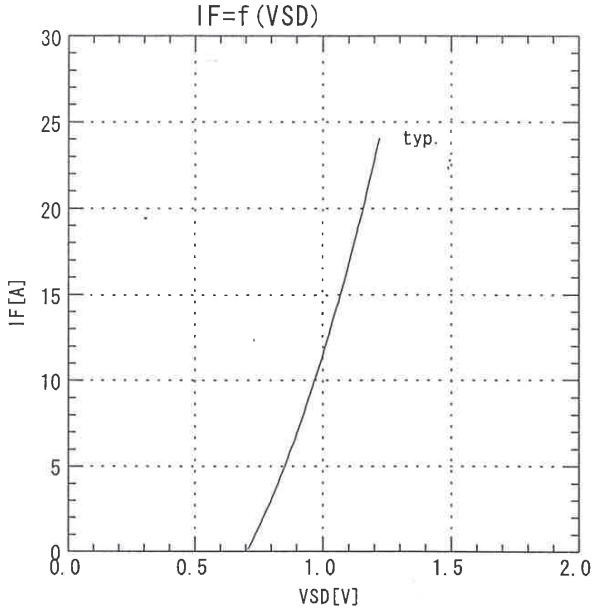
Short circuit detection
IOC=f(Tj):VGS=5V



Short circuit detection
IOC=f(VGS):Tj=25℃



Forward on voltage
IF=f(VSD)



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