F5041

FUJI Intelligent Power MOSFET

Intelligent Power MOSFET

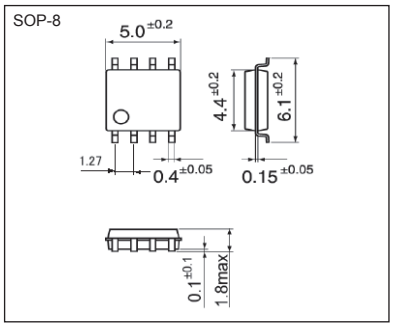
Features

- Two N-ch power MOSFET circuits
- Over temperature protection
- Short circuit protection
- Low on-resistance
- High speed switching

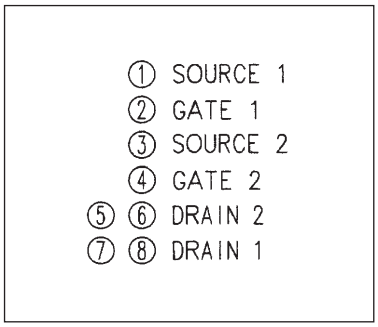
Applications

- 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}	7	V	DC
Gate-source minus voltage	$-V_{GSS}$	1.5	V	R_G=100Ω
Continuous drain current	I_D	1	A	–
Maximum power dissipation	P_D	1.5	W	*
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}	25	mJ	T_j=150°C, I_D=0.5A Single pulse, dv/dt≤10V/μs

Note * : Surface mounted on 1000mm²PCB (FR-4), 2ch on simultaneously

● 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	1.53	–	2.8	V
Operation gate voltage (protection circuit operates)	$V_{GS\ (p)}$	–	2.8	–	7.0	V
Zero gate voltage drain current	$I_{DSS(-VGS)}$	V_{DS}=16V, V_{GS}=0~1.5V	–	–	15	μA
		V_{DS}=30V, V_{GS}=0~1.5V	–	–	35	μA
Zero gate minus voltage drain current	I_{DSS}	V_{DS}=16V, V_{GS}=-1.5V, R_G=100Ω	–	–	12	μA
		V_{DS}=30V, V_{GS}=-1.5V, R_G=100Ω	–	–	30	μA
Gate-sourse leakage current	$I_{GS\ (n)}$	V_{GS}=5V**	–	–	250	μA
	$I_{GS\ (un)}$	V_{GS}=5V, Tj>150˚C***	–	–	300	μA
Drain-source on-state resistance	$R_{DS\ (on)}$	I_D=0.5A, V_{GS}=5V	–	–	600	mΩ
Turn-on time	t_{on}	V_{DS}=13V, I_D=0.5A, V_{GS}=5V	–	–	50	μS
Turn-off time	t_{off}		–	–	50	μS
Over-temperature protection	T_{trip}	V_{GS}=5V	150	–	–	˚C
Short circuit protection	I_{OC}	V_{GS}=5V	1.5	–	–	A

Note ** : Under normal operation
Note *** : Under self protection (Short circuit ~ Short circuit protection ~ Over-temperature 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	1.5	–	3.0	V
Operation gate voltage (protection circuit operates)	$V_{GS\ (p)}$	–	3.0	–	6.8	V
Zero gate voltage drain current	$I_{DSS(-VGS)}$	V_{DS}=16V, V_{GS}=0~1.5V	–	–	25	μA
		V_{DS}=30V, V_{GS}=0~1.5V	–	–	50	μA
Zero gate minus voltage drain current	I_{DSS}	V_{DS}=16V, V_{GS}=-1.5V, R_G=100Ω	–	–	20	μA
		V_{DS}=30V, V_{GS}=-1.5V, R_G=100Ω	–	–	50	μA
Gate-sourse leakage current	$I_{GS\ (n)}$	V_{GS}=5V**	–	–	300	μA
	$I_{GS\ (un)}$	V_{GS}=5V, Tj>150˚C***	–	–	350	μA
Drain-source on-state resistance	$R_{DS\ (on)}$	I_D=0.5A, V_{GS}=5V	–	–	920	mΩ
Turn-on time	t_{on}	V_{DS}=13V, I_D=0.5A, V_{GS}=5V	–	–	70	μs
Turn-off time	t_{off}		–	–	50	μs
Short circuit protection	I_{OC}	V_{GS}=5V	0.7	–	–	A

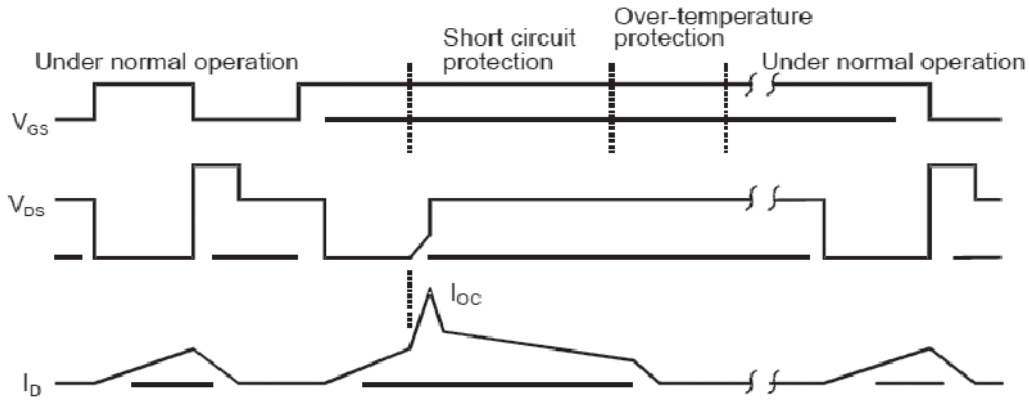
Note ** : Under normal operation
Note *** : Under self protection (Short circuit ~ Short circuit protection ~ Over-temperature protection)

● Thermal resistance

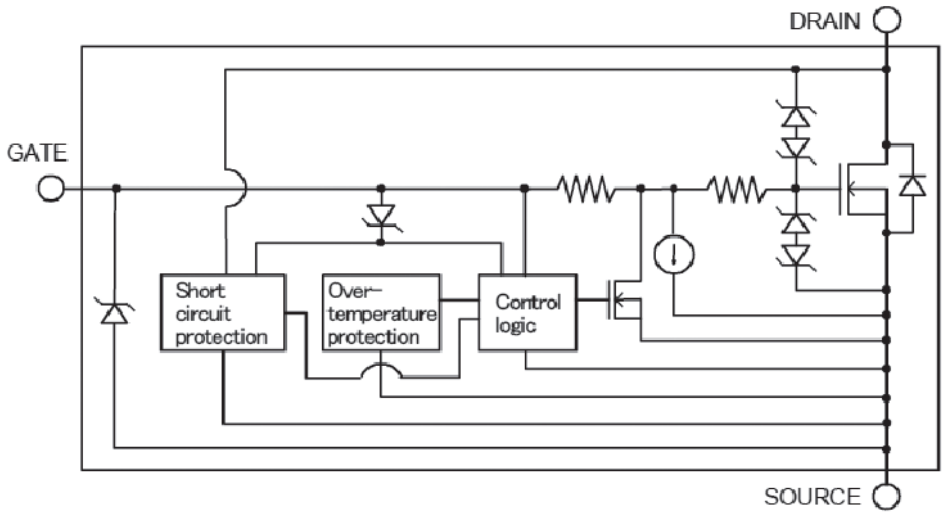
Description	Symbol	Test conditions	min.	typ.	max.	Unit
Thermal resistance	$R^{th\ (j-a)}$	Junction-ambient*	–	–	83	°C/W

Note * : Surface mounted on 1000mm²PCB (FR-4), 2ch on simultaneously

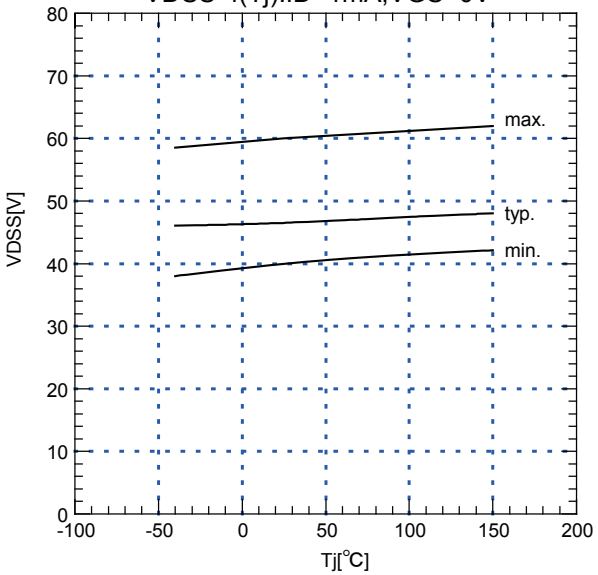
■ Timing chart



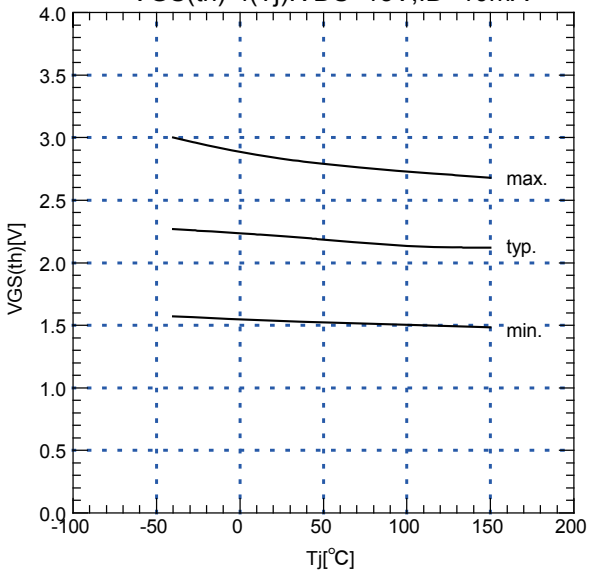
■ Circuit block diagram



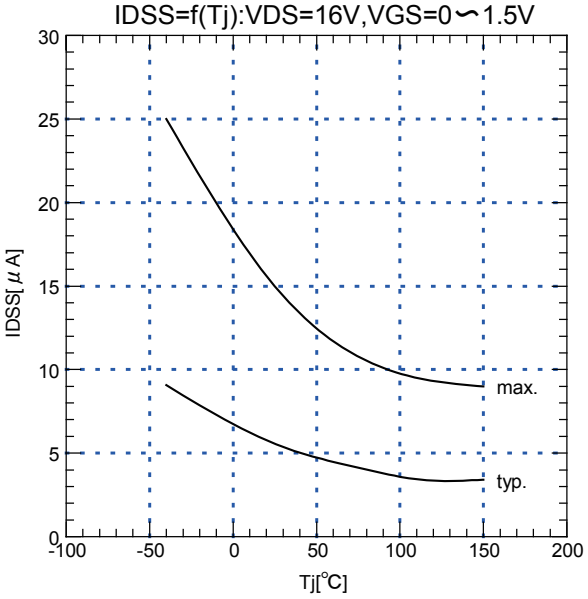
Drain-source breakdown voltage
VDSS=f(Tj):ID=1mA,VGS=0V



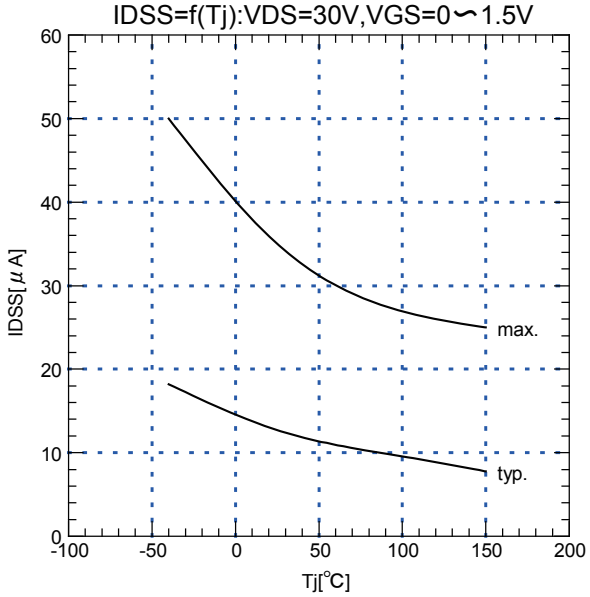
Gate threshold voltage
VGS(th)=f(Tj):VDS=13V,ID=10mA



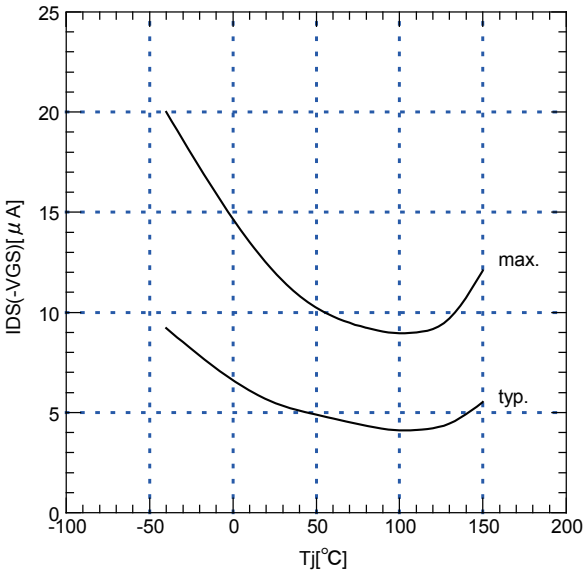
Zero gate voltage drain current
IDSS=f(Tj):VDS=16V,VGS=0∽1.5V



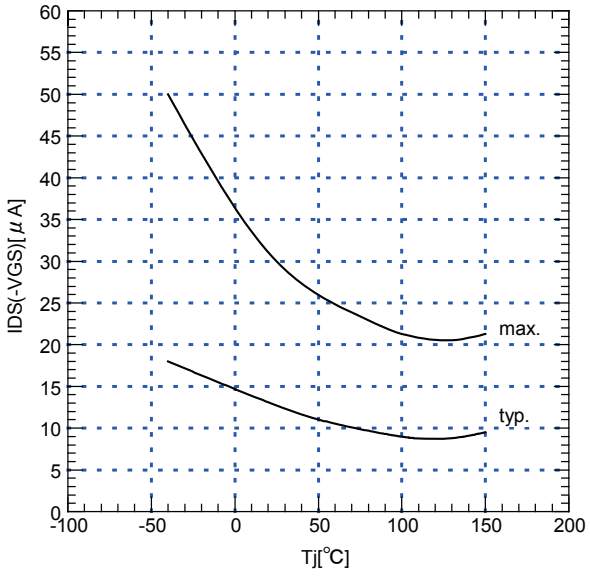
Zero gate voltage drain current
IDSS=f(Tj):VDS=30V,VGS=0∽1.5V



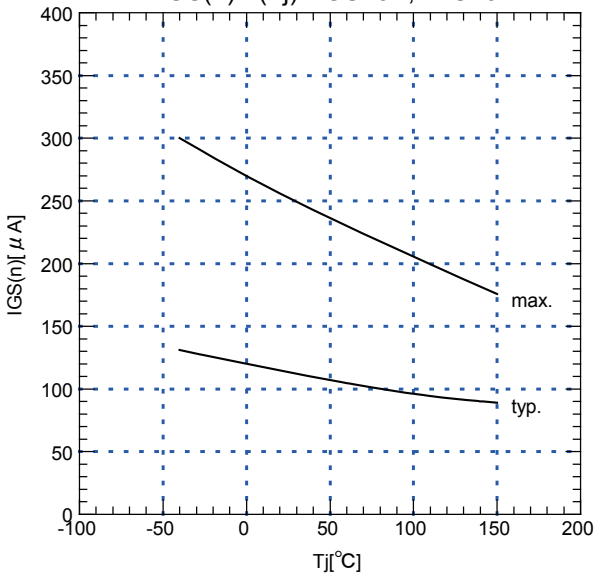
Zero gate minus voltage drain current
IDS(-VGS)=f(Tj):VDS=16V,VGS=-1.5V,RG=100Ω



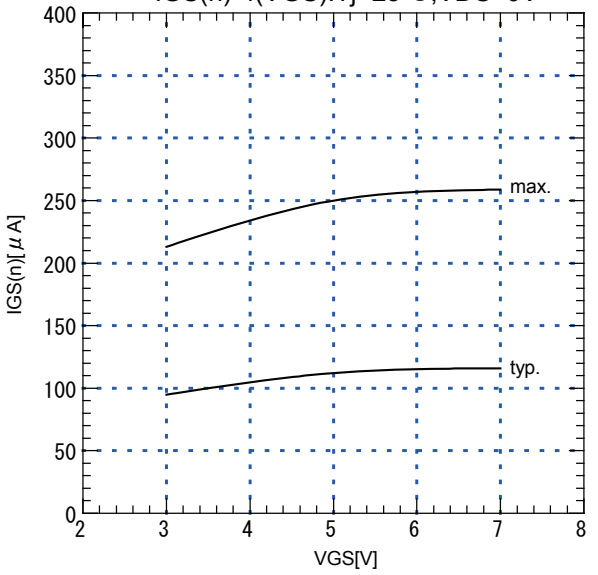
Zero gate minus voltage drain current
IDS(-VGS)=f(Tj):VDS=30V,VGS=-1.5V,RG=100Ω



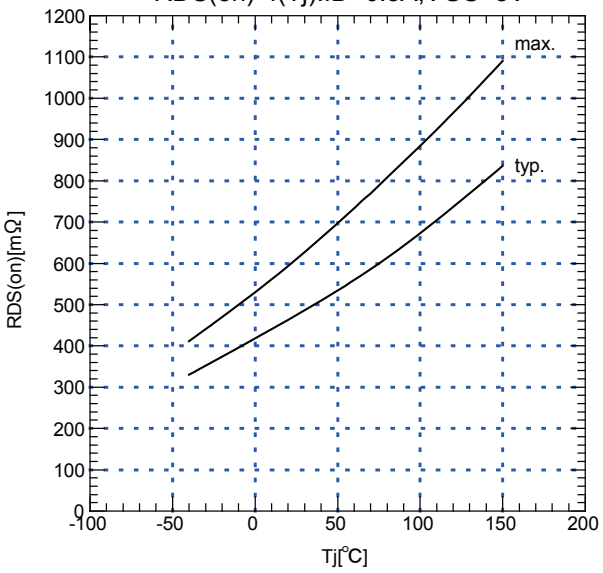
Gate-source leakage current
IGS(n)=f(Tj):VGS=5V,VDS=0V



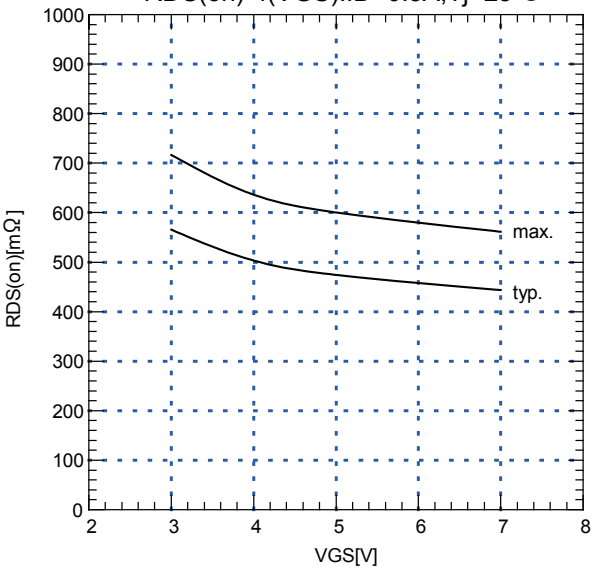
Gate-source leakage current
IGS(n)=f(VGS):Tj=25℃,VDS=0V



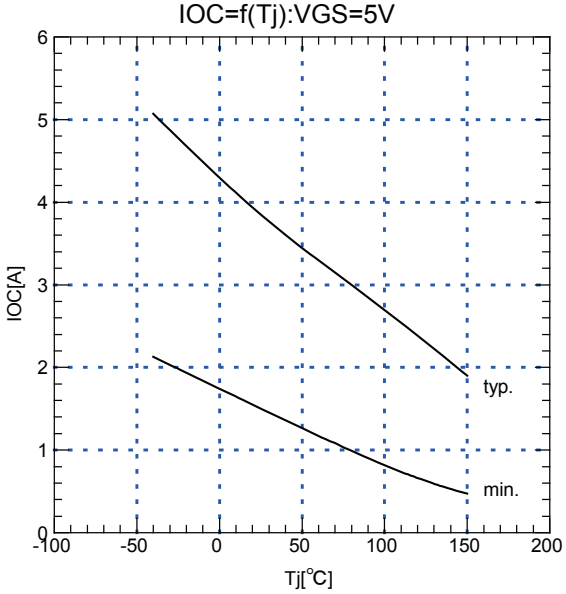
Drain-source on-state resistance
RDS(on)=f(Tj):ID=0.5A,VGS=5V



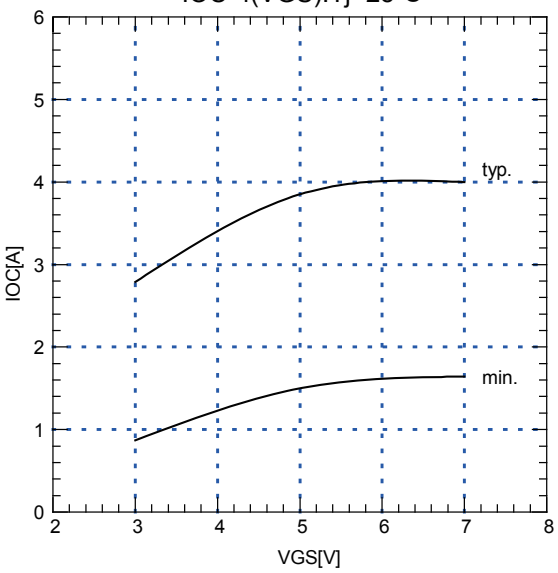
Drain-source on-state resistance
RDS(on)=f(VGS):ID=0.5A,Tj=25℃



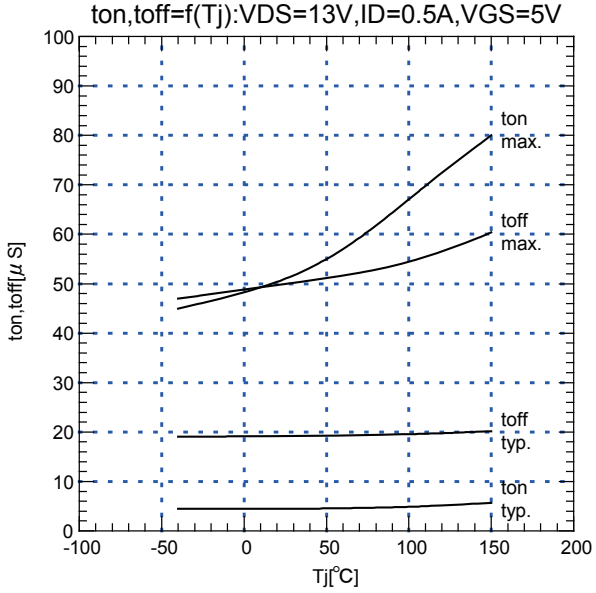
Short circuit protection
IOC=f(Tj):VGS=5V



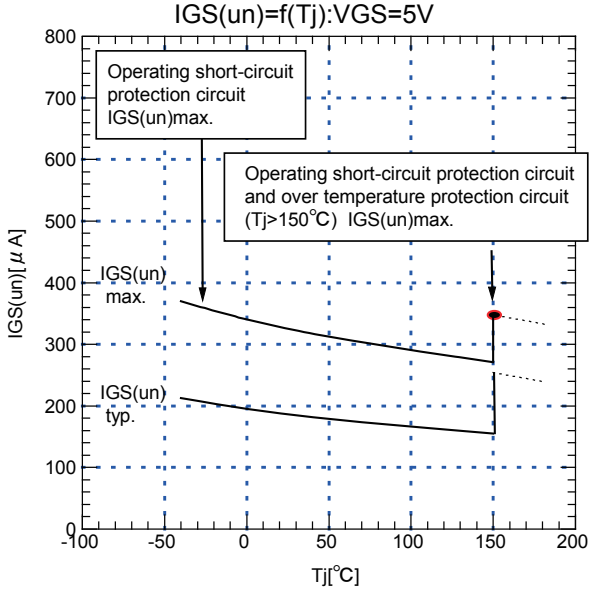
Short circuit protection
IOC=f(VGS):Tj=25℃



Turn-on time, Turn-off time
ton,toff=f(Tj):VDS=13V,ID=0.5A,VGS=5V



Gate-source leakage current
IGS(un)=f(Tj):VGS=5V



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