

# F5055

FUJI Intelligent Power MOSFET

## Intelligent Power MOSFET

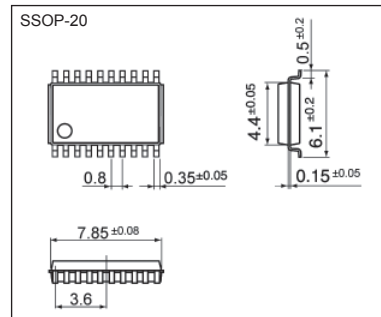
### ■ Features

- 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

TERMINAL No.	FUNCTION
①	DRAIN 1
②③	SOURCE 1
④	GATE 1
⑤	NC
⑥⑦	SOURCE 2
⑧	GATE 2
⑨	NC
⑩	DRAIN 2
⑪~⑬	DRAIN 2
⑭~⑲	DRAIN 1

### ■ Maximum ratings and characteristics

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

Description	Symbol	Characteristics	Unit	Remarks
Drain-source voltage	V <sub>DSS</sub>	40	V	DC
Gate-source voltage	V <sub>GSS</sub>	-0.3~7.0	V	DC
Continuous drain current	I <sub>D</sub>	5.9	A	for each channel
Maximum power dissipation	P <sub>D</sub>	7.8	W	for each channel
Operating junction temperature	T <sub>j</sub>	150	°C	-
Storage temperature range	T <sub>stg</sub>	-55 ~ 150	°C	-
Single pulse inductive load switch-off energy dissipation	E <sub>CL</sub>	100	mJ	T <sub>j</sub> =150°C, L=5mH, I <sub>DP</sub> =8A Single pulse, dv/dt≤10V/μs for each channel

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

Description	Symbol	Conditions	min.	typ.	max.	Unit
Drain-source clamp voltage	V <sub>DSS</sub>	I <sub>D</sub> =1mA, V <sub>GS</sub> =0V	40	-	60	V
Gate threshold voltage	V <sub>GS(th)</sub>	I <sub>D</sub> =10mA, V <sub>DS</sub> =13V	1.0	-	2.8	V
Operation gate voltage (protection circuit operates)	V <sub>GS(p)</sub>	-	2.8	-	7.0	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =16V, V <sub>GS</sub> =0~1.5V	-	-	60	μA
		V <sub>DS</sub> =30V, V <sub>GS</sub> =0~1.5V	-	-	1	mA
Gate-source leakage current	I <sub>GS(un)*</sub>	V <sub>GS</sub> =5V	-	-	250	μA
		V <sub>GS</sub> =5V, T <sub>j</sub> >150°C	-	-	350	μA
Drain-source on-state resistance	R <sub>DS(on)</sub>	I <sub>D</sub> =5A, V <sub>GS</sub> =5V	-	-	140	mΩ
Turn-on time	t <sub>on</sub>	V <sub>DS</sub> =13V, I <sub>D</sub> =0.5A, V <sub>GS</sub> =5V	-	-	50	μs
Turn-off time	t <sub>off</sub>		-	-	50	μs
Over-temperature protection	T <sub>trip</sub>	V <sub>GS</sub> =5V	150	-	-	°C
Short circuit protection	I <sub>OC</sub>	V <sub>GS</sub> =5V	12	-	32	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 <sub>DSS</sub>	I <sub>D</sub> =1mA, V <sub>GS</sub> =0V	38	-	62	V
Gate threshold voltage	V <sub>GS(th)</sub>	I <sub>D</sub> =10mA, V <sub>DS</sub> =14V	1.0	-	3.0	V
Operation gate voltage (protection circuit operates)	V <sub>GS(p)</sub>	-	3.0	-	6.7	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =16V, V <sub>GS</sub> =0V	-	-	100	μA
		V <sub>DS</sub> =30V, V <sub>GS</sub> =0V	-	-	1.6	mA
Gate-source leakage current	I <sub>GS(un)*</sub>	V <sub>GS</sub> =5V	-	-	300	μA
		V <sub>GS</sub> =5V, T <sub>j</sub> >150°C	-	-	350	μA
Drain-source on-state resistance	R <sub>DS(on)</sub>	I <sub>D</sub> =5A, V <sub>GS</sub> =5V	-	-	205	mΩ
Turn-on time	t <sub>on</sub>	V <sub>DS</sub> =13V, I <sub>D</sub> =5A, V <sub>GS</sub> =5V	-	-	62	μs
Turn-off time	t <sub>off</sub>		-	-	52	μs
Short circuit protection	I <sub>OC</sub>	V <sub>GS</sub> =5V	8.4	-	42	A

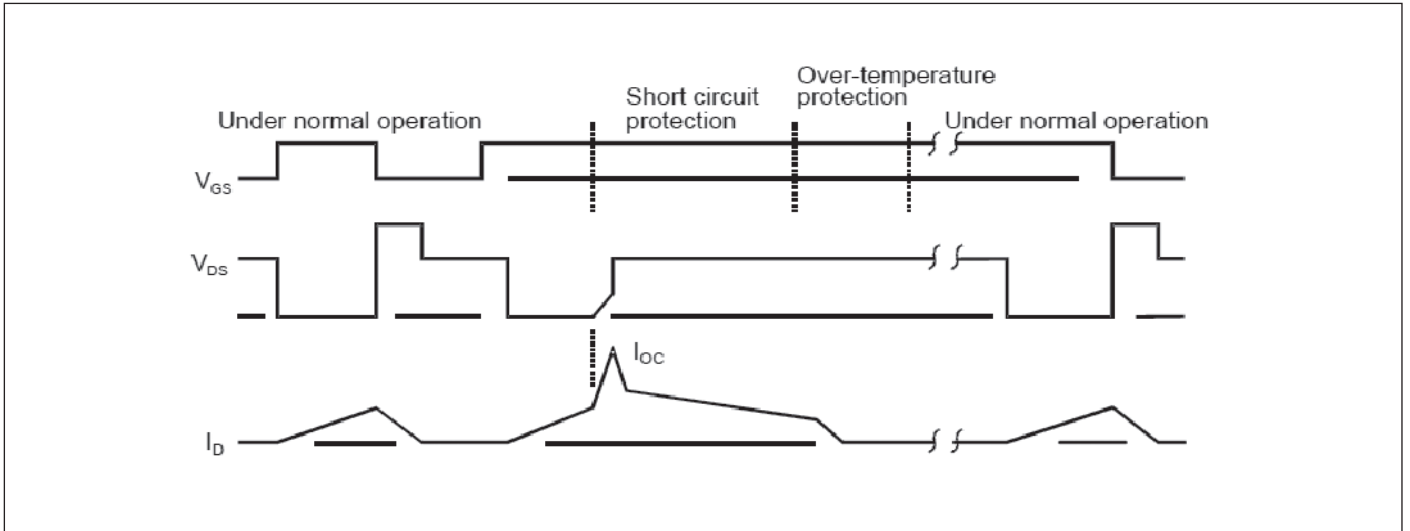
Note \* : Under normal operation

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

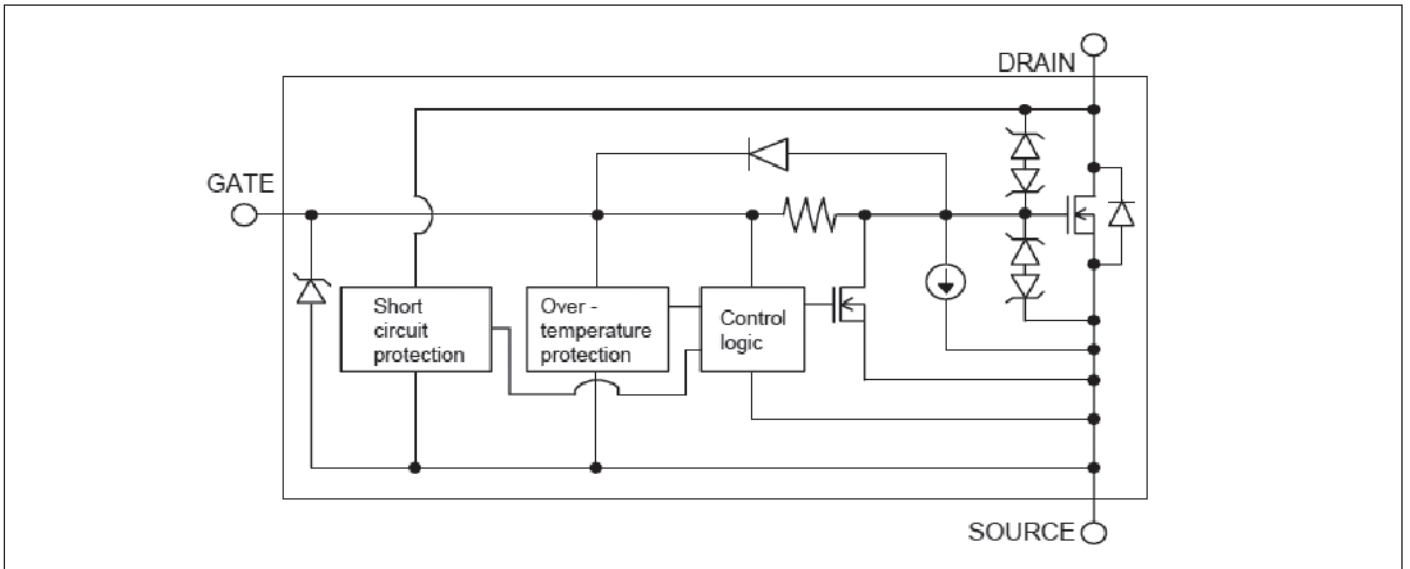
### ● Thermal resistance

Description	Symbol	Test conditions	min.	typ.	max.	Unit
Thermal resistance	R <sub>th(j-c)</sub>	Junction-case	-	-	16.0	°C/W

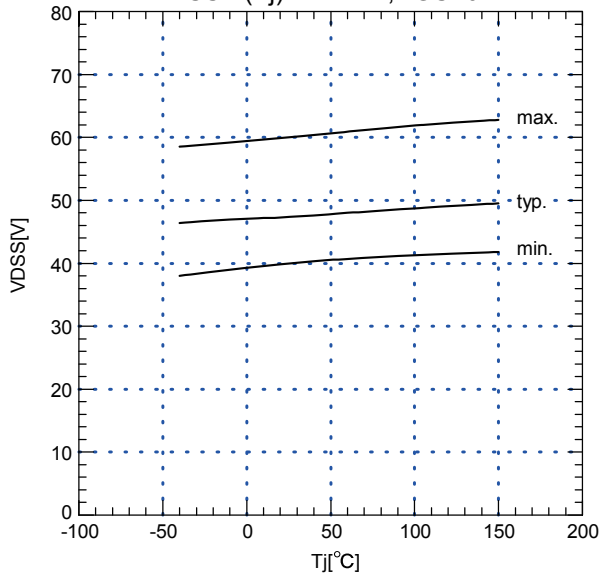
■ Timing chart



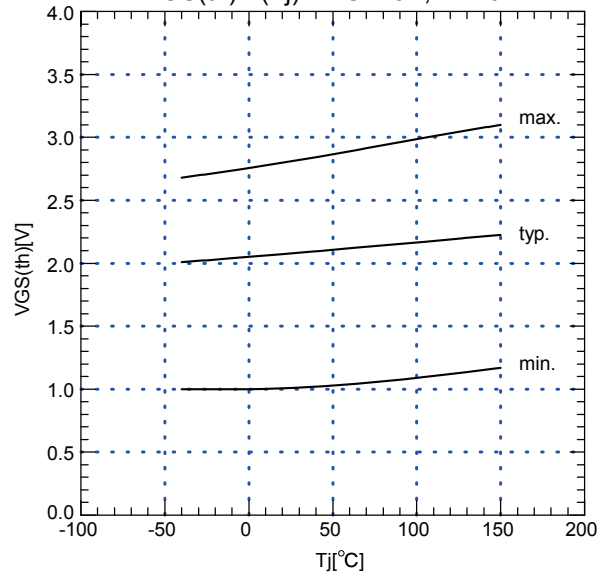
■ Circuit block diagram



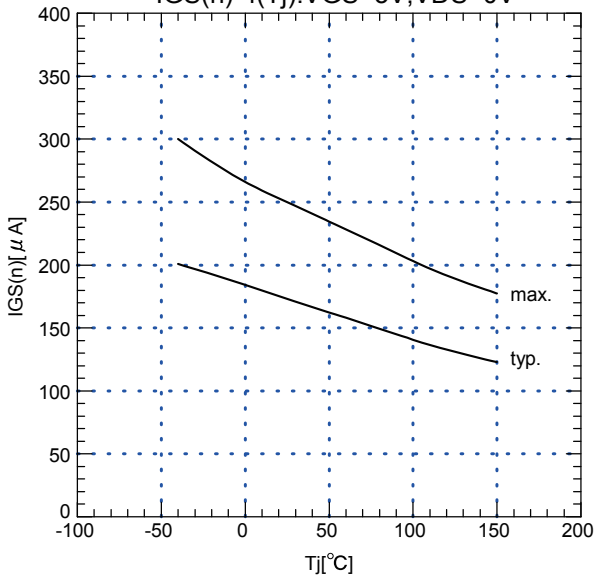
Drain-source breakdown voltage  
 $V_{DSS}=f(T_j): I_D=1\text{mA}, V_{GS}=0\text{V}$



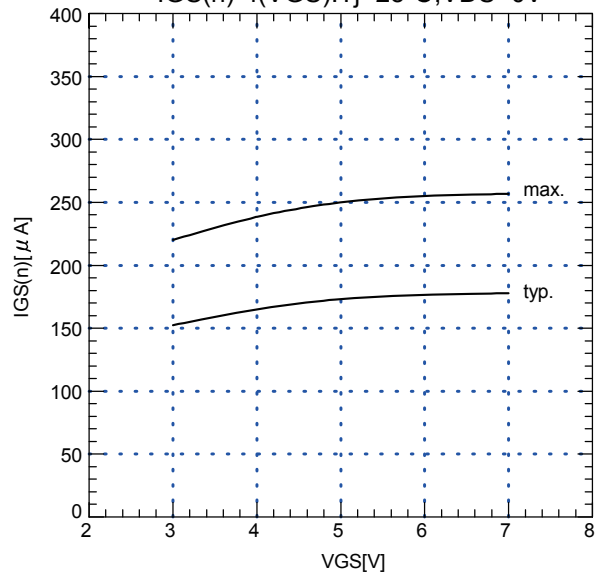
Gate threshold voltage  
 $V_{GS(th)}=f(T_j): V_{DS}=13\text{V}, I_D=10\text{mA}$



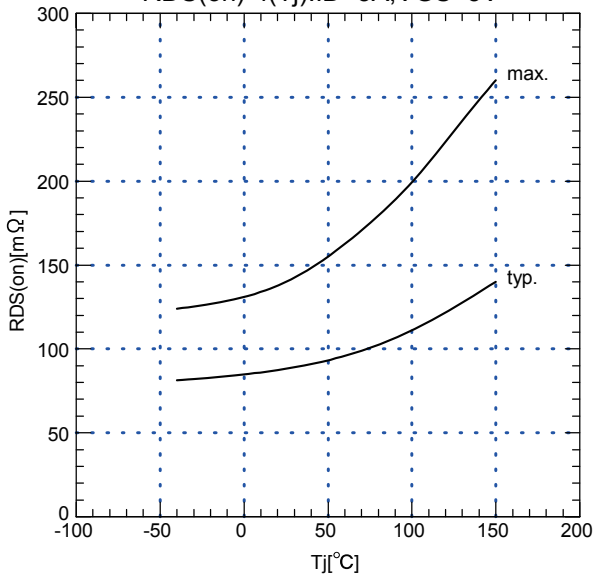
Gate-source leakage current  
 $I_{GS(n)}=f(T_j): V_{GS}=5\text{V}, V_{DS}=0\text{V}$



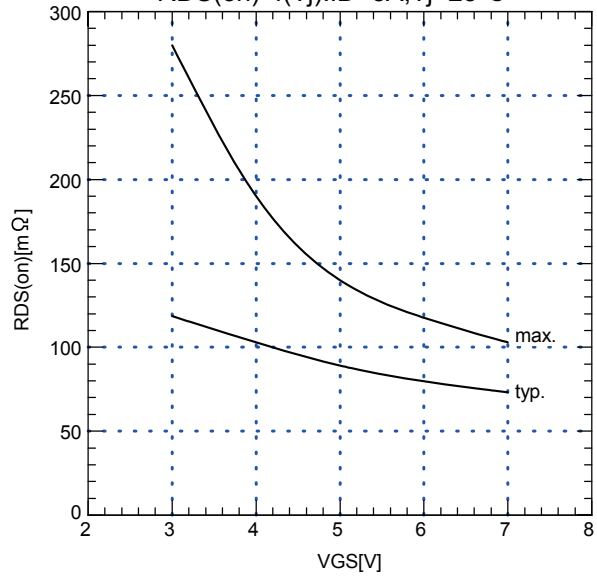
Gate-source leakage current  
 $I_{GS(n)}=f(V_{GS}): T_j=25^\circ\text{C}, V_{DS}=0\text{V}$

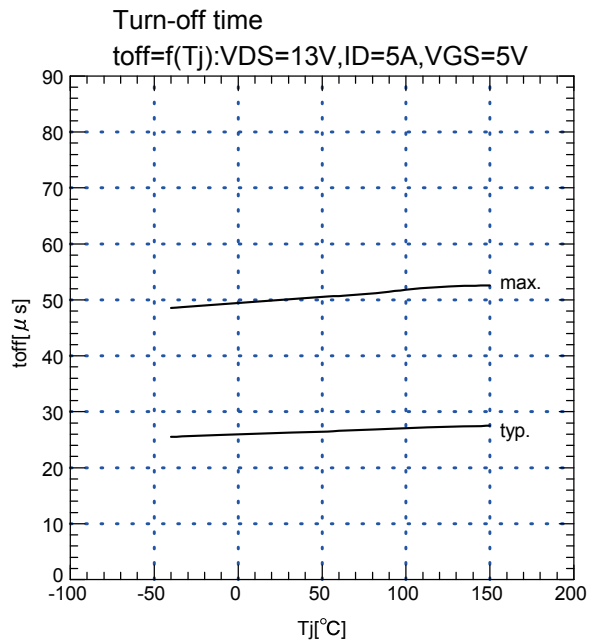
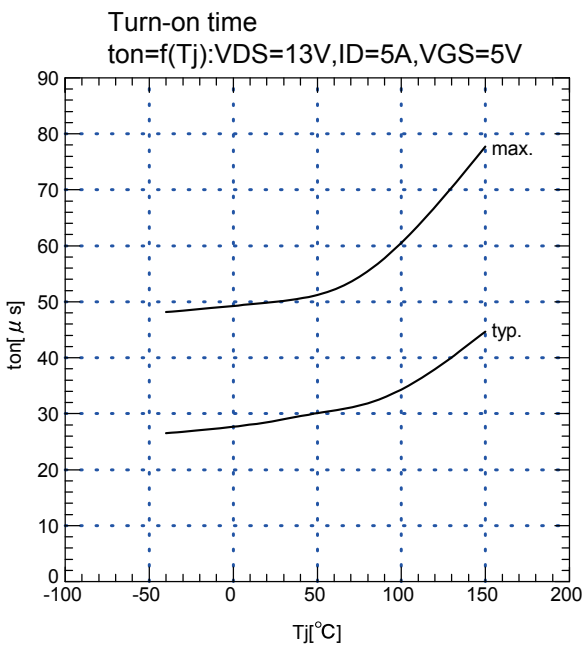
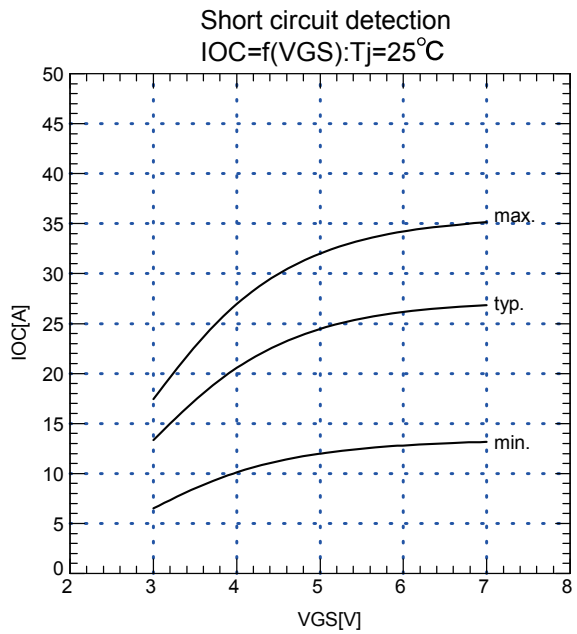
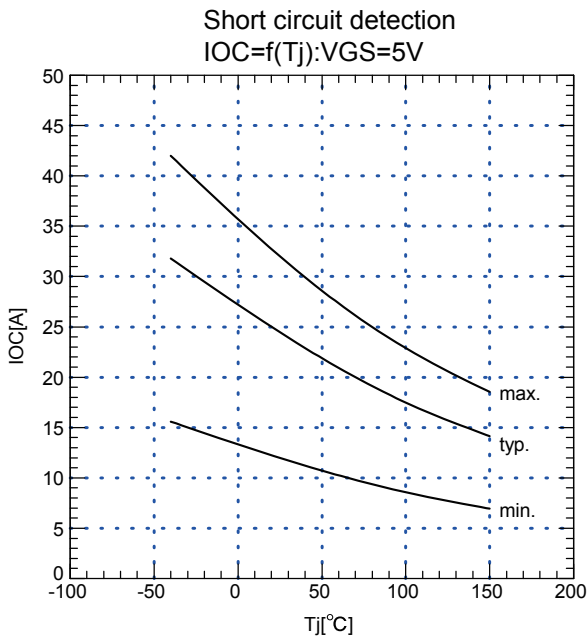
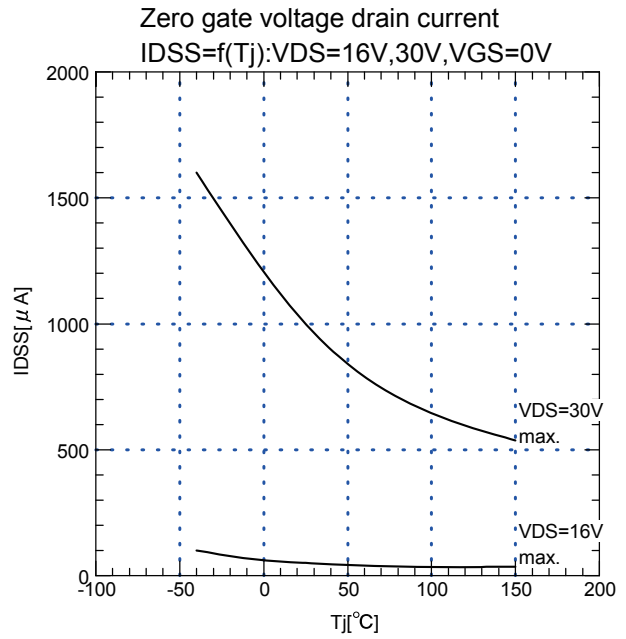
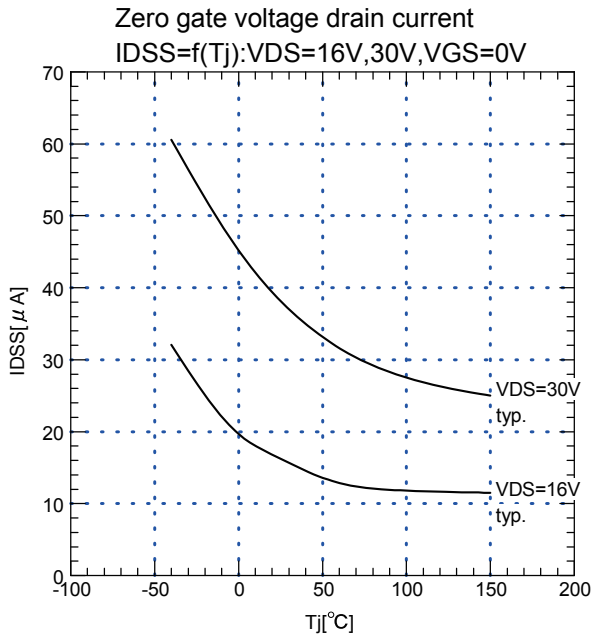


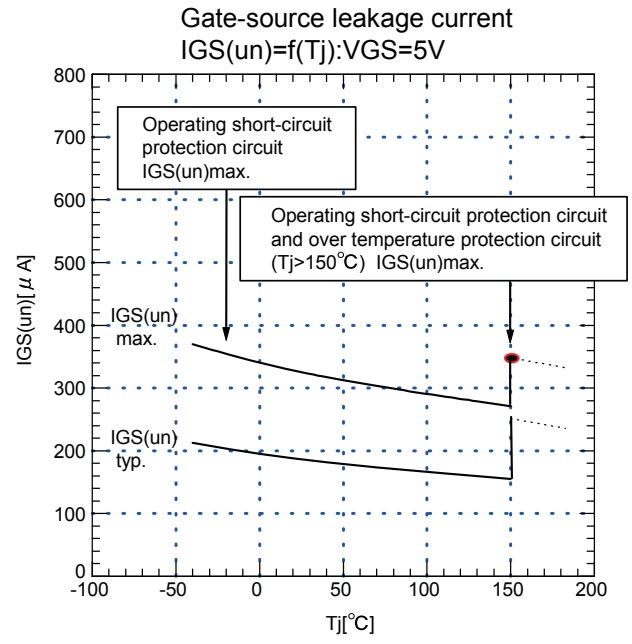
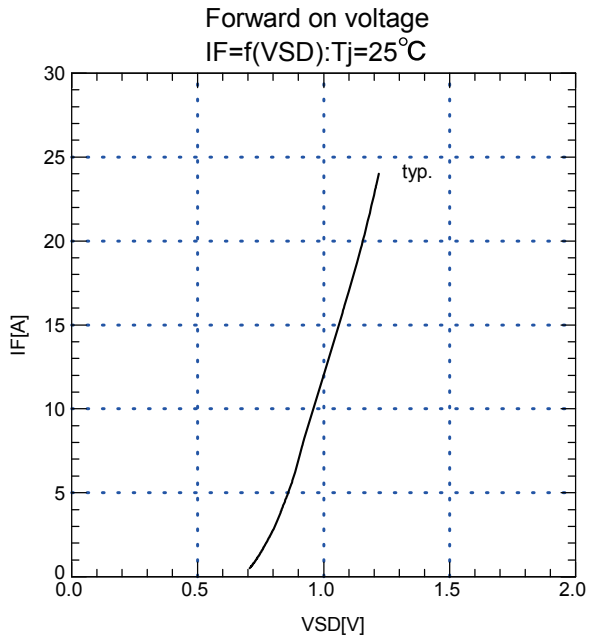
Drain-source on-state resistance  
 $R_{DS(on)}=f(T_j): I_D=5\text{A}, V_{GS}=5\text{V}$



Drain-source on-state resistance  
 $R_{DS(on)}=f(T_j): I_D=5\text{A}, T_j=25^\circ\text{C}$







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