

# F5062H

FUJI High-side IPS

## High-side Intelligent Power Switch

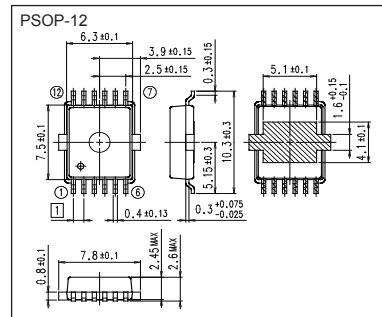
### Features

- Low on-state resistance
- High inductive load energy withstand capability
- Over current detection
- Over temperature shutdown
- Reverse battery protection

### Applications

- Motor driver
- Replacements for fuse and relay

### Outline drawings [mm]



### Connection

TERMINAL No.	FUNCTION
①	OUT
②	OUT
③	OUT
④	OUT
⑤	NC
⑥	VCC1
⑦	GND
⑧	GND
⑨	NC
⑩	TN
⑪	VCC2
⑫	VCC1

### Maximum ratings and characteristics

#### Absolute maximum ratings (at Tc=25°C)

Description	Symbol	Characteristics	Unit	Remarks
Supply voltage	V <sub>cc</sub>	35	V	DC
Reverse supply voltage	-V <sub>cc</sub>	-16	V	t=2min, I <sub>out</sub> =-18A
		-12	V	DC, I <sub>out</sub> =-18A
Maximum voltage at load short	V <sub>ccs</sub>	16	V	0.02Ω < R <sub>out</sub> < 0.2Ω
Output current	I <sub>out</sub>	I <sub>lim</sub>	A	Pulse 50ms
		50	A	DC
Reverse output current	-I <sub>out</sub>	-50	A	DC
Input voltage	V <sub>in</sub>	-0.3~V <sub>cc</sub> +0.3	V	DC
Maximum power dissipation	P <sub>D</sub>	114	W	-
Operating junction temperature	T <sub>j</sub>	150	°C	-
Storage temperature	T <sub>stg</sub>	-55~-150	°C	-
Single pulse inductive load switch-off energy dissipation	E <sub>CL</sub>	800	mJ	T <sub>j</sub> ≤150°C, V <sub>cc</sub> ≤16V, Single pulse I <sub>out</sub> =80A, dv/dt≤10V/us

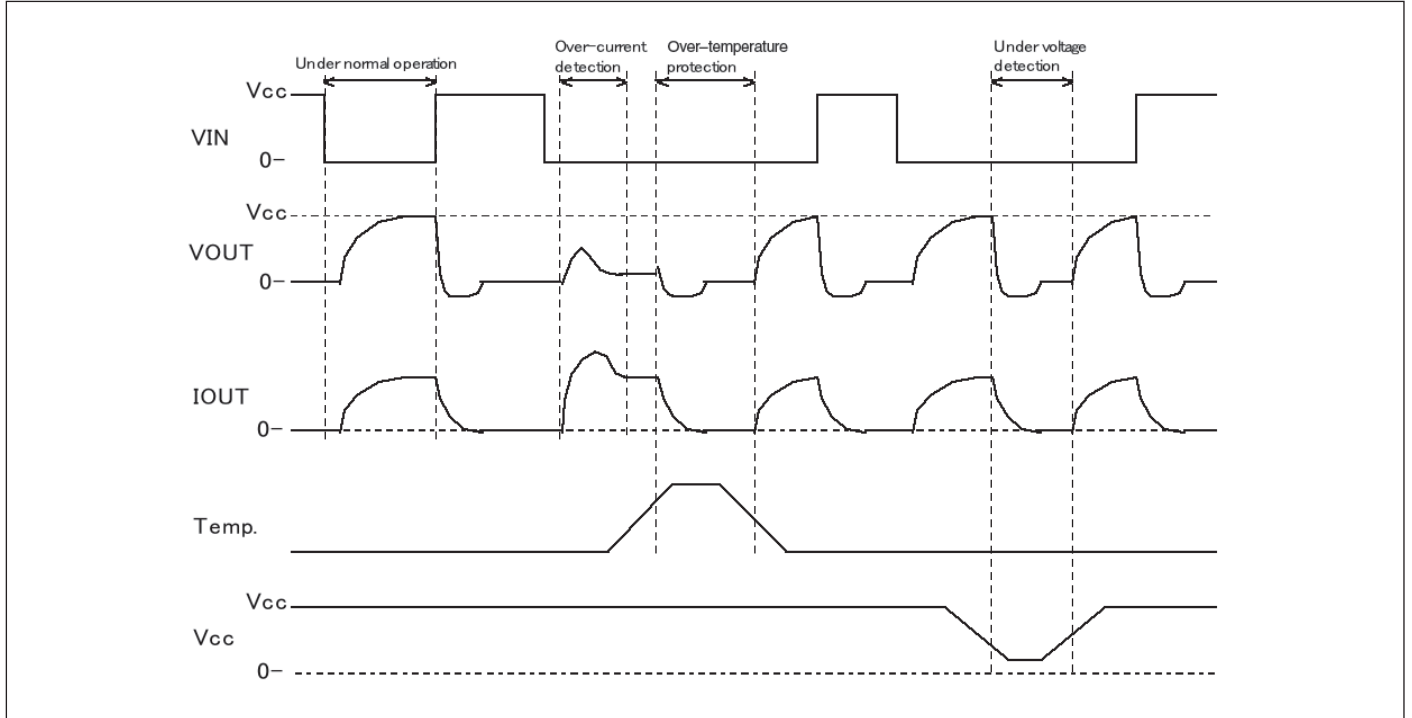
#### Electrical characteristics (at Tc=-40~150°C, unless otherwise specified.)

Description	Symbol	Conditions	min.	typ.	max.	Unit
Operating voltage	V <sub>cc</sub>	Tc=-40~150°C	V <sub>usd</sub>	-	18	V
Standby current 1	I <sub>cc(off) 1</sub>	V <sub>cc</sub> =18V, V <sub>in</sub> =V <sub>cc</sub> , RL=10Ω, Tc=-40~110°C	-	-	50	μA
Standby current 2	I <sub>cc(off) 2</sub>	V <sub>cc</sub> =18V, V <sub>in</sub> =V <sub>cc</sub> , RL=10Ω, Tc=-110~150°C	-	-	70	μA
Operating current	I <sub>cc(on)</sub>	V <sub>cc</sub> =18V, V <sub>in</sub> =GND, RL=OPEN	-	-	10	mA
Input voltage	V <sub>inL</sub>	V <sub>cc</sub> =6~18V, RL=10Ω	-	-	0.4V <sub>cc</sub>	V
	V <sub>inH</sub>	V <sub>cc</sub> =6~18V, RL=10Ω	0.6V <sub>cc</sub>	-	-	V
Input hysteresis voltage	V <sub>inHYST</sub>	V <sub>cc</sub> =6~18V	0.05V <sub>cc</sub>	-	-	V
Input current	I <sub>inL</sub>	V <sub>cc</sub> =18V, 0V≤V <sub>in</sub> ≤7.2V	-80	-	-10	μA
	I <sub>inH</sub>	V <sub>cc</sub> =18V, V <sub>in</sub> =10.8V	-80	-	-10	μA
On-state resistance	R <sub>DS(on)</sub>	8V≤V <sub>cc</sub> ≤18V, I <sub>out</sub> =40A, Tc=25°C, V <sub>in</sub> =GND	-	6	8	mΩ
		8V≤V <sub>cc</sub> ≤18V, I <sub>out</sub> =40A, Tc=150°C, V <sub>in</sub> =GND	-	11	14.5	
		6V≤V <sub>cc</sub> <8V, RL=0.2Ω, Tc=25°C, V <sub>in</sub> =GND	-	6.5	12	
		6V≤V <sub>cc</sub> <8V, RL=0.2Ω, Tc=150°C, V <sub>in</sub> =GND	-	12	22	
Turn-on time	t <sub>d(on)</sub>	V <sub>cc</sub> =16V, RL=0.25Ω, V <sub>in</sub> =V <sub>cc</sub> →GND	0.15	-	0.6	ms
Turn-off time	t <sub>d(off)</sub>	V <sub>cc</sub> =16V, RL=0.25Ω, V <sub>in</sub> =GND→V <sub>cc</sub>	-	-	1.0	ms
Rise time	t <sub>r</sub>	V <sub>cc</sub> =16V, RL=0.25Ω, V <sub>in</sub> =V <sub>cc</sub> →GND	-	-	0.6	ms
Fall time	t <sub>f</sub>	V <sub>cc</sub> =16V, RL=0.25Ω, V <sub>in</sub> =GND→V <sub>cc</sub>	-	-	0.6	ms
Under voltage detection	V <sub>usd</sub>	V <sub>cc</sub> =6→2.5V, RL=10Ω, V <sub>in</sub> =GND	2.5	-	-	V
Under voltage recovery	V <sub>usdR</sub>	V <sub>cc</sub> =2.5→6V, RL=10Ω, V <sub>in</sub> =GND	-	-	6.0	V
Overheating detection temperature	T <sub>tsd</sub>	V <sub>cc</sub> =6~18V, V <sub>in</sub> =GND	155	-	205	°C
Recovery temperature	T <sub>tr</sub>		150	-	-	°C
Hysteresis temperature	T <sub>hyst</sub>		5	10	-	°C
Over-current detection	I <sub>lim</sub>	V <sub>cc</sub> =8~16V, V <sub>in</sub> =GND, Tc=-40~130°C	96	-	-	A
Output-clamp voltage	V <sub>clamp(L)</sub>	V <sub>cc</sub> =16V, L=10mH/10Ω, V <sub>in</sub> =GND→V <sub>cc</sub> , Tc=150°C	-5.9	-	-4.2	V

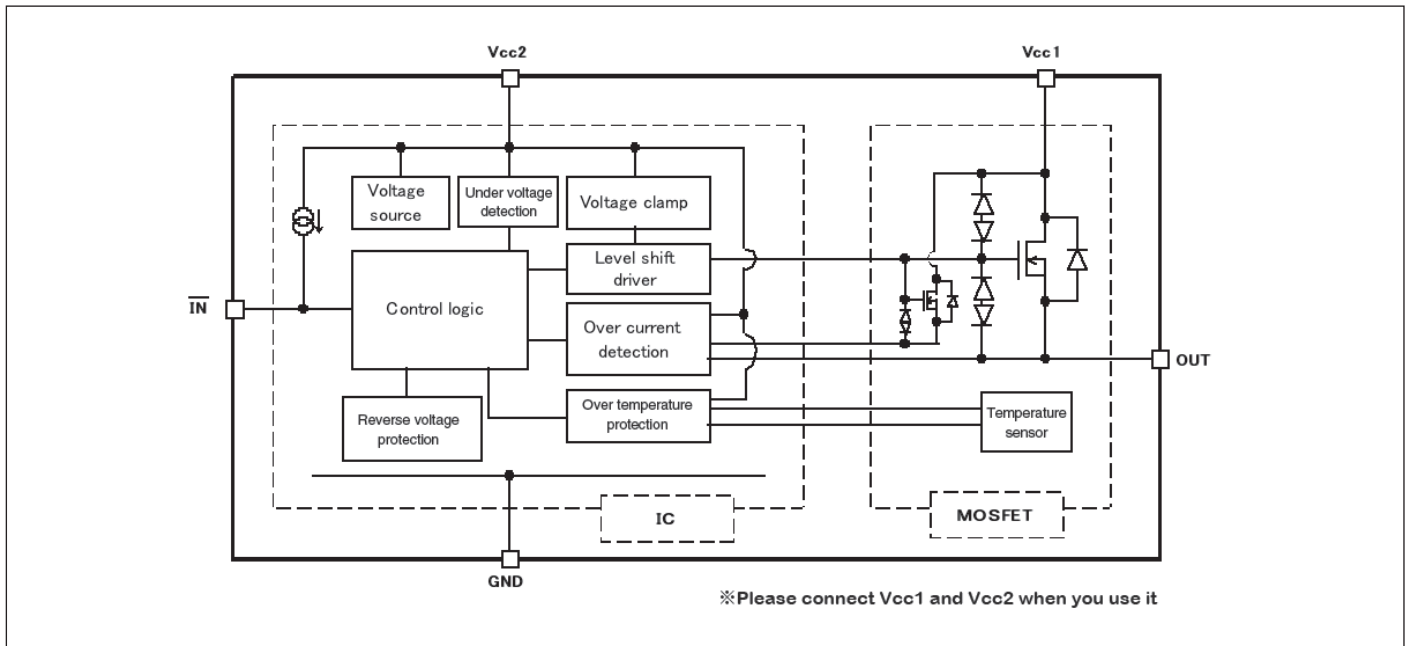
#### Thermal characteristics

Description	Symbol	Test conditions	min.	typ.	max.	Unit
Thermal resistance	R <sub>th(j-c)</sub>	Junction - case	-	-	1.1	°C/W

■ Timing chart

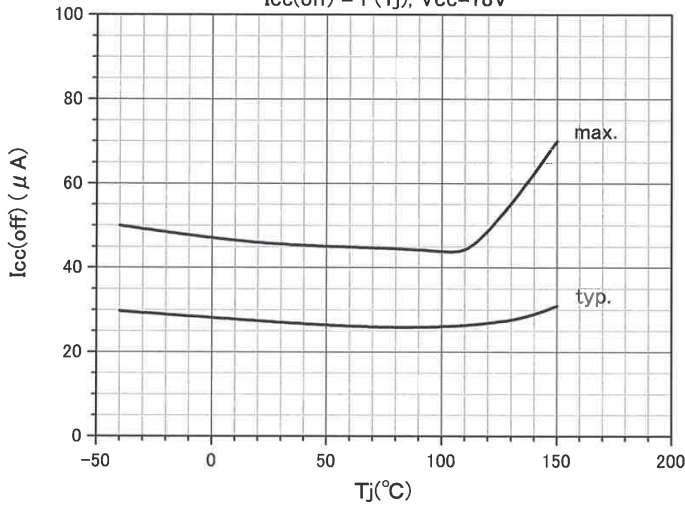


■ Circuit block diagram



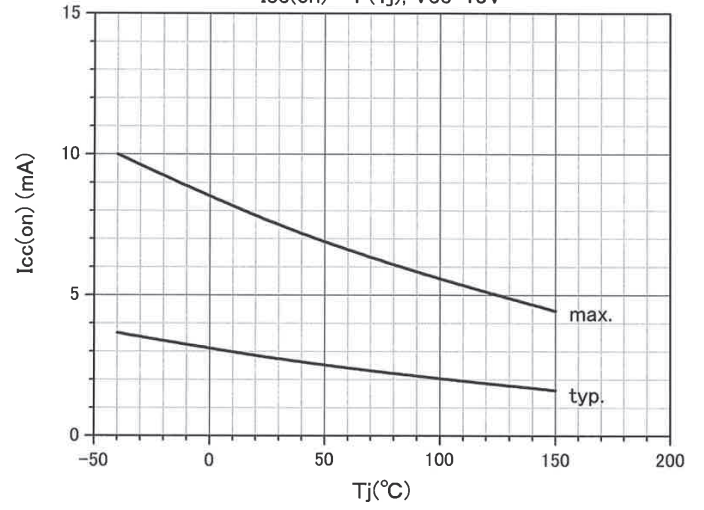
**Standby current**

$I_{cc(off)} = f(T_j), V_{cc}=18V$



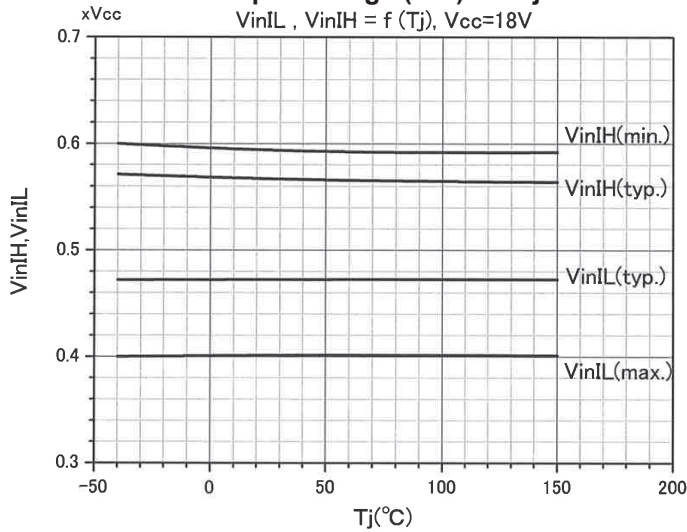
**Operating current**

$I_{cc(on)} = f(T_j), V_{cc}=18V$



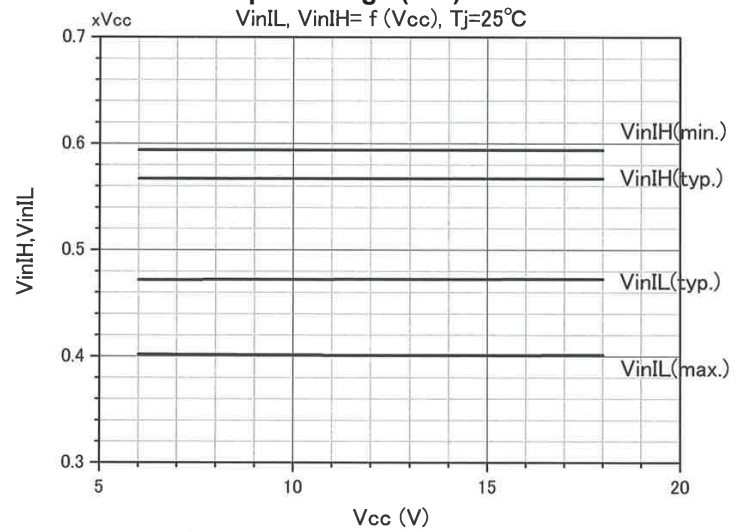
**Input voltage (L/H) vs. Tj**

$V_{inL}, V_{inH} = f(T_j), V_{cc}=18V$



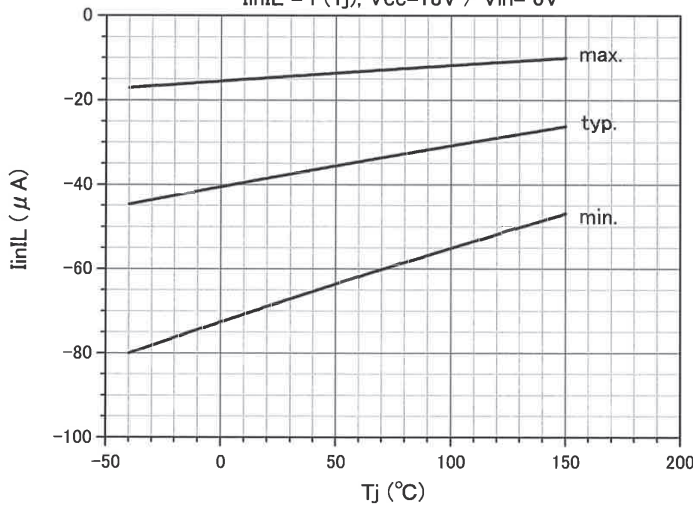
**Input voltage (L/H) vs. Vcc**

$V_{inL}, V_{inH} = f(V_{cc}), T_j=25^\circ C$



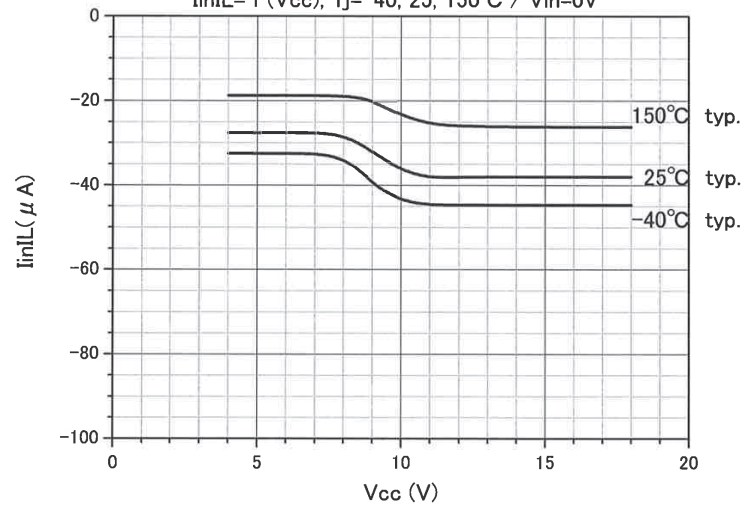
**Input current (L) vs. Tj**

$I_{inL} = f(T_j), V_{cc}=18V / V_{in}=0V$



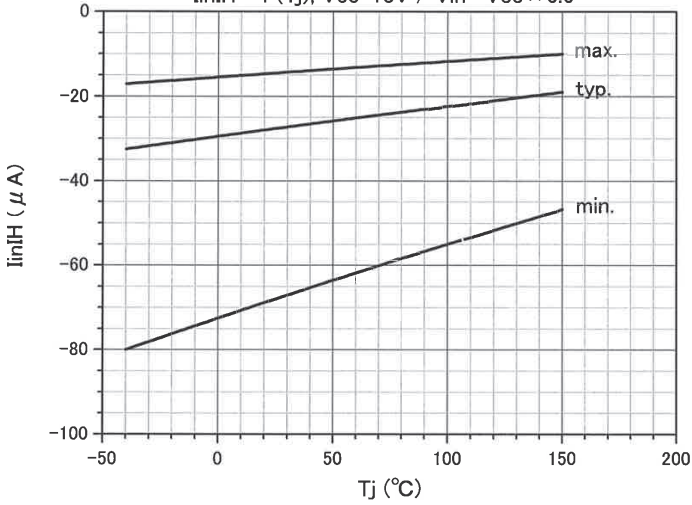
**Input current (L) vs. Vcc**

$I_{inL} = f(V_{cc}), T_j=-40, 25, 150^\circ C / V_{in}=0V$



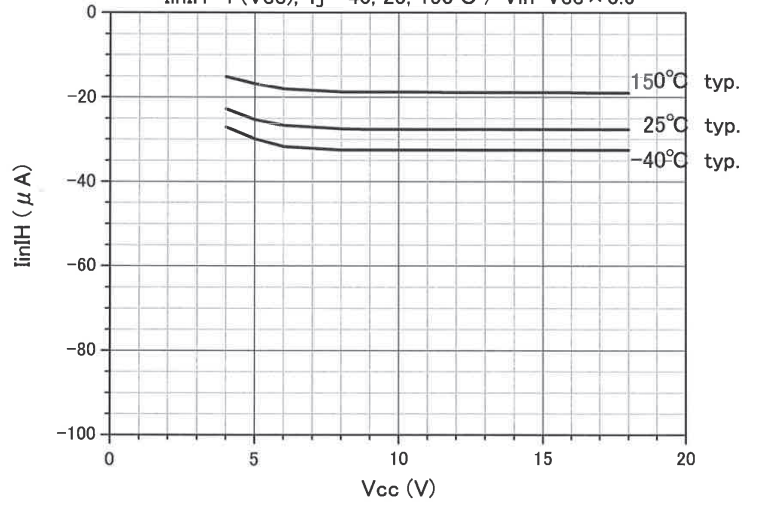
**Input current (H) vs. Tj**

$I_{inH} = f(T_j), V_{cc}=18V / V_{in}=V_{cc} \times 0.6$



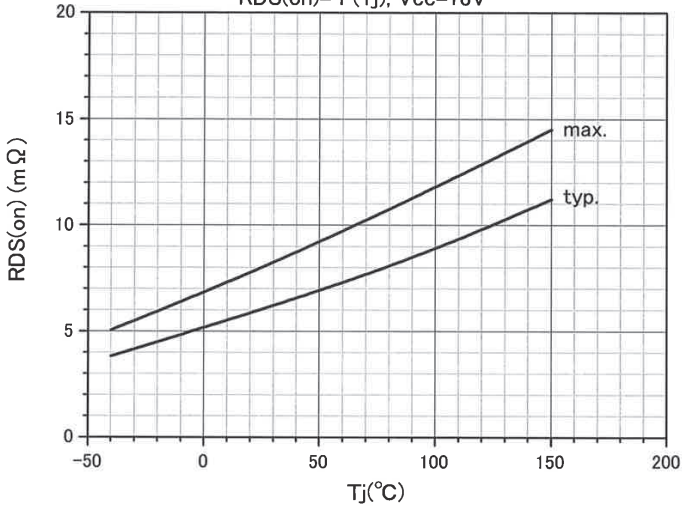
**Input current (H) vs. Vcc**

$I_{inH} = f(V_{cc}), T_j=-40, 25, 150^\circ C / V_{in}=V_{cc} \times 0.6$



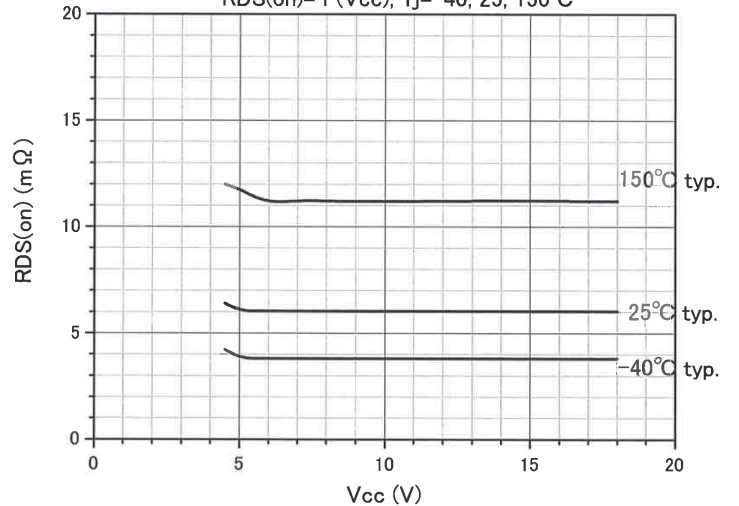
**RDS(on) vs. Tj**

$R_{DS(on)} = f(T_j), V_{cc}=18V$



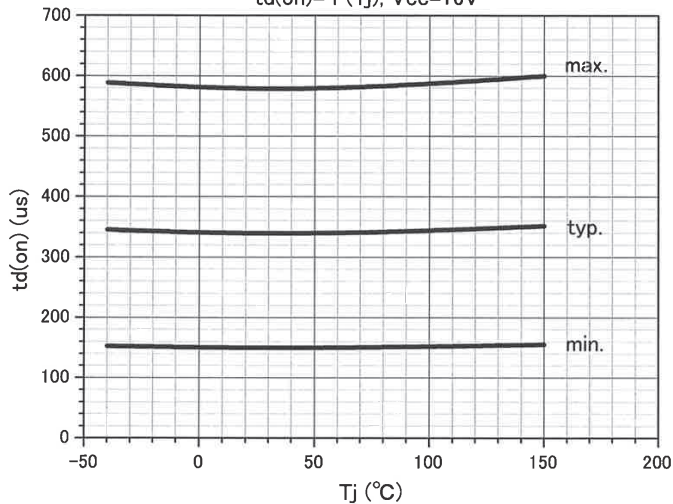
**RDS(on) vs. Vcc**

$R_{DS(on)} = f(V_{cc}), T_j=-40, 25, 150^\circ C$



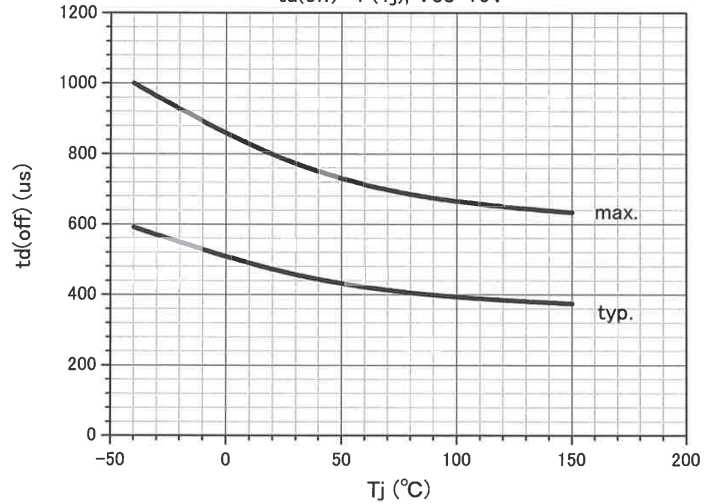
**Turn-on Time**

$t_{d(on)} = f(T_j), V_{cc}=16V$

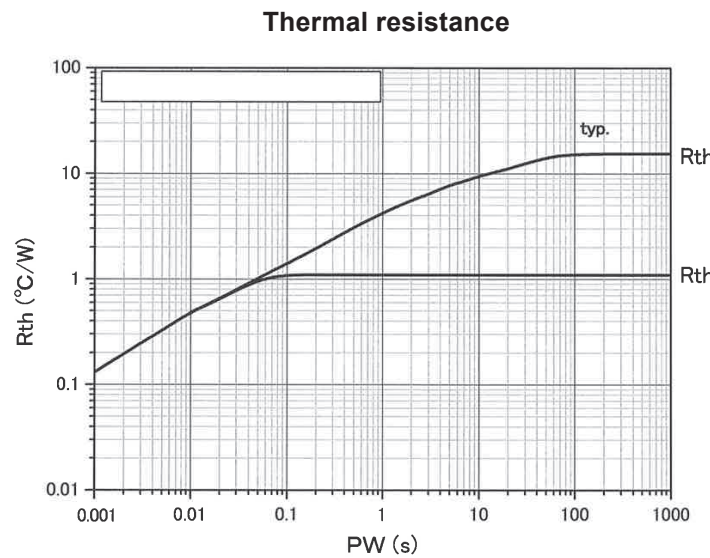
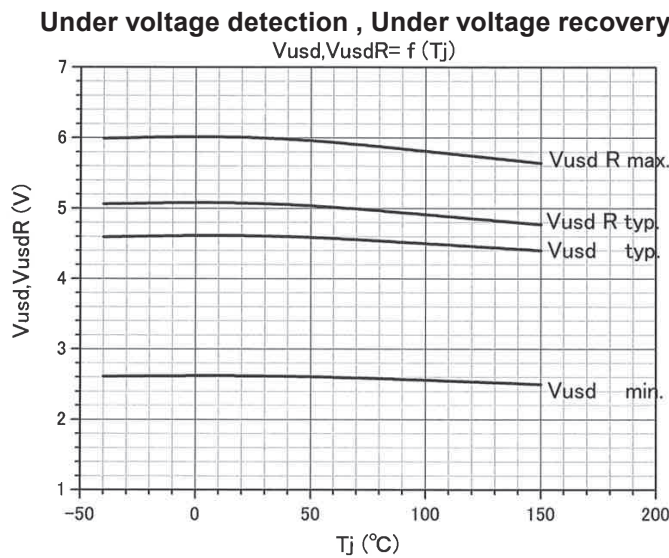
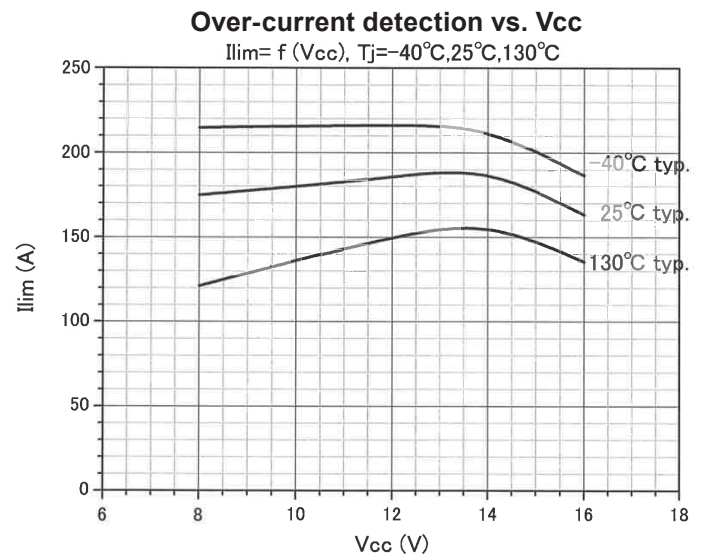
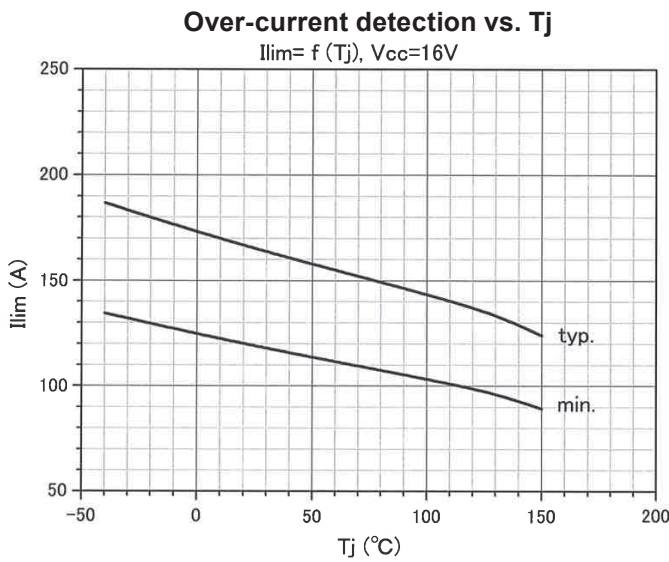
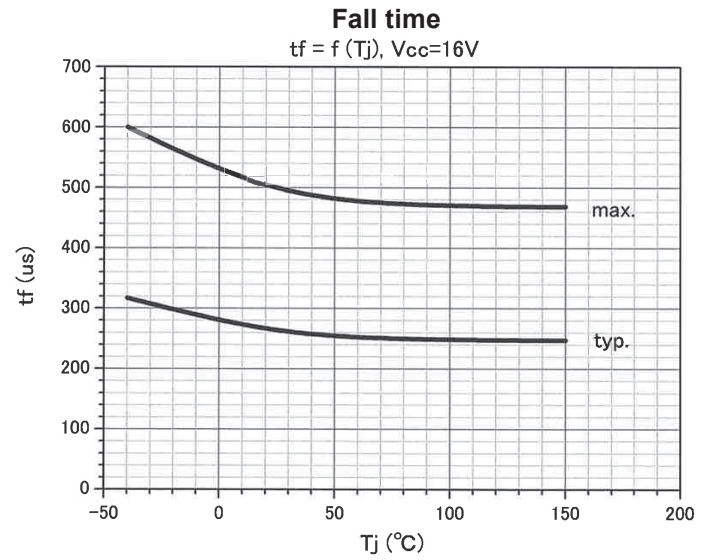
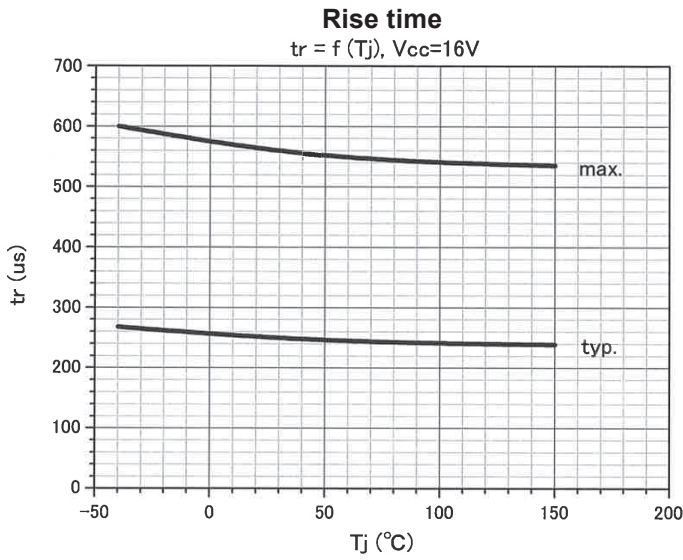


**Turn-off Time**

$t_{d(off)} = f(T_j), V_{cc}=16V$







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