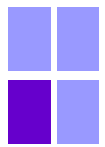


IGBT Selection Guide

- Punch Through IGBTs
- Field Stop IGBTs

All the contents in this document are as of date of publication.
Make sure that this is the latest revision of the document before use.
Please check the details of the product by data sheet.

<http://www.sanken-ele.co.jp/en>

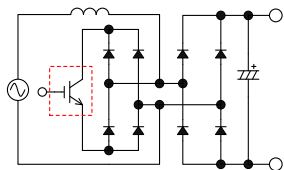


Sanken provides the low saturation voltage type and the high speed type IGBTs. You can select an optimal IGBT according to your application.

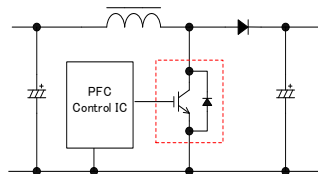
	KGF65AxH MGF65AxH FGF65AxH → p.3	KGA65A3H → p.4	KGF65AxL MGF65AxL FGF65AxL → p.5	MGD6xx → p.6	FGM6xx → p.7
Feature	Higher Switching Speed	Higher Switching Speed	High Switching Speed	Low Saturation Voltage	Low Saturation Voltage
$V_{CE(sat)}$	1.9 V	1.9 V	1.6 V	1.5 V	1.5 V
Operation Frequency	~ 100 kHz	~ 100 kHz	~ 30 kHz	~ 20 kHz	~ 20 kHz
Fast Recovery Diode	Built-in	— (Built-in Protection Diode)	Built-in	Built-in	—
Short Circuit Withstand Time	10 μ s	10 μ s	5 μ s	—	—
Application	<ul style="list-style-type: none"> • PFC Circuit (Air conditioner, lighting) • Boost Circuit (Power conditioner, UPS) • Welding Machine 	<ul style="list-style-type: none"> • PFC Circuit (Air conditioner, lighting) 	<ul style="list-style-type: none"> • Partial Switching PFC (Air conditioner) • Inverter Circuit • Motor Driving • UPS 	<ul style="list-style-type: none"> • Partial Switching PFC (Air conditioner) • Inverter Circuit • Bridge Circuit • IH 	<ul style="list-style-type: none"> • Partial Switching PFC (Air conditioner)

<Circuit Example>

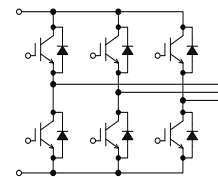
➤ Partial Switching PFC



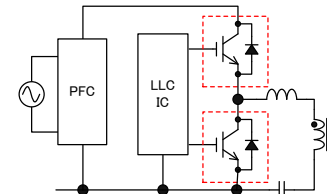
➤ PFC Circuit



➤ Inverter



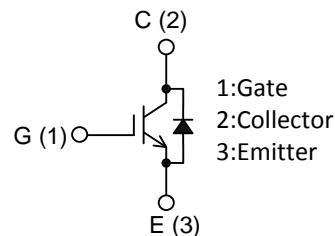
➤ Half Bridge Circuit



KGF65AxH, MGF65AxH, FGF65AxH Series

Features

- High Speed Switching (60 ns, to 80 kHz)
- Field Stop Structure achieves Low Saturation Voltage (1.9 V)
- Built-in a First Recovery Diode (1.8 V, 50 ns)
- **Short Circuit Withstand Time: 10 μ s**

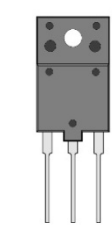


TO3P



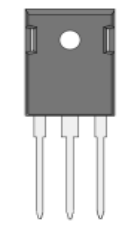
1 2 3

TO3PF



1 2 3

TO-247



1 2 3

Application

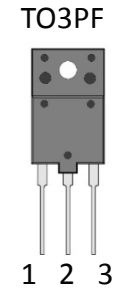
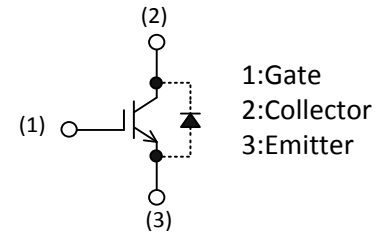
- Welding Converters
- PFC Circuit of the High Power Application such as Air Conditioner and Lighting
- Boost Circuit for Solar Panel
- UPS , etc.

Part Number	Package	V_{CES}	I_C		$I_{C(PULSE)}$ $T_C = 25^\circ C$	$V_{CE(sat)}$ (typ.)	t_f (typ.)		V_F (typ.)	t_{rr} (typ.) $T_J = 25^\circ C$
			$T_J = 25^\circ C$	$T_J = 100^\circ C$			$T_J = 25^\circ C$	$T_J = 175^\circ C$		
FGF65A3H	TO3PF	650 V	25 A	15 A	90 A	1.9 V	30 ns	60 ns	1.8 V	50 ns
FGF65A4H			35 A	20 A	120 A		40 ns			
MGF65A3H	TO3P	650 V	50 A	30 A	90 A	1.9 V	30 ns	60 ns	1.8 V	50 ns
MGF65A4H			65 A	40 A	120 A		40 ns			
MGF65A6H			80 A	60 A	180 A		40 ns			
KGF65A3H	TO247	650 V	50 A	30 A	90 A	1.9 V	30 ns	60 ns	1.8 V	50 ns
KGF65A4H			65 A	40 A	120 A		40 ns			
KGF65A6H			80 A	60 A	180 A		40 ns			

FGA65A3H

Features

- High Speed Switching (60 ns, to 80 kHz)
- Field Stop Structure achieves Low Saturation Voltage (1.9 V)
- **Built-in Protection Diode**
 $V_F = 2.0 \text{ V}$ ($I_F = 0.5 \text{ A}$)
- **Short Circuit Withstand Time: 10 μs**



Application

- PFC Circuit of the High Power Application such as Air Conditioner and Lighting

Part Number	Package	V_{CES}	I_C		$I_{C(PULSE)}$ $T_C = 25 \text{ }^\circ\text{C}$	$V_{CE(sat)}$ (typ.)	t_f (typ.)	
			$T_j = 25 \text{ }^\circ\text{C}$	$T_j = 100 \text{ }^\circ\text{C}$			$T_j = 25 \text{ }^\circ\text{C}$	$T_j = 175 \text{ }^\circ\text{C}$
FGA65A3H	TO3PF	650 V	25 A	15 A	90 A	1.9 V	30 ns	60 ns

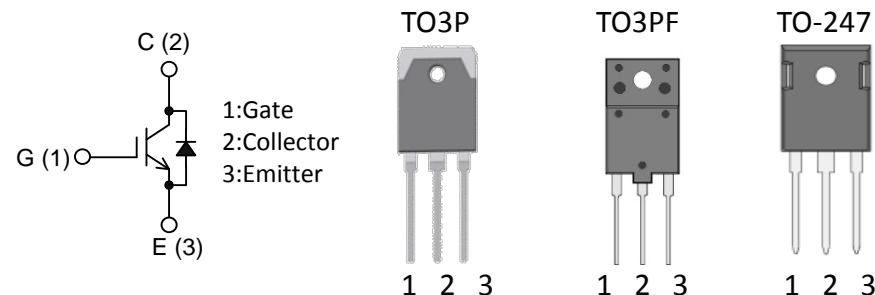
KGF65AxL, MGF65AxL, FGF65AxL Series

Features

- Field Stop Structure achieves Low Saturation Voltage (1.6 V)
- Built-in a First Recovery Diode (1.6 V, 50 ns)
- **Short Circuit Withstand Time: 5 μ s**

Application

- Motor Driving
- Inverter for Solar Panel
- UPS
- Totem-Pole Bridgeless PFC Circuit, etc.



Part Number	Package	V_{CES}	I_C		$I_{C(PULSE)}$ $T_C = 25\text{ }^\circ\text{C}$	$V_{CE(sat)}$ (typ.)	t_f (typ.)		V_F (typ.)	t_{rr} (typ.) $T_J = 25\text{ }^\circ\text{C}$
			$T_J = 25\text{ }^\circ\text{C}$	$T_J = 100\text{ }^\circ\text{C}$			$T_J = 25\text{ }^\circ\text{C}$	$T_J = 175\text{ }^\circ\text{C}$		
FGF65A3L6L	TO3PF	650 V	25 A	15 A	90 A	1.6 V	40 ns	160 ns	1.5 V	70 ns
FGF65A3L			25 A	15 A	90 A		40 ns	160 ns	1.6 V	
FGF65A4L			30 A	20 A	120 A		50 ns	160 ns	1.6 V	
MGF65A3L	TO3P	650 V	50 A	30 A	90 A	1.6 V	40 ns	160 ns	1.6 V	50 ns
MGF65A4L			65 A	40 A	120 A		50 ns	160 ns	1.6 V	
MGF65A6L			80 A	60 A	180 A		60 ns	150 ns	1.8 V	
KGF65A3L	TO247	650 V	50 A	30 A	90 A	1.6 V	40 ns	160 ns	1.6 V	50 ns
KGF65A4L			65 A	40 A	120 A		50 ns	160 ns	1.6 V	
KGF65A6L			80 A	60 A	180 A		60 ns	150 ns	1.8 V	

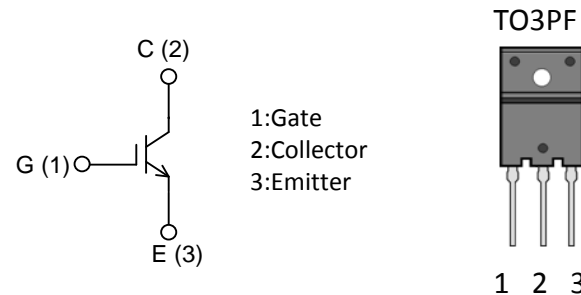
FGM6xx Series

Features

- Low Saturation Voltage (to 1.7 V)

Application

- Partial Switching PFC for Air Conditioner
- PFC Circuit of Air Conditioner and Lighting, etc.



Part Number	Package	V_{CES}	I_C		$I_{C(PULSE)}$ $T_C = 25\text{ }^\circ\text{C}$	$V_{CE(sat)}$ (typ.)	t_f (typ.)	
			$T_J = 25\text{ }^\circ\text{C}$	$T_J = 100\text{ }^\circ\text{C}$			$T_J = 25\text{ }^\circ\text{C}$	$T_J = 125\text{ }^\circ\text{C}$
FGM622S	TO3PF	600 V	25 A	16 A	75 A	1.7 V	120 ns	200 ns
FGM623S	TO3PF		30 A	18 A	100 A	1.5 V	120 ns	200 ns
FGM633			30 A	18 A	100 A	1.5 V	120 ns	200 ns

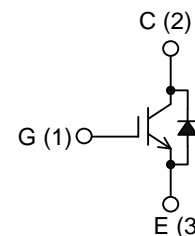
MGD6xx Series

Features

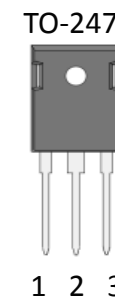
- Low Saturation Voltage (to 2.1 V)
- Built-in a First Recovery Diode (to 1.3 V, to 350 ns)

Application

- IH
- PFC Circuit of Air Conditioner and Lighting
- Inverter
- Bridge Circuit , etc.



1:Gate
2:Collector
3:Emitter



Part Number	Package	V_{CES}	I_C		$I_{C(PULSE)}$ $T_c = 25\text{ }^\circ\text{C}$	$V_{CE(sat)}$ (typ.)	t_f (typ.)		V_F (typ.)	t_{rr} (typ.) $T_J = 25\text{ }^\circ\text{C}$
			$T_J = 25\text{ }^\circ\text{C}$	$T_J = 100\text{ }^\circ\text{C}$			$T_J = 25\text{ }^\circ\text{C}$	$T_J = 125\text{ }^\circ\text{C}$		
MGD622	TO3P	600 V	40 A	20 A	80 A	2.1 V	120 ns	200 ns	1.2 V	300 ns
MGD623N	TO3P		50 A	37 A	100 A	1.7 V	200 ns	350 ns	1.2 V	300 ns
MGD623S			50 A	37 A	100 A	1.8 V	120 ns	200 ns	1.2 V	300 ns

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