

# FVP18030IM3LSG1 Sustain

## Features

- Use of high speed 300V IGBTs with parallel FRDs
- Single-grounded power supply by means of built-in HVIC
- Sufficient current driving capability for IGBTs due to adding a buffer
- Isolation rating of 1500Vrms/min.
- Low leakage current due to using an insulated metal substrates

## Applications

- Sustain Part of a PDP(Plasma display panel)

## General Description

It is an advanced smart power module (SPM™) that Fairchild has newly developed and designed to provide very compact and optimized performance for the sustaining circuit of PDP driving system. It contains HVICs, buffers and low-loss high speed IGBTs that are needed to compose the sustaining circuits. Under voltage lock-out protection function enhances the system reliability. The high speed built-in HVIC provides optocoupler-less single power supply IGBT gate driving capability that further reduce the overall system size of PDP and the buffer provides high current driving capability of IGBTs.

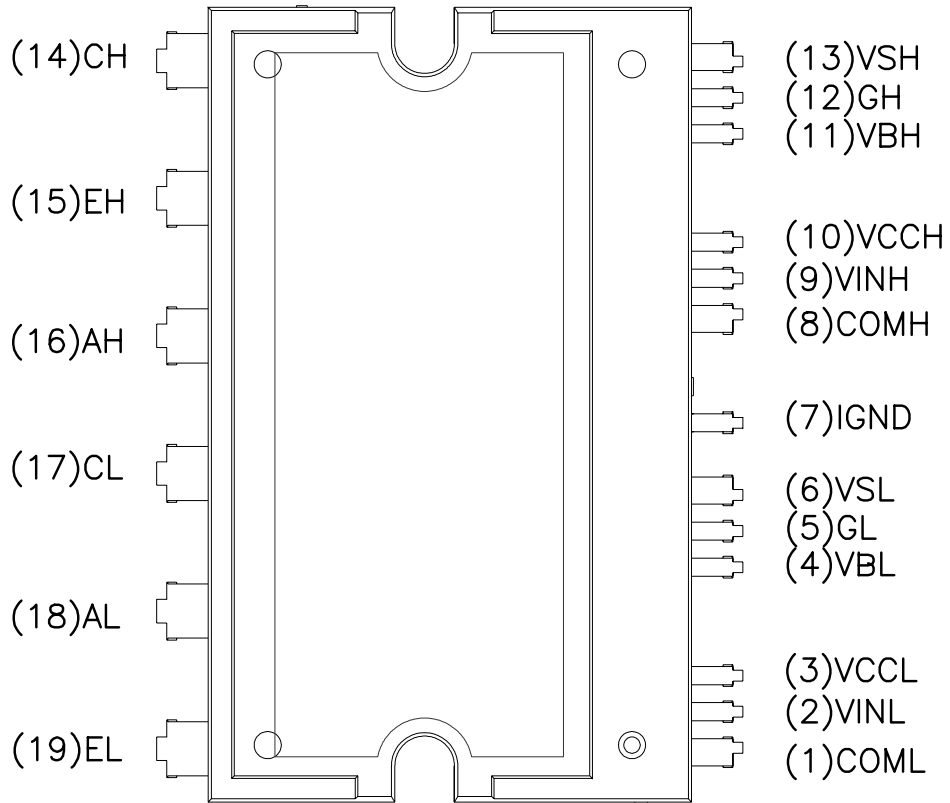
## Package Outlines



Figure 1.

**Pin Configurations**

**Top View**

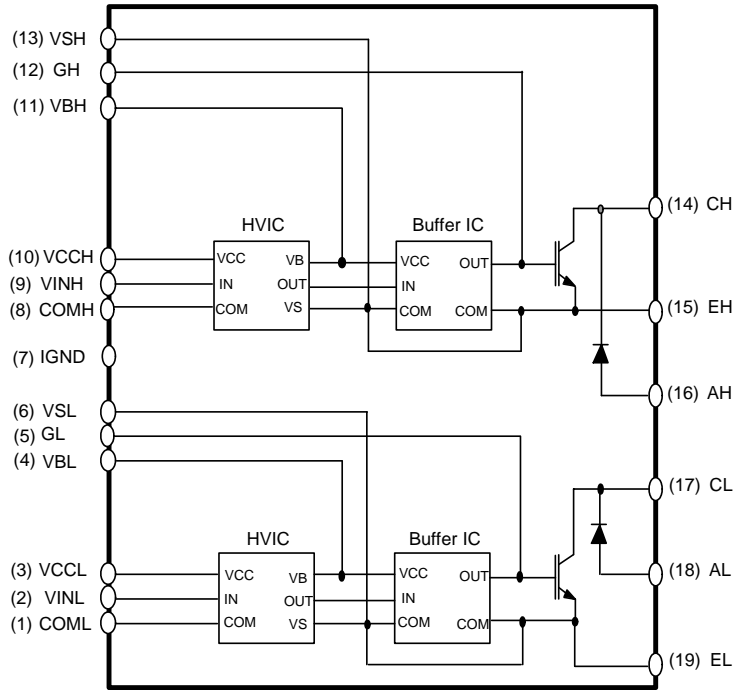


**Figure 2.**

## Pin Descriptions

Pin Number	Pin Name	Pin Descriptions
1	COML	Low-side Signal Ground
2	VINL	Low-side Signal Input
3	VCCL	Low-side Supply Voltage for HVIC
4	VBL	Low-side Floating Supply Voltage for Buffer IC and IGBT Driving
5	GL	Low-side Gate
6	VSL	Low-side Floating Ground for Buffer IC and IGBT Driving
7	IGND	IMS Ground
8	COMH	High-side Signal Ground
9	VINH	High-side Signal Input
10	VCCH	High-side Supply Voltage for HVICg
11	VBH	High-side Floating Supply Voltage for Buffer IC and IGBT Driving
12	GH	High-side Gate
13	VSH	High-side Floating Ground for Buffer IC and IGBT Driving
14	CH	High-side IGBT Collector
15	EH	High-side IGBT Emitter
16	AH	High-side Diode Anode
17	CL	Low-side IGBT Collector
18	AL	Low-side Diode Anode
19	EL	Low-side IGBT Emitter

**Internal Equivalent Circuit and Input/Output Pins (Bottom View)**



**Figure 3.**

**Absolute Maximum Ratings** ( $T_C = 25^\circ\text{C}$ , Unless Otherwise Specified)

Symbol	Parameter	Conditions	Rating	Units
VCC	Control Supply Voltage	Applied between VCCL-COML, VCCH - COMH	20	V
VBS	Control Bias Voltage	Applied between VBL - VSL, VBH - VSH	20	V
VIN	Input Signal Voltage	Applied between VINL-COML, VINH - COMH	-0.3~17	V

Symbol	Parameter	Conditions	Rating	Units
VCE	Collector to Emitter Voltage	Between CL to EL, Between CH to EH $V_{GH-EH}=V_{GL-EL}=0V$ , $I_{CH}=I_{CL}=250\mu\text{A}$	300	V
VRRM	Peak Repetitive Reverse Voltage	Between CH to AH, Between CL to AL $I_{AH}=I_{AL}=250\mu\text{A}$	300	V
VIN	Input Signal Voltage	VINL, VINH	-0.3 to $V_{CC}+0.3$	V
$I_C$	Collector Current Continuous	Between CL to EL, Between CH to EH	180	A
$I_{F(AV)}$	Average Rectified Forward Current	Between CH to AH, Between CL to AL	10	A
$I_{CP}$	Pulsed Collector Current	Between CL to EL, Between CH to EH (Note1)	450	A
$I_{FP}$	Pulsed Diode Current	Between CH to AH, Between CL to AL (Note1)	100	A

**Notes :**1. Pulse Width = 100 $\mu\text{sec}$ , Duty = 0.1; half sine wave\* $I_{CP}$  limited by MAX  $T_J$ 

Symbol	Parameter	Conditions	Rating	Units
$P_d$	IGBT Dissipation	$T_C=25^\circ\text{C}$ per IGBT	167	W
		$T_C=100^\circ\text{C}$ per IGBT	67	W
	FRD Dissipation	$T_C=25^\circ\text{C}$ per diode	34	W
		$T_C=100^\circ\text{C}$ per diode	14	W
$T_J$	Operating Junction Temperature		-20 ~ 150	$^\circ\text{C}$
$T_C$	Module Case Operation Temperature		-20 ~ 125	$^\circ\text{C}$
$T_{STG}$	Storage Temperature		-40 ~ 125	$^\circ\text{C}$
$V_{ISO}$	Isolation Voltage	60Hz, Sinusoidal, AC 1 minute, Connection Pins to IMS substrate	1500	$V_{rms}$

**Thermal Resistance**

Symbol	Parameter	Conditions	Min.	Max.	Units
$R_{th(j-c)}$	Junction to Case Thermal Resistance	Between CH to EH, Between CL to EL per IGBT	-	0.75	$^\circ\text{C/W}$
		Between CH to AH, Between CL to AL per Diode	-	3.70	$^\circ\text{C/W}$

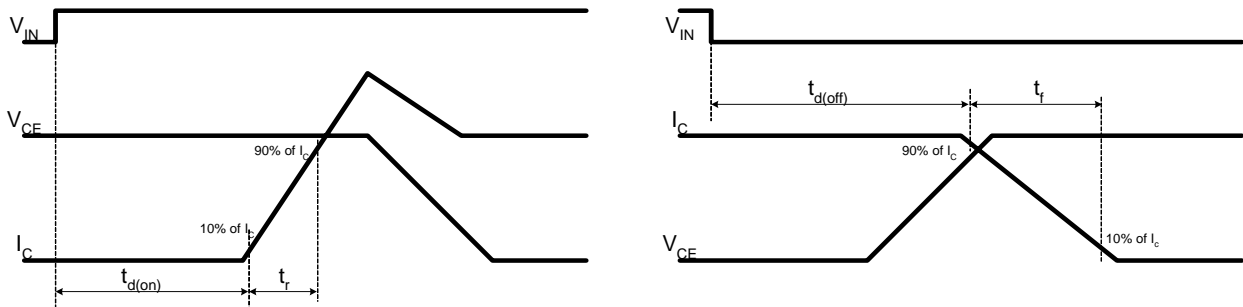
**Electrical Characteristics** ( $T_c = 25^\circ\text{C}$ , Unless Otherwise Specified)

Symbol	Parameter	Conditions		Min.	Typ.	Max.	Units
$I_{QCC}$	Quiescent VCC Supply Current	VCC = 15V VINL, VINH = 0V	VCCL-COML, VCCH-COMH	-	-	100	$\mu\text{A}$
$I_{QBS}$	Quiescent VBS Supply Current	VBS = 15V VINL, VINH = 0V	VBL- VSL, VBH- VSH	-	-	500	$\mu\text{A}$
$UV_{BSD}$	Supply Circuit Under Voltage Protection	Detection Level		10.1	11.3	12.5	V
$UV_{BSR}$		Reset Level		10.5	11.7	12.9	V
$V_{IN(ON)}$	ON Threshold Voltage	Applied between VINL-COML, VINH - COMH		3.0	-	-	V
$V_{IN(OFF)}$	OFF Threshold Voltage			-	-	0.8	V

Symbol	Parameter	Condition		Min.	Typ.	Max.	Units
$V_{CE(SAT)}$	IGBT Collector-Emitter Saturation Voltage	VCC = VBS = 15V VIN = 5V	$I_C = 40\text{A}, T_J = 25^\circ\text{C}$	-	-	1.4	V
			$I_C = 180\text{A}, T_J = 25^\circ\text{C}$	-	1.9	-	V
$V_F$	Diode Forward Voltage	VIN = 0V	$I_C = 10\text{A}, T_J = 25^\circ\text{C}$	-	-	1.4	V
$t_{dON}$	Switching Times	VCE=200V, VCC= VBS=15V $I_C = 20\text{A}$ VIN = 0V 5V, Inductive Load $T_c = 25^\circ\text{C}$ (Note2)		-	230	-	ns
$t_r$				-	54	-	ns
$t_{dOFF}$				-	260	-	ns
$t_f$				-	108	-	ns
$I_{CES}$	Collector-Emitter Leakage Current	VCE = 300V		-	-	250	$\mu\text{A}$
$I_R$	Diode Anode-Cathode Leakage Current	Between EH to CH Between EL to CL	$V_{\text{Anode-Cathode}}=300\text{V}$			250	$\mu\text{A}$

**Notes :**

2.  $t_{ON}$  and  $t_{OFF}$  include the propagation delay time of internal drive IC. For the detailed information, please see Figure 4.



**Figure 4. Switching Time Definition**

## Typical Performance Characteristics

Figure 5. Typical Output Characteristics

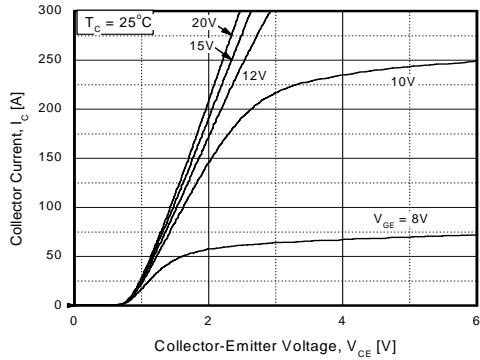


Figure 6. Typical Output Characteristics

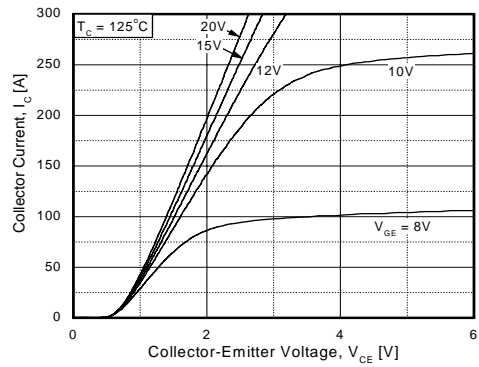


Figure 7. Typical Forward Voltage Drop

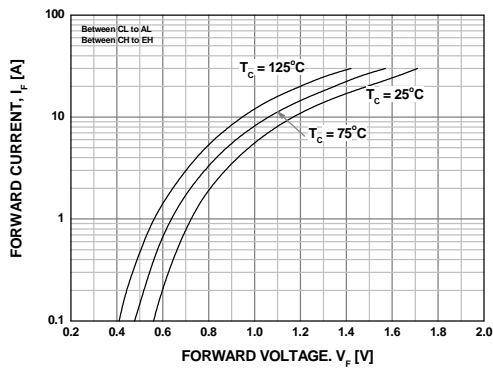
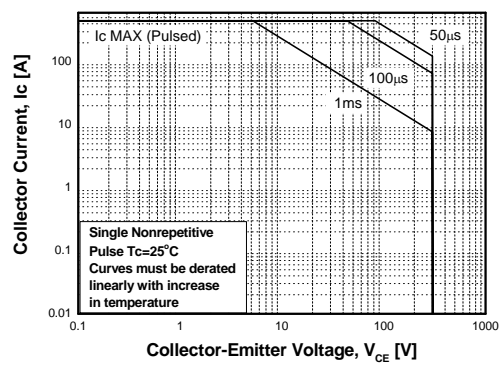


Figure 8. Typical Forward Voltage Drop



## Mechanical Characteristics and Ratings

Parameter	Conditions		Limits			Units
			Min.	Typ.	Max.	
Mounting Torque	Mounting Screw: - M3	Recommended 0.62N•m	0.51	0.62	0.72	N•m
Device Flatness		Note Figure 5	0	-	+100	μm
Weight			-	13.4	-	g

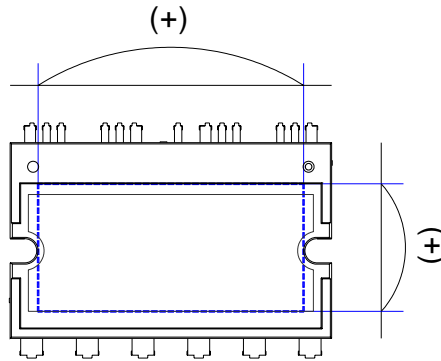


Figure 9. Flatness Measurement Position



Detailed Package Outline Drawings

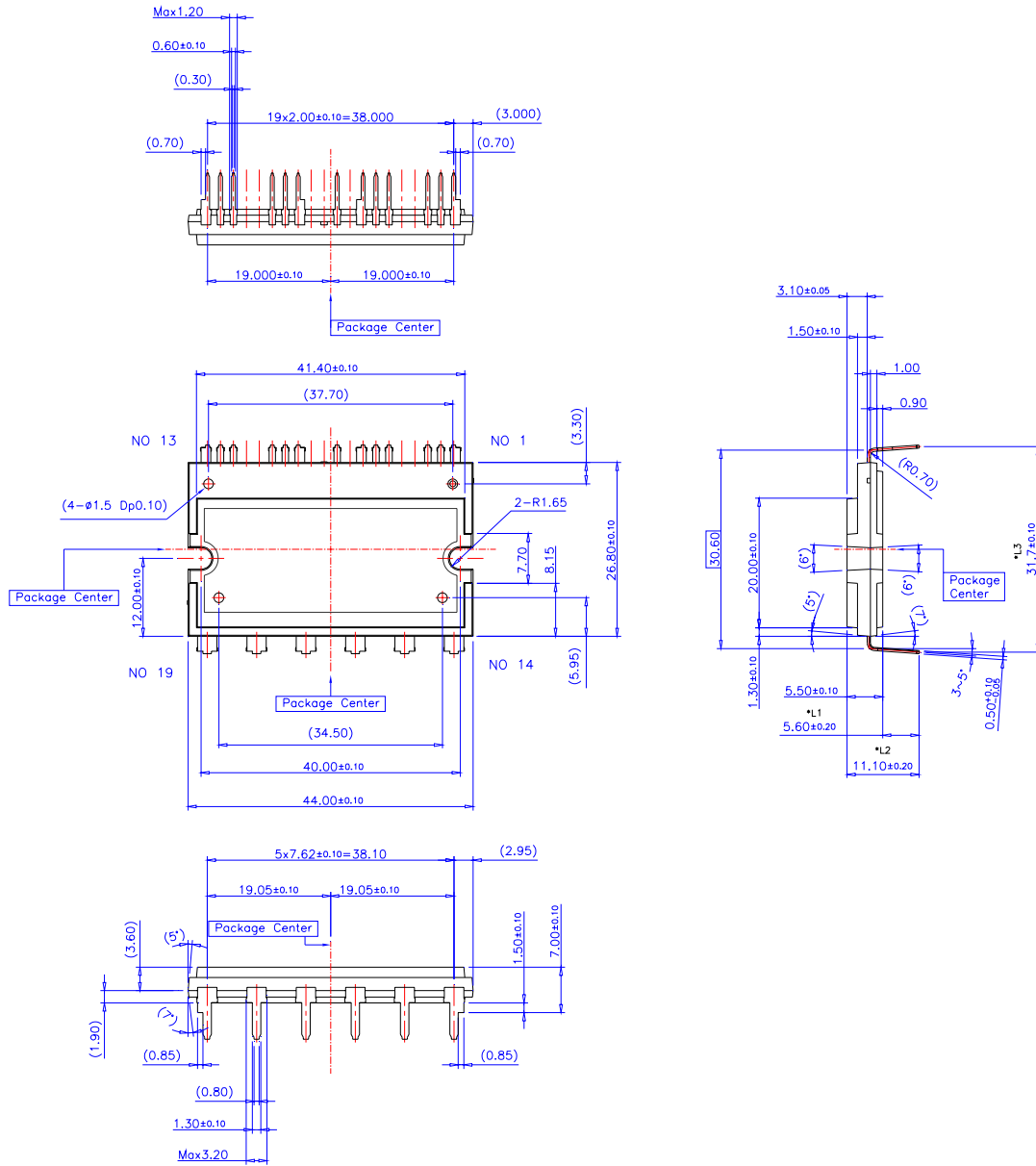



Figure 10.



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