

# FGD4536 360 V PDP Trench IGBT

## Features

- High Current Capability
- Low Saturation Voltage: V<sub>CE(sat)</sub> = 1.59 V @ I<sub>C</sub> = 50 A
- High Input Impedance
- Fast Switching
- RoHS Compliant

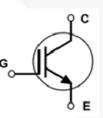
## Applications

• PDP TV, Consumer Appliances

## **General Description**

Using novel trench IGBT technology, Fairchild's new series of trench IGBTs offer the optimum performance for consumer appliances and PDP TV applications where low conduction and switching losses are essential.





### **Absolute Maximum Ratings**

Symbol	Description		Ratings	Unit
V <sub>CES</sub>	Collector to Emitter Voltage		360	V
V <sub>GES</sub>	Gate to Emitter Voltage		± 30	V
I <sub>C pulse(1)*</sub>	Pulsed Collector Current	@ T <sub>C</sub> = 25°C	220	A
P <sub>D</sub>	Maximum Power Dissipation	@ T <sub>C</sub> = 25°C	125	W
	Maximum Power Dissipation $@T_{C} = 100^{\circ}C$		50	W
TJ	Operating Junction Temperature		-55 to +150	°C
T <sub>stg</sub>	Storage Temperature Range		-55 to +150	°C
TL	Maximum Lead Temp. for soldering Purposes, 1/8" from case for 5 seconds		300	°C

#### **Thermal Characteristics**

Symbol	Parameter	Тур.	Max.	Unit	
R <sub>θJC</sub> (IGBT)	Thermal Resistance, Junction to Case	-	1.0	°C/W	
R <sub>0JA</sub> Thermal Resistance, Junction to Ambient		-	62.5	°C/W	

#### Notes:

(1) Half Sine Wave, D < 0.01, pluse width < 1 $\mu$ sec \* lc\_pluse limited by max Tj

September 2013

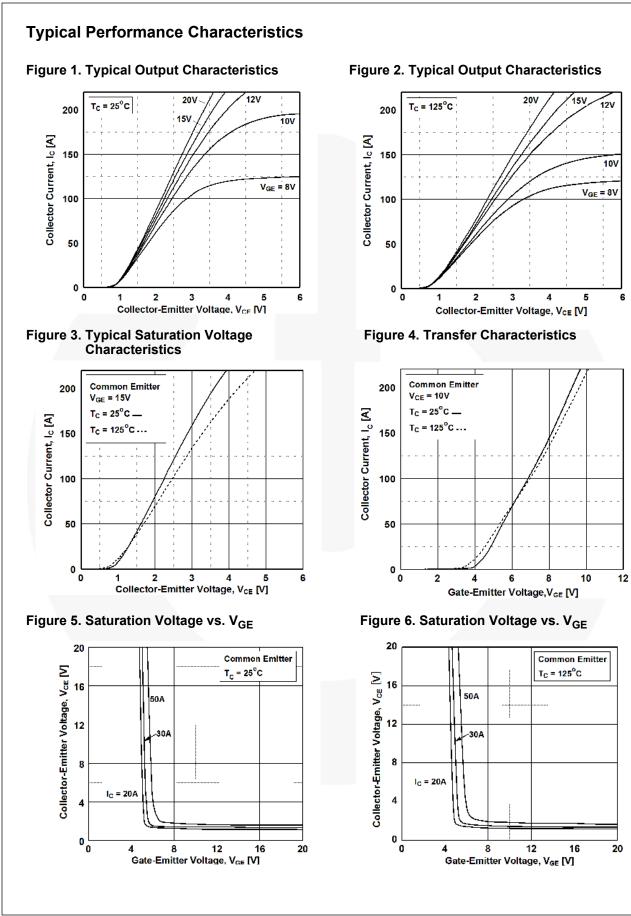
FGD4536 — 360 V PDP Trench IGBT

## Package Marking and Ordering Information

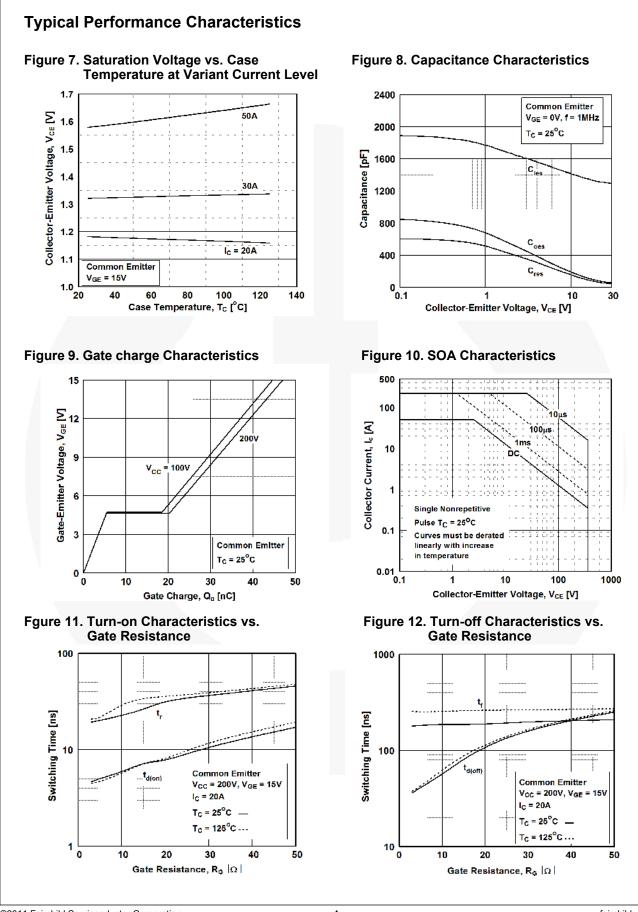
Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FGD4536	FGD4536TM	TO252(D-PAK)	380 mm	16 mm	-
FGD4536	FGD4536TM_F065	TO252(D-PAK)	380 mm	16 mm	-

## Electrical Characteristics of the IGBT T<sub>C</sub> = 25°C unless otherwise noted

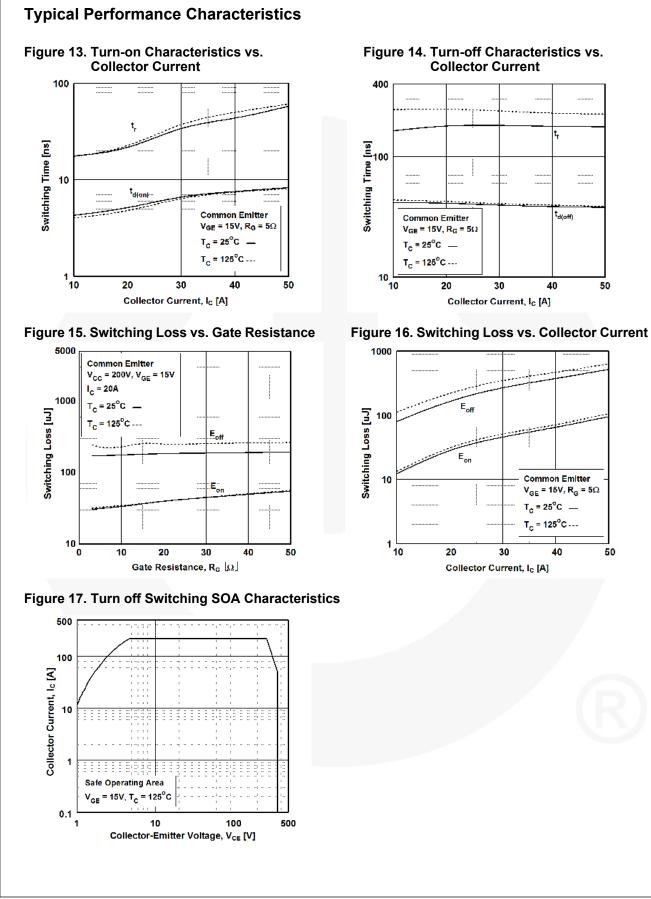
Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
Off Charac	teristics					
BV <sub>CES</sub>	Collector to Emitter Breakdown Voltage	V <sub>GE</sub> = 0V, I <sub>C</sub> = 250 μA	360	-	-	V
$\frac{\Delta BV_{CES}}{\Delta T_{J}}$	Temperature Coefficient of Breakdown Voltage	V <sub>GE</sub> = 0V, I <sub>C</sub> = 250 μA	-	0.4	-	V/ºC
I <sub>CES</sub>	Collector Cut-Off Current	$V_{CE} = V_{CES}, V_{GE} = 0 V$	-	-	100	μA
I <sub>GES</sub>	G-E Leakage Current	$V_{GE} = V_{GES}, V_{CE} = 0 V$	-	-	±400	nA
On Charac	teristics					
V <sub>GE(th)</sub>	G-E Threshold Voltage	I <sub>C</sub> = 250 μA, V <sub>CE</sub> = V <sub>GE</sub>	2.4	3.3	4.0	V
(**)	Collector to Emitter Saturation Voltage	$I_{\rm C} = 20$ A, $V_{\rm GE} = 15$ V	-	1.19	-	V
V		I <sub>C</sub> = 30 A, V <sub>GE</sub> = 15 V		1.33	-	V
V <sub>CE(sat)</sub>		I <sub>C</sub> = 50 A, V <sub>GE</sub> = 15 V, T <sub>C</sub> = 25°C	-	1.59	1.8	v
		$I_{\rm C}$ = 50 A, V <sub>GE</sub> = 15 V, T <sub>C</sub> = 125°C	-	1.66	-	v
Dynamic C	characteristics					
C <sub>ies</sub>	Input Capacitance		-	1295	-	pF
C <sub>oes</sub>	Output Capacitance	V <sub>CE</sub> = 30 V, V <sub>GE</sub> = 0 V, f = 1 MHz	-	56	-	pF
C <sub>res</sub>	Reverse Transfer Capacitance		-	43	-	pF
Switching	Characteristics					
t <sub>d(on)</sub>	Turn-On Delay Time		-	5	-	ns
t <sub>r</sub>	Rise Time	V <sub>CC</sub> = 200 V, I <sub>C</sub> = 20 A, R <sub>G</sub> = 5 Ω, V <sub>GE</sub> = 15 V,	- 7	20	-	ns
t <sub>d(off)</sub>	Turn-Off Delay Time	$R_G = 502, V_{GE} = 15 V,$ ResistiveLoad, $T_C = 25^{\circ}C$	-	41	-	ns
t <sub>f</sub>	Fall Time		-	182	- /	ns
t <sub>d(on)</sub>	Turn-On Delay Time		-	5	-	ns
t <sub>r</sub>	Rise Time	$V_{CC} = 200 \text{ V}, \text{ I}_{C} = 20 \text{ A},$	-	21	-	ns
t <sub>d(off)</sub>	Turn-Off Delay Time	$R_G = 5 \Omega$ , $V_{GE} = 15 V$ , Resistive Load, $T_C = 125^{\circ}C$	-	43	-	ns
t <sub>f</sub>	Fall Time		-	249	- /	ns
Qg	Total Gate Charge	V 000V/1 00 1	-	47	- (	nC
•	Gate to Emitter Charge	V <sub>CE</sub> = 200 V, I <sub>C</sub> = 20 A, V <sub>GE</sub> = 15 V	-	5.4		nC
Q <sub>ge</sub>						



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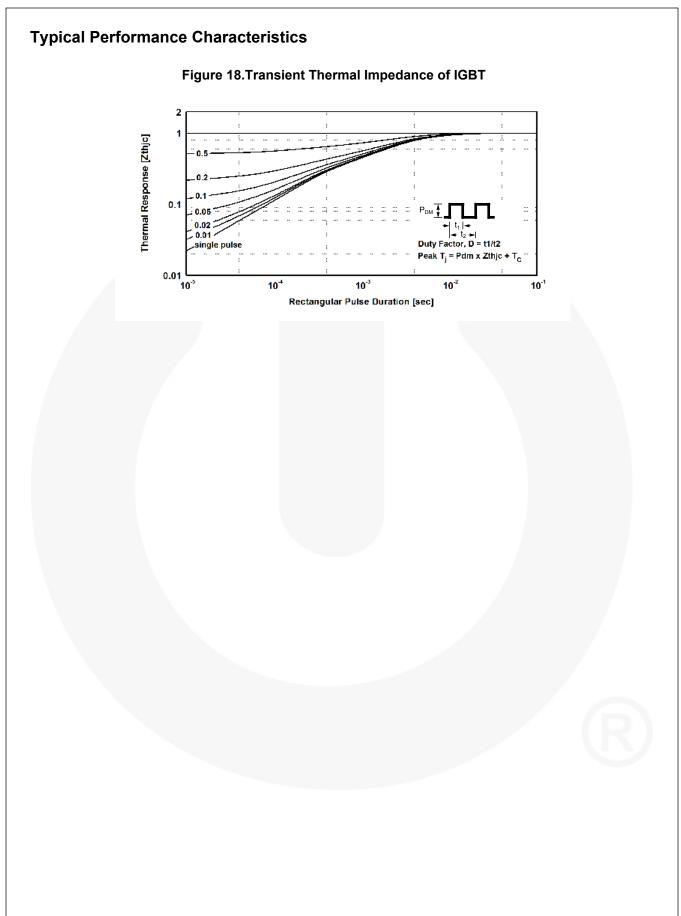


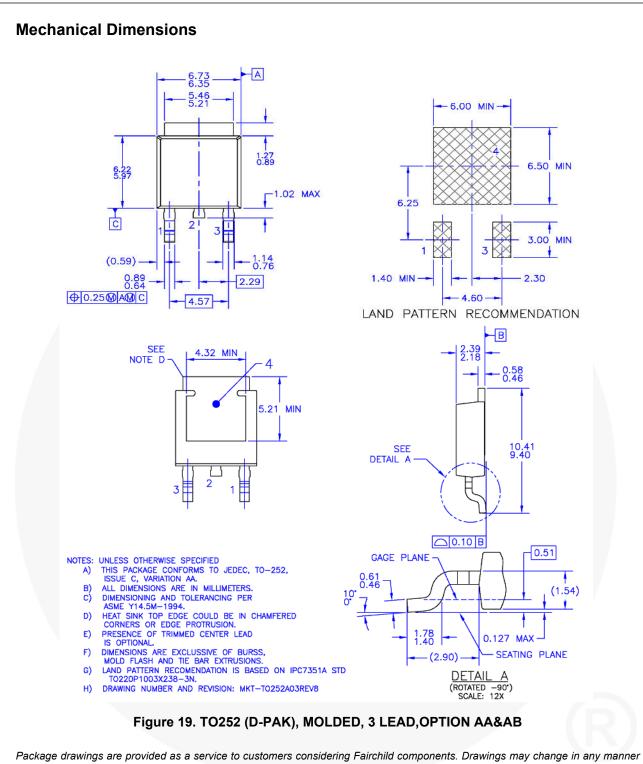
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**Dimensions in Millimeters** 



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