

March 2011

FGY75N60SMD 600V, 75A Field Stop IGBT

Features

- · High Current Capability
- Low Saturation Voltage: $V_{CE(sat)} = 1.9V @ I_C = 75A$
- High Input Impedance
- · Fast Switching
- · RoHS Compliant

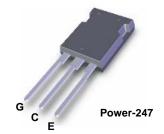


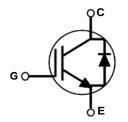
General Description

Using Novel Field Stop IGBT Technology, Fairchild's new series of Field Stop IGBTs offer the optimum performance for Solar Inverter, UPS, Welder, SMPS and PFC applications where low conduction and switching losses are essential.

Application

• Solar Inverter, UPS, Welder, SMPS, PFC





Absolute Maximum Ratings

Symbol	Description		Ratings	Units
V _{CES}	Collector to Emitter Voltage		600	V
V _{GES}	Gate to Emitter Voltage		± 20	V
I _C	Collector Current	@ T _C = 25°C	150	A
10	Collector Current	@ T _C = 100°C	75	A
I _{CM (1)}	Pulsed Collector Current	@ T _C = 25°C	225	А
	Diode Forward Current	@ T _C = 25°C	75	А
I _F	Diode Forward Current	$@ T_C = 100^{\circ}C$	50	A
I _{FM (1)}	Pulsed Diode Maximum Forward Current		225	A
P _D	Maximum Power Dissipation	@ T _C = 25°C	750	W
י ט	Maximum Power Dissipation	$@ T_C = 100^{\circ}C$	375	W
T _J	Operating Junction Temperature		-55 to +175	°C
T _{stg}	Storage Temperature Range		-55 to +175	°C
T _L	Maximum Lead Temp. for soldering Purposes, 1/8" from case for 5 seconds		300	°C

Notes

1: Repetitive rating: Pulse width limited by max. junction temperature.

Thermal Characteristics

Symbol	Parameter	Тур.	Max.	Units
$R_{\theta JC}(IGBT)$	Thermal Resistance, Junction to Case	-	0.2	°C/W
$R_{\theta JC}(Diode)$	Thermal Resistance, Junction to Case	-	0.7	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	-	40	°C/W

Package Marking and Ordering Information

Device Marking	Device	Package	Packaging Type	Qty per Tube	
FGY75N60SMD	FGY75N60SMD	Power-247	Tube	30ea	

Electrical Characteristics of the IGBT $T_C = 25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Units
Off Charac	eteristics					
BV _{CES}	Collector to Emitter Breakdown Voltage	$V_{GE} = 0V, I_{C} = 250\mu A$	600	-	-	V
$\frac{\Delta BV_{CES}}{\Delta T_J}$	Temperature Coefficient of Breakdown Voltage	$V_{GE} = 0V, I_{C} = 250\mu A$	-	0.67	-	V/°C
I _{CES}	Collector Cut-Off Current	$V_{CE} = V_{CES}, V_{GE} = 0V$	-	-	250	μА
I_{GES}	G-E Leakage Current	$V_{GE} = V_{GES}, V_{CE} = 0V$	-	-	±400	nA
On Charac	teristics					
V _{GE(th)}	G-E Threshold Voltage	$I_C = 250 \mu A, V_{CE} = V_{GE}$	3.5	5.0	6.5	V
		I _C = 75A, V _{GE} = 15V	-	1.90	2.50	V
V _{CE(sat)}	Collector to Emitter Saturation Voltage	I _C = 75A, V _{GE} = 15V, T _C = 175°C	-	2.14	-	V
Dynamic C	Characteristics					
C _{ies}	Input Capacitance		-	3800	-	pF
C _{oes}	Output Capacitance	$V_{CE} = 30V_{,} V_{GE} = 0V_{,}$ f = 1MHz	-	390	-	pF
C _{res}	Reverse Transfer Capacitance	1 = 11/11/12	-	105	-	pF
Switching	Characteristics					
t _{d(on)}	Turn-On Delay Time		-	24	32	ns
t _r	Rise Time		-	56	73	ns
t _{d(off)}	Turn-Off Delay Time	V _{CC} = 400V, I _C = 75A,	-	136	177	ns
t _f	Fall Time	$R_G = 3\Omega$, $V_{GE} = 15V$,	-	22	29	ns
E _{on}	Turn-On Switching Loss	Inductive Load, T _C = 25°C	-	2.3	2.99	mJ
E _{off}	Turn-Off Switching Loss		-	0.77	1.00	mJ
E _{ts}	Total Switching Loss		-	3.07	3.99	mJ
t _{d(on)}	Turn-On Delay Time		-	23	-	ns
t _r	Rise Time		-	53	-	ns
t _{d(off)}	Turn-Off Delay Time	$V_{CC} = 400V, I_{C} = 75A,$ $R_{G} = 3\Omega, V_{GE} = 15V,$	-	146	-	ns
t _f	Fall Time		-	15	-	ns
E _{on}	Turn-On Switching Loss	Inductive Load, T _C = 175°C	-	3.60	-	mJ
E _{off}	Turn-Off Switching Loss		-	1.11	-	mJ
E _{ts}	Total Switching Loss		-	4.71	-	mJ

Electrical Characteristics of the IGBT $T_C = 25$ °C unless otherwise noted

Qg	Total Gate Charge	V _{CE} = 400V, I _C = 75A, V _{GE} = 15V	-	248	370	nC
Q _{ge}	Gate to Emitter Charge		-	28	42	nC
Q _{gc}	Gate to Collector Charge	VGE = 10V	-	129	195	nC

Electrical Characteristics of the Diode $T_C = 25^{\circ}C$ unless otherwise noted

Symbol	Parameter	Test Conditions		Min.	Тур.	Max	Units
V _{FM}	Diode Forward Voltage	I _F = 50A	$T_{\rm C} = 25^{\rm o}{\rm C}$	-	1.75	2.1	V
			$T_{\rm C} = 175^{\rm o}{\rm C}$	-	1.35	-	
E _{rec}	Reverse Recovery Energy	$I_F = 50A$, $dI_F/dt = 200A/\mu s$ $V_R = 400V$	$T_{\rm C} = 175^{\rm o}{\rm C}$	-	0.14	-	mJ
t _{rr}	Diode Reverse Recovery Time		$T_{\rm C} = 25^{\rm o}{\rm C}$	-	41	55	ns
ना			$T_{\rm C} = 175^{\rm o}{\rm C}$	-	126	-]
Q _{rr}	Diode Reverse Recovery Charge		$T_C = 25^{\circ}C$	-	81	115	nC
~ II	2.535 No.55		$T_{\rm C} = 175^{\rm o}{\rm C}$	-	736	-]

Figure 1. Typical Output Characteristics

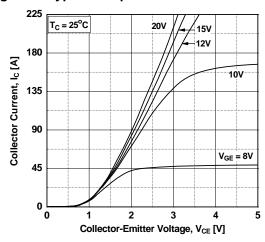


Figure 3. Typical Saturation Voltage Characteristics

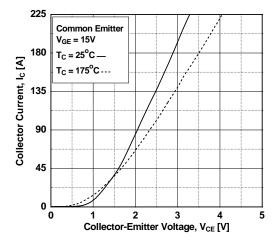


Figure 5. Saturation Voltage vs. Case
Temperature at Variant Current Level

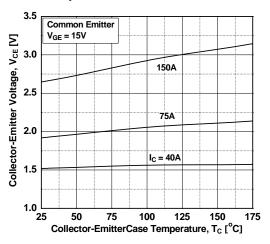


Figure 2. Typical Output Characteristics

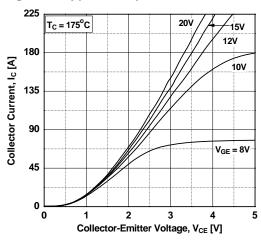


Figure 4. Transfer Characteristics

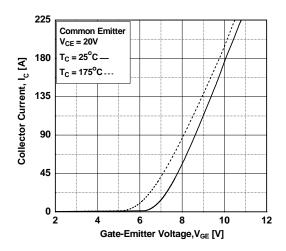


Figure 6. Saturation Voltage vs. V_{GE}

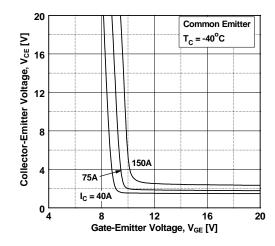


Figure 7. Saturation Voltage vs. V_{GE}

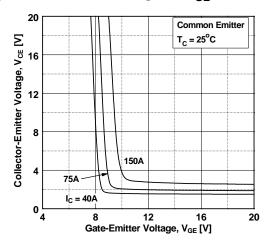


Figure 9. Capacitance Characteristics

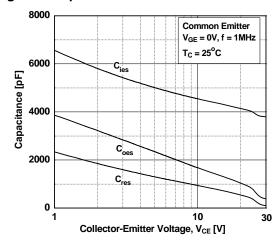


Figure 11. Turn-off Characteristics vs.
Gate Resistance

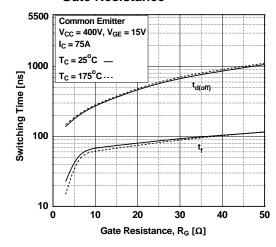


Figure 8. Saturation Voltage vs. V_{GE}

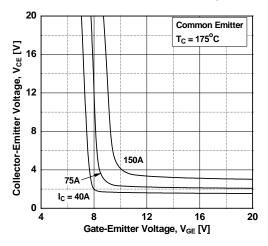


Figure 10. Gate charge Characteristics

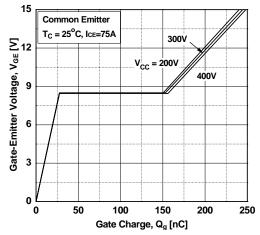


Figure 12. Turn-on Characteristics vs.
Gate Resistance

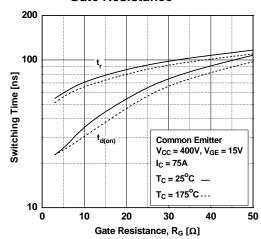


Figure 13. Turn-off Characteristics vs. Collector Current

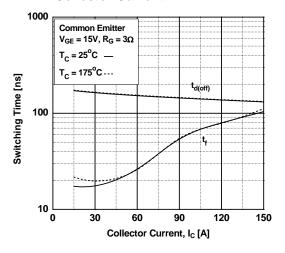


Figure 14. Turn-on Characteristics vs. Collector Current

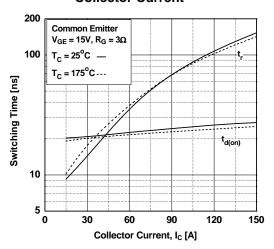


Figure 15. Switching Loss vs. Collector Current

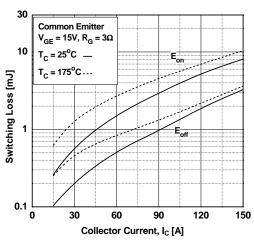


Figure 16. Switching Loss vs. Gate Resistance

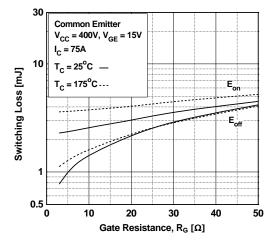


Figure 17. SOA Characteristics

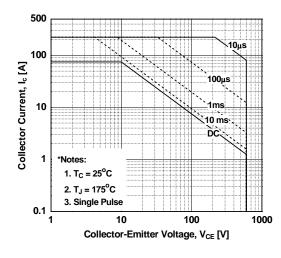


Figure 18. Turn off Switching SOA Characteristics

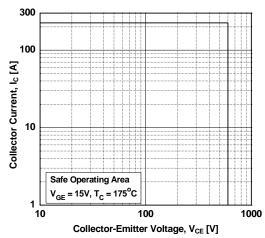


Figure 19. Current Derating

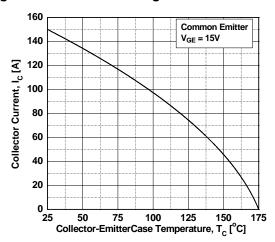


Figure 20. Load Current vs. Frequency

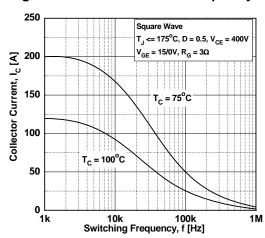


Figure 21. Forward Characteristics

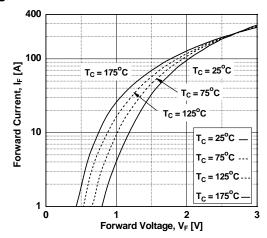


Figure 22. Reverse Current

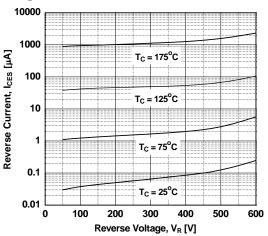


Figure 23. Stored Charge

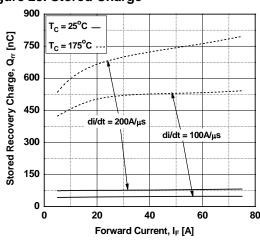


Figure 24. Reverse Recovery Current

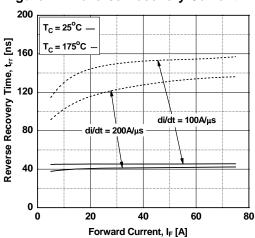


Figure 25. Transient Thermal Impedance of IGBT

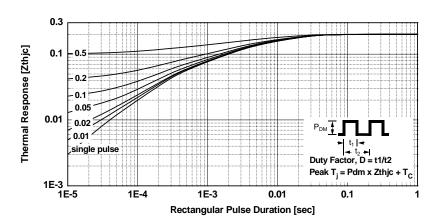
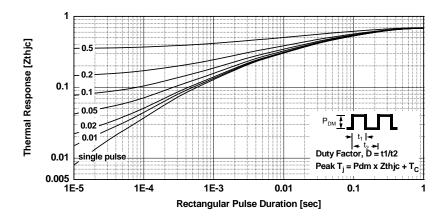
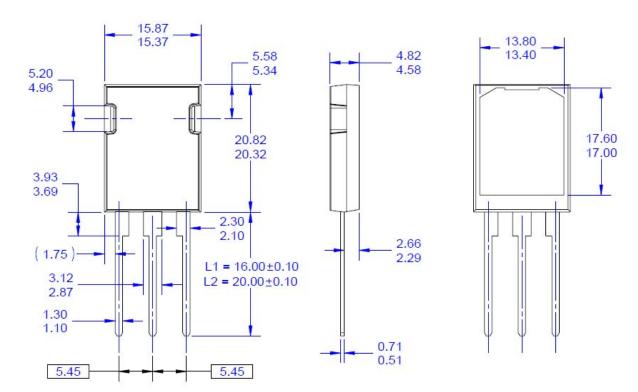


Figure 26. Transient Thermal Impedance of Diode



Mechanical Dimensions

Power-247



NOTES:

- A. THIS PACKAGE DOES NOT CONFORM TO ANY STANDARDS.
- ANT STANDARDS.

 B. ALL DIMENSIONS ARE IN MILLIMETERS.

 C. DIMENSIONS ARE EXCLUSIVE OF BURRS,
 MOLD FLASH AND TIE BAR PROTRUSIONS.

 E. DIMENSION AND TOLERANCE AS PER ASME
- Y14.5-1994.
- F. DRAWING FILE NAME: TO247D03REV1

Dimensions in Millimeters





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Obsolete Not In Production		Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.		

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