IGBT - PT

600 V, 30 A

FGH30N60LSD

Description

Using ON Semiconductor's advanced PT technology, the FGA30N60LSD IGBT offers superior conduction performances, which offer the optimum performance for medium switching application such as solar inverter, UPS applications where low conduction losses are the most important factor.

Features

- Low Saturation Voltage: $V_{CE(sat)} = 1.1 \text{ V}$ @ $I_C = 30 \text{ A}$
- High Input Impedance
- Low Conduction Loss
- This Device is Pb-Free and is RoHS Compliant

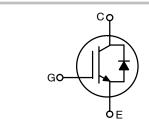
Applications

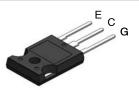
• Solar Inverter, UPS



ON Semiconductor®

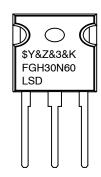
www.onsemi.com





TO-247-3LD CASE 340CK

MARKING DIAGRAM



\$Y = ON Semiconductor Logo &Z = Assembly Plant Code &3 = Numeric Date Code

&K = Lot Code

FGH30N60LSD = Specific Device Code

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^{\circ}C$ unless otherwise noted)

Description	Symbol	Rating	Unit	
Collector to Emitter Voltage		V _{CES}	600	V
Gate to Emitter Voltage		V _{GES}	V _{GES} ±20	
Collector Current	T _C = 25°C	I _C	60	Α
Collector Current	T _C = 100°C	1	30	Α
Pulsed Collector Current		I _{CM} (Note 1)	90	Α
Non-repetitive Peak Surge Current 60 Hz Sing	le Half-Sine Wave	I _{FSM}	150	Α
Maximum Power Dissipation	T _C = 25°C	P _D	480	W
Maximum Power Dissipation	T _C = 100°C	1 1	192	W
Operating Junction Temperature		T _J	-55 to +150	°C
Storage Temperature Range		T _{stg} –55 to +150		°C
Maximum Lead Temp. for soldering Purposes,	1/8" from case for 5 seconds	T _L	300	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

Parameter	Symbol	Тур	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$ (IGBT)	-	0.26	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}(Diode)$	-	0.92	°C/W
Thermal Resistance, Junction to Ambient	$R_{ heta JA}$	-	40	°C/W

PACKAGE MARKING AND ORDERING INFORMATION

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FGH30N60LSDTU	FGH30N60LSD	TO-247	Tube	N/A	N/A	30

ELECTRICAL CHARACTERISTICS OF THE IGBT ($T_C = 25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Тур	Max	Unit
OFF CHARACTERISTICS						
Collector to Emitter Breakdown Voltage	BV _{CES}	$V_{GE} = 0 \text{ V, } I_{C} = 250 \mu\text{A}$	600	_	_	V
Temperature Coefficient of Breakdown Voltage	$\Delta BV_{CES}/\Delta T_{J}$	$V_{GE} = 0 \text{ V, I}_{C} = 250 \mu\text{A}$	_	0.6	-	V/°C
Collector Cut-Off Current	I _{CES}	V _{CE} = V _{CES} , V _{GE} = 0 V	-	-	250	μΑ
G-E Leakage Current	I _{GES}	V _{GE} = V _{GES} , V _{CE} = 0 V	-	-	±250	nA
ON CHARACTERISTICs						
G-E Threshold Voltage	V _{GE(th)}	$I_C = 250 \mu A, V_{CE} = V_{GE}$	4.0	5.5	7.0	V
Collector to Emitter Saturation Voltage	V _{CE(sat)}	I _C = 30 A, V _{GE} = 15 V	-	1.1	1.4	V
		I _C = 30 A, V _{GE} = 15 V, T _C = 125°C	-	1.0	-	٧
		I _C = 60 A, V _{GE} = 15 V	-	1.3	-	٧

^{1.} Repetitive Rating: Pulse width limited by max. junction temperature.

ELECTRICAL CHARACTERISTICS OF THE IGBT ($T_C = 25^{\circ}C$ unless otherwise noted) (continued)

Parameter	Symbol	Test Conditions	Min	Тур	Max	Unit
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ies}	$V_{CE} = 30 \text{ V}, V_{GE} = 0 \text{ V}, f = 1 \text{ MHz}$	_	3550	-	pF
Output Capacitance	C _{oes}		_	245	-	pF
Reverse Transfer Capacitance	C _{res}		_	90	-	pF
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(on)}	$V_{CC}=400 \text{ V, } I_C=30 \text{ A,} \\ R_G=6.8 \ \Omega, V_{GE}=15 \text{ V,} \\ \text{Inductive Load, } T_C=25^{\circ}\text{C}$	_	18	-	ns
Rise Time	t _r		_	46	-	ns
Turn-Off Delay Time	t _{d(off)}		_	250	-	ns
Fall Time	t _f		_	1.3	2.0	μs
Turn-On Switching Loss	E _{on}		_	1.1	_	mJ
Turn-Off Switching Loss	E _{off}		_	21	_	mJ
Turn-On Delay Time	t _{d(on)}	V _{CC} = 400 V, I _C = 30 A,	_	17	_	ns
Rise Time	t _r	$R_G = 6.8 \Omega$, $V_{GE} = 15 V$, Inductive Load, $T_C = 125^{\circ}C$	_	45	_	ns
Turn-Off Delay Time	t _{d(off)}		_	270	_	ns
Fall Time	t _f		_	2.6	-	μs
Turn-On Switching Loss	E _{on}		_	1.1	-	mJ
Turn-Off Switching Loss	E _{off}		_	36	-	mJ
Total Gate Charge	Qg	V _{CE} = 600 V, I _C = 30 A, V _{GE} = 15 V	_	225	-	nC
Gate to Emitter Charge	Q _{ge}		-	30	-	nC
Gate to Collector Charge	Q_{gc}		-	105	-	nC
Internal Emitter Inductance	L _e	Measured 5 mm from PKG	_	7	-	nΗ
				l .		L

ELECTRICAL CHARACTERISTICS OF THE DIODE ($T_J = 25^{\circ}C$ unless otherwise noted)

Parameter	Conditions	Conditions				Unit
V_{FM}	I _F = 15 A	T _C = 25°C	_	1.8	2.2	V
	I _F = 15 A	T _C = 125°C	_	1.6	_	
I _{RM}	V _R = 600 V	T _C = 25°C	_	_	100	μΑ
t _{rr}	$I_F = 1 \text{ A, di}_F / \text{dt} = 100 \text{ A/}\mu\text{s, V}_R = 30 \text{ V}$	T _C = 25°C	_	_	35	ns
	$I_F = 15 \text{ A}, \text{ di}_F / \text{ dt} = 100 \text{ A}/\mu\text{s}, \text{ V}_R = 390 \text{ V}$	T _C = 25°C	_	_	40	
t _a	$I_F = 15 \text{ A}, \text{ di}_F / \text{ dt} = 100 \text{ A}/\mu\text{s}, \text{ V}_R = 390 \text{ V}$	T _C = 25°C	_	18	_	ns
t _b		T _C = 25°C	_	13	_	
Q _{rr}		T _C = 25°C	_	27.5	_	nC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

TYPICAL PERFORMANCE CHARACTERISTICS

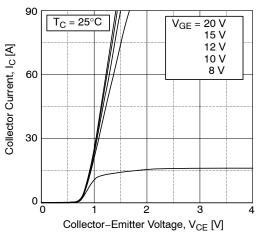


Figure 1. Typical Output Characteristics

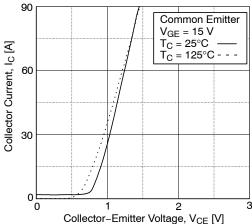


Figure 3. Typical Saturation Voltage Characteristics

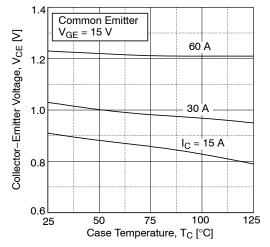


Figure 5. Saturation Voltage vs. Case Temperature at Variant Current Level

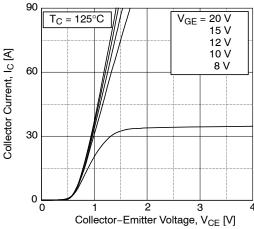


Figure 2. Typical Saturation Voltage Characteristics

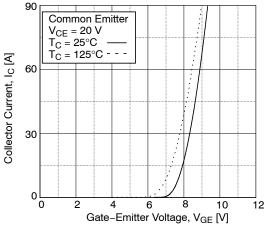


Figure 4. Transfer Characteristics

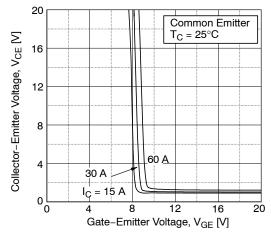


Figure 6. Saturation Voltage vs V_{GE}

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

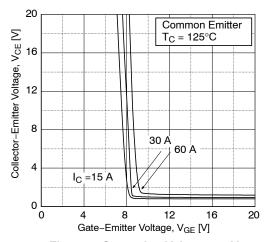


Figure 7. Saturation Voltage vs. V_{GE}

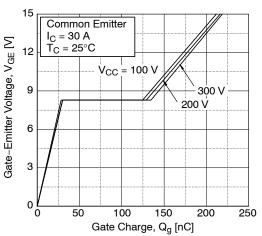


Figure 9. Gate Charge Characteristics

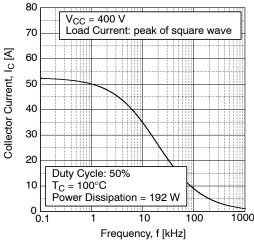


Figure 11. Load Current vs. Frequency

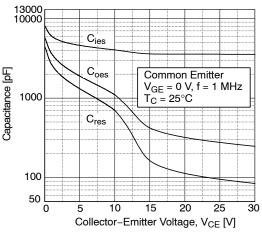


Figure 8. Capacitance Characteristic

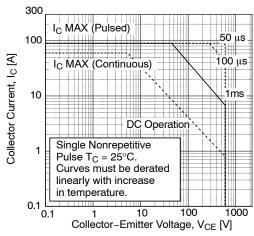


Figure 10. SOA Characteristics

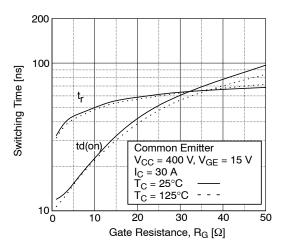


Figure 12. Turn-On Characteristics vs. Gate Resistance

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

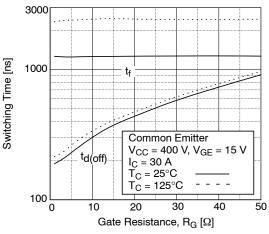


Figure 13. Turn-Off Characteristics vs. Gate Resistance

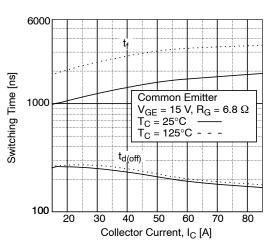


Figure 15. Turn-Off Characteristics vs. Collector Current

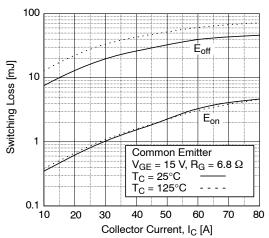


Figure 17. Switching Loss vs. Collector Current

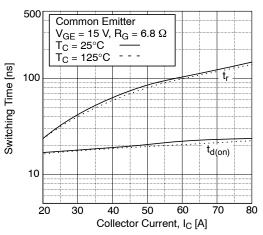


Figure 14. Turn-On Characteristics vs. Collector Current

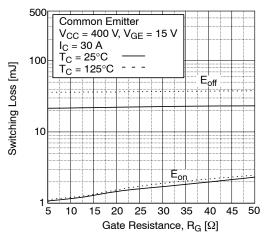


Figure 16. Switching Loss vs. Gate Resistance

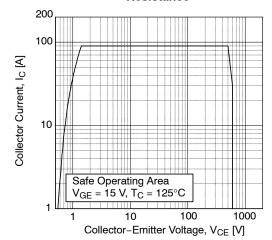


Figure 18. Turn-Off Switching SOA
Characteristics

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

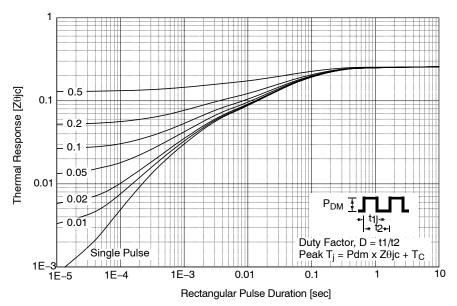


Figure 19. Transient Thermal Impedance of IGBT

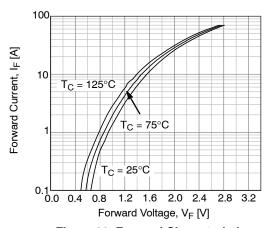


Figure 20. Forward Characteristics

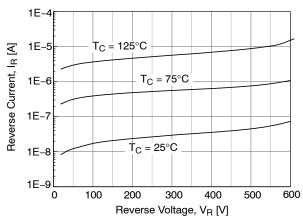


Figure 21. Reverse Current

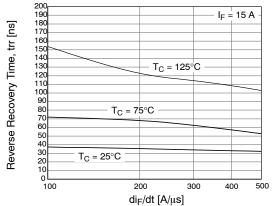
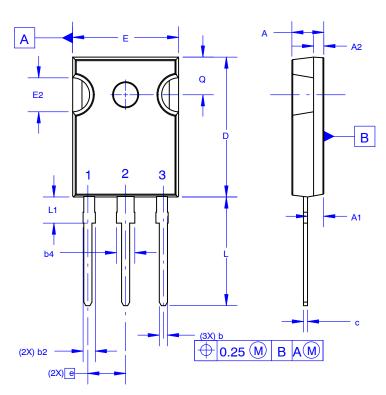


Figure 22. Reverse Recovery Time

TO-247-3LD SHORT LEAD

CASE 340CK ISSUE A





- A. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DRAWING CONFORMS TO ASME Y14.5 2009.
- D. DIMENSION A1 TO BE MEASURED IN THE REGION DEFINED BY L1.
- E. LEAD FINISH IS UNCONTROLLED IN THE REGION DEFINED BY L1.

GENERIC MARKING DIAGRAM*



XXXX = Specific Device Code

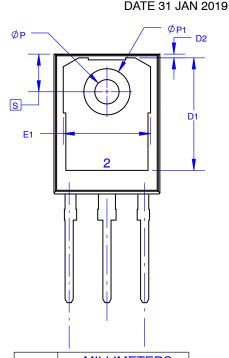
A = Assembly Location

Y = Year

WW = Work Week

ZZ = Assembly Lot Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.



DIM	MILLIMETERS				
DIIVI	MIN	NOM	MAX		
Α	4.58	4.70	4.82		
A1	2.20	2.40	2.60		
A2	1.40	1.50	1.60		
b	1.17	1.26	1.35		
b2	1.53	1.65	1.77		
b4	2.42	2.54	2.66		
С	0.51	0.61	0.71		
D	20.32	20.57	20.82		
D1	13.08	~	~		
D2	0.51	0.93	1.35		
E	15.37	15.62	15.87		
E1	12.81	~	~		
E2	4.96	5.08	5.20		
е	~	5.56	~		
L	15.75	16.00	16.25		
L1	3.69	3.81	3.93		
ØΡ	3.51	3.58	3.65		
Ø P1	6.60	6.80	7.00		
Q	5.34	5.46	5.58		
S	5.34	5.46	5.58		

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DESCRIPTION:	TO-247-3LD SHORT LEAD		PAGE 1 OF 1	

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