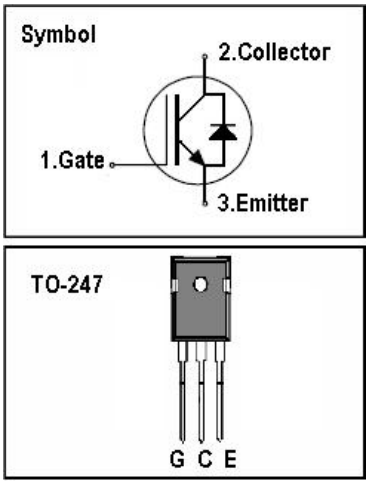
LGEGW50N65F1A

650V /50A Trench Field Stop IGBT

FEATURES

- 650V 50A,$V_{CE(sat)(typ.)}$ = 1.80 V@50A
- High breakdown voltage up to 650V for improved reliability
- Trench-Stop Technology offering :
  - ➢ High speed switching
  - ➢ High ruggedness, temperature stable
  - ➢ Short circuit withstand time – 5μs
  - ➢ Low V_{CEsat}
  - ➢ Easy parallel switching capability due to positive temperature coefficient in V_{CEsat}
- Enhanced avalanche capability



APPLICATION

- Uninterruptible Power Supplies
- Inverter
- Welding Converters
- PFC applications
- Converter with high switching frequency

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Maximum Ratings （T_j= 25℃ unless otherwise specified）

Parameter	Symbol	Value	Unit
Collector-Emitter Breakdown Voltage	V_{CE}	650	V
DC collector current, limited by T_{jmax} T_C = 25°C T_C = 100°C	I_C	 100 50	A
Diode Forward current, limited by T_{jmax} T_C = 25°C T_C = 100°C	I_F	 80 40	A
Continuous Gate-emitter voltage	V_{GE}	±20	V
Transient Gate-emitter voltage	V_{GE}	±30	V
Turn off safe operating area V_{CE} ≤650V, T_j≤ 175℃ , t_p = 1μs	-	150	A
Pulse collector current, V_{GE} =15V, t_p limited by T_{jmax}	I_{CM}	150	A
Short Circuit Withstand Time, V_{GE}= 15V, V_{CE}≤ 400V	T_{SC}	5	μs
Power dissipation , T_j=25℃	P_{tot}	312	W
Operating junction temperature	T_j	-40...+150	℃
Storage temperature	T_S	-55...+150	℃
Soldering temperature, wave soldering 1.6mm (0.063in.) from case for 10s	-	260	℃
Mounting torque, M3 screw Maximum of mounting processes: 3	M	0.6	Nm

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT thermal resistance, junction - case	$R_{\theta(j-c)}$	0.48	K/W
Diode thermal resistance, junction - case	$R_{\theta(j-c)}$	1.1	K/W
Thermal resistance, junction - ambient	$R_{\theta(j-a)}$	40	K/W

Electrical Characteristics （T_j= 25℃ unless otherwise specified）

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static						
Collector-Emitter Breakdown Voltage	BV_{CES}	V_{GE}=0V , I_C=250uA	650	-	--	V
		V_{GE}=0V , I_C=1mA	650	-	-	V
Gate Threshold Voltage	$V_{GE(th)}$	V_{GE}=V_{CE}, I_C=250uA	4.0	5.0	6.0	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=50A T_j = 25°C T_j = 175℃	- -	1.80 2.45	2.30 -	V
Zero gate voltage collector current	I_{CES}	V_{CE} = 650V, V_{GE} = 0V T_j = 25°C T_j = 175℃	- -	0.1 -	40 4000	μA
Gate-emitter leakage current	I_{GES}	V_{CE} = 0V, V_{GE} = ±20V	-	-	100	nA
Transconductance	g_{fs}	V_{CE} = 20V, I_C = 50A	-	30	-	S

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Dynamic						
Input capacitance	C_{ies}	V_{CE} = 30V, V_{GE} = 0V, f = 1MHz	-	2800	-	pF
Output capacitance	C_{oes}		-	130	-	
Reverse transfer capacitance	C_{res}		-	75	-	
Gate charge	Q_G	V_{CC} = 520V, I_C = 50A, V_{GE} = 15V	-	180	-	nC
Short circuit collector current	$I_{C(SC)}$	V_{GE}=15V,t_{SC}≤5us V_{CC}=400V, $T_{j,\ start}$=25℃	-	310	-	A

Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Dynamic T_j=25°C						
Turn-on Delay Time	$t_{d(on)}$	V_{CC} = 400V, I_C = 50.0A, V_{GE} = 0.0/15.0V, Rg=12Ω	-	40	-	ns
Rise Time	t_r		-	22	-	ns
Turn-off Delay Time	$t_{d(off)}$		-	180	-	ns
Fall Time	t_f		-	88	-	ns
Turn-on Energy	E_{on}		-	1.9	-	mJ
Turn-off Energy	E_{off}		-	1.1	-	mJ

Electrical Characteristics of the DIODE（T_j= 25℃ unless otherwise specified）

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Dynamic						
Diode Forward Voltage	V_{FM}	I_F = 40A	-	2.3	-	V
Reverse Recovery Time	T_{rr}	I_F= 40A, V_R = 300V, di/dt= 600A/μs,	-	90	-	ns
Reverse Recovery Current	I_{rr}		-	17	-	A
Reverse Recovery Charge	Q_{rr}		-	900	-	nC

Typical Performance Characteristics

Fig. 1 FBSOA characteristics

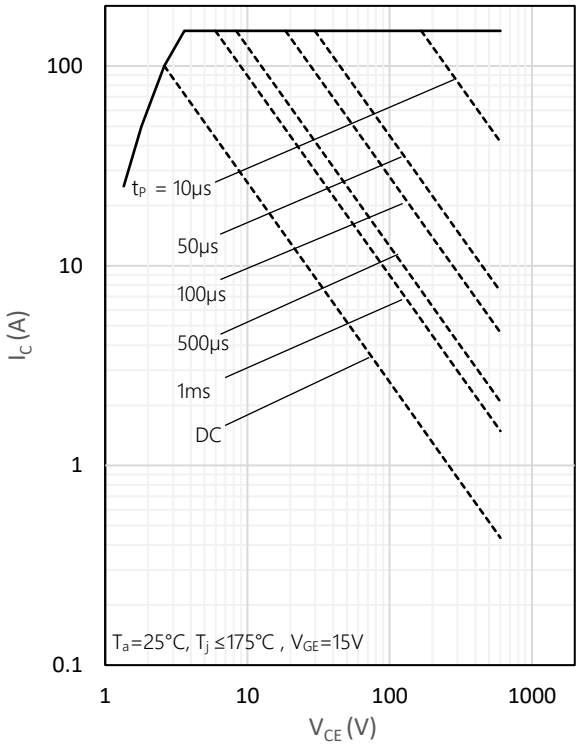


Fig. 2 Load Current vs. Frequency

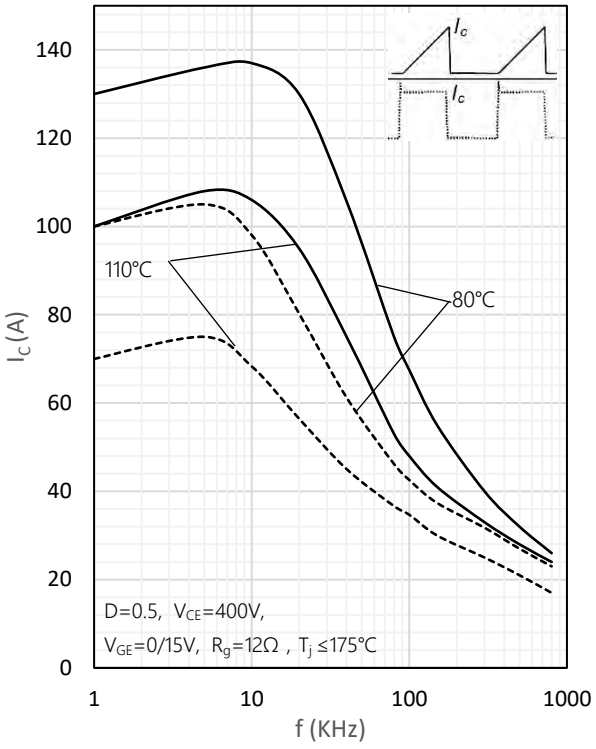


Fig. 3 Output characteristics

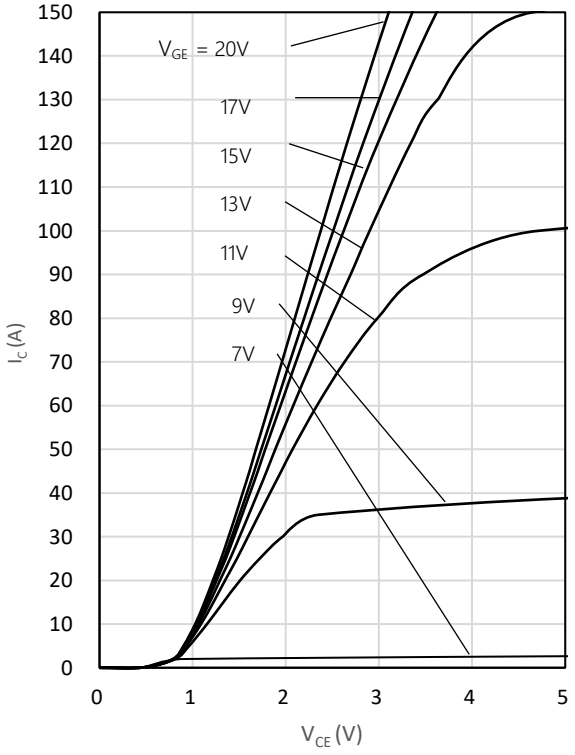


Fig. 4 Saturation voltage characteristics

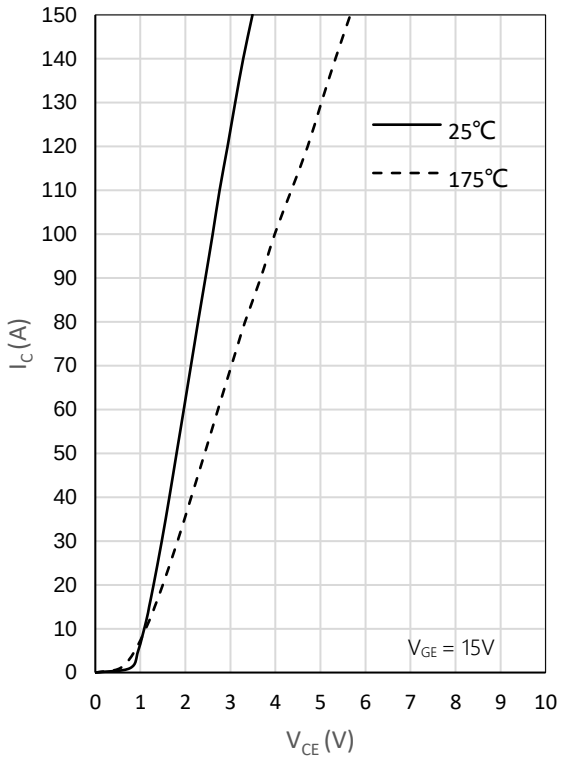


Fig. 5 Switching times vs. gate resistor

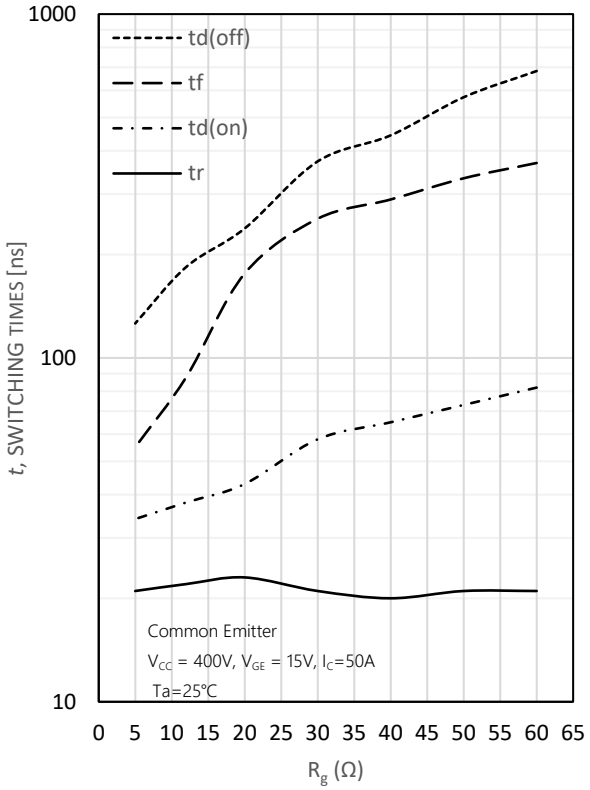


Fig. 6 Switching times vs. collector current

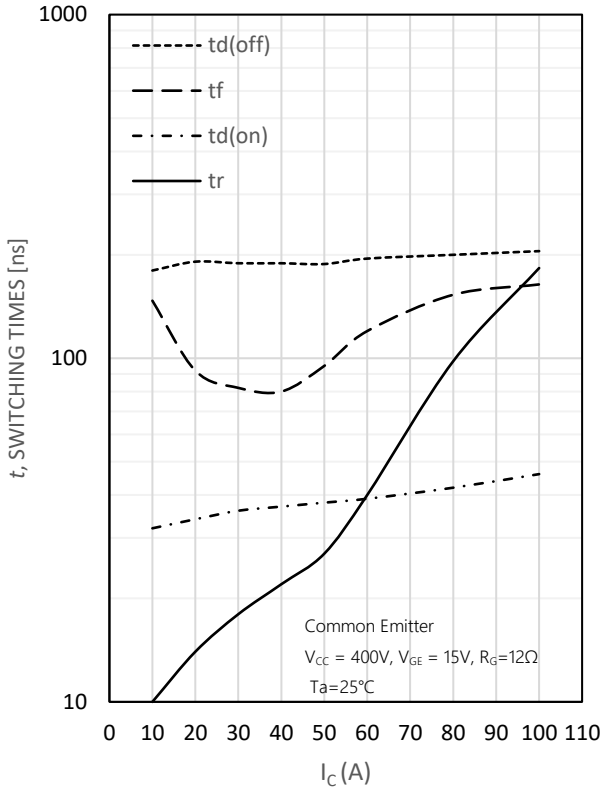


Fig. 7 Switching loss vs. gate resistor

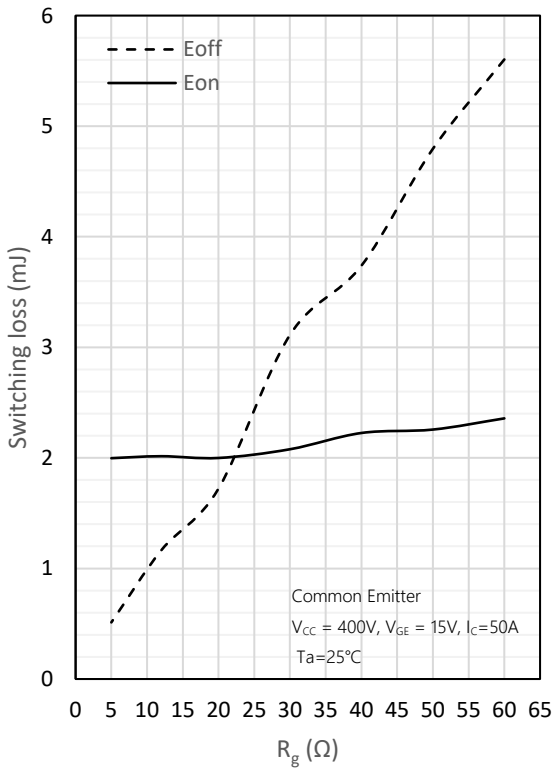


Fig. 8 Switching loss vs. collector current

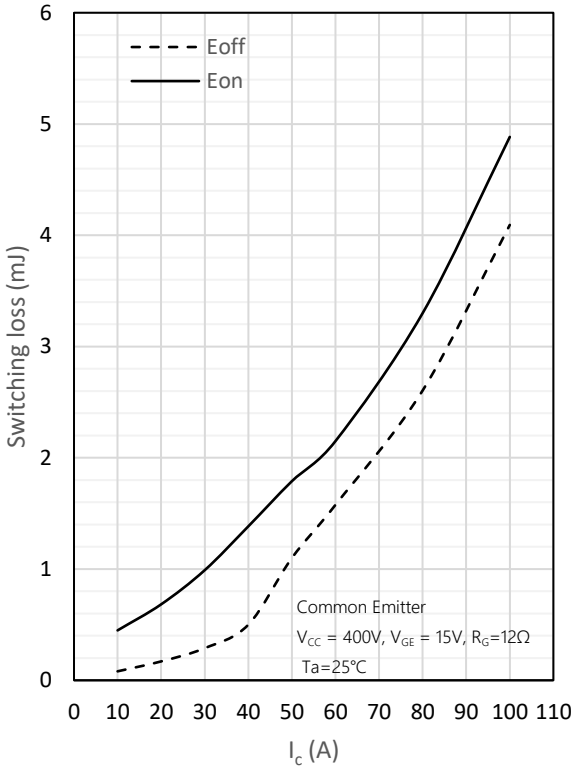


Fig. 9 Gate charge characteristics

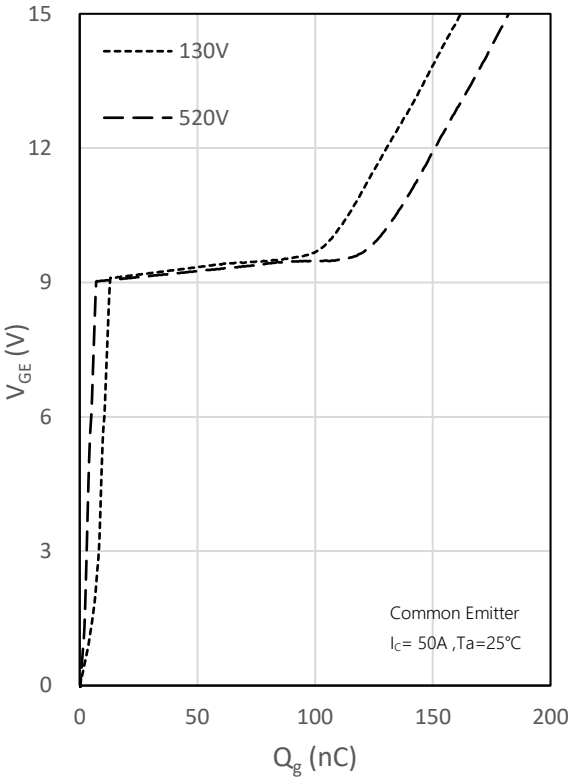
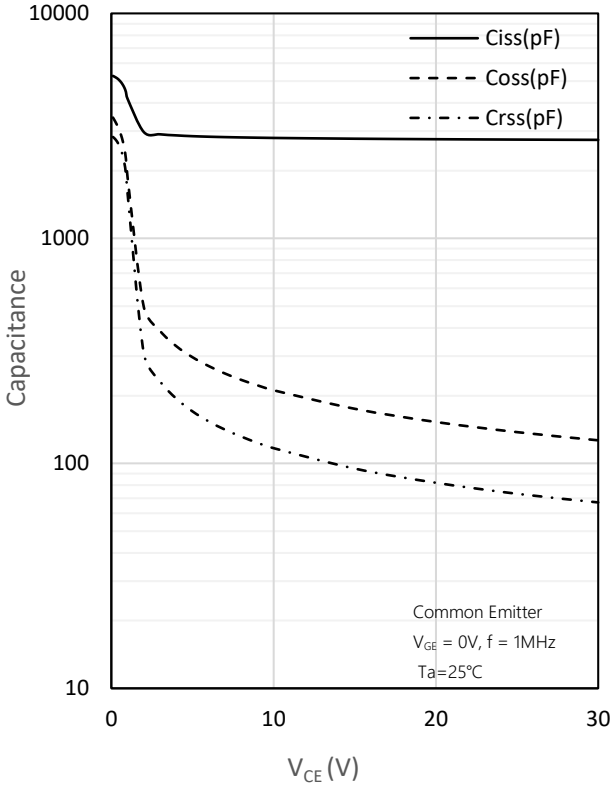
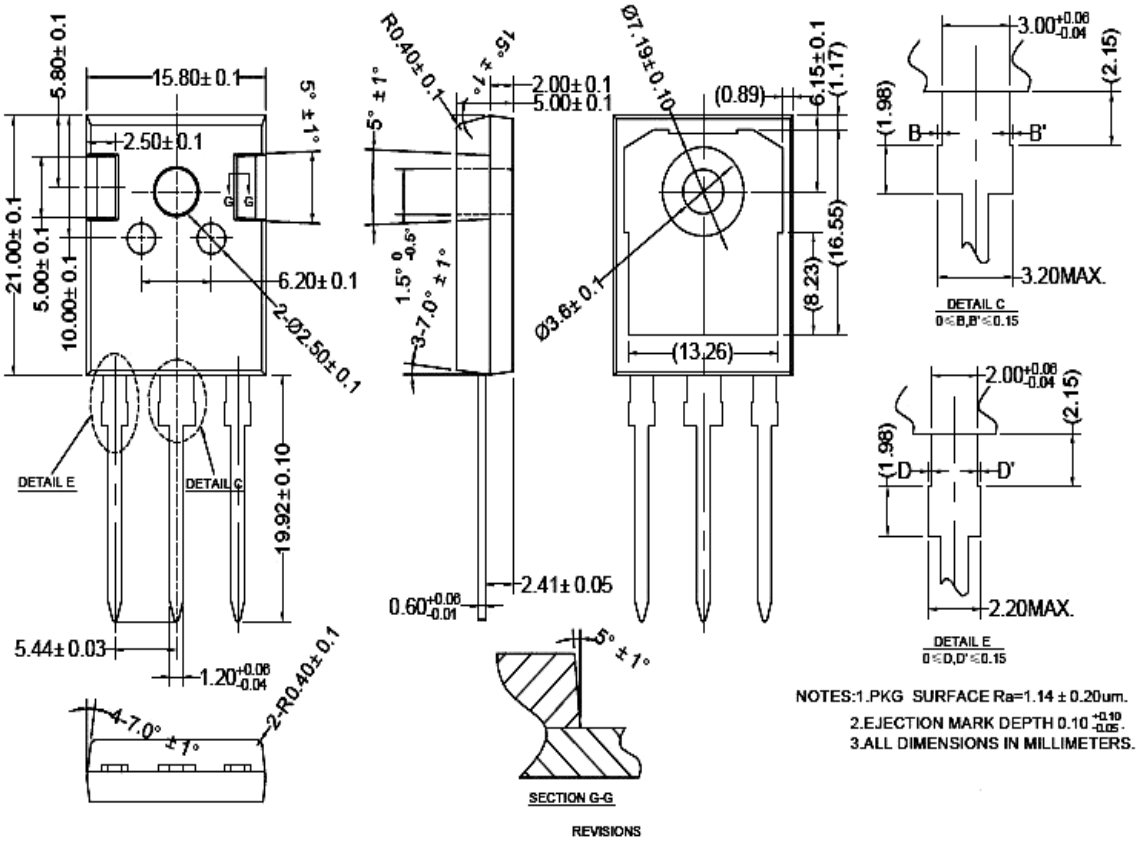


Fig. 10 Capacitance characteristics



TO247 PACKAGE OUTLINE



公差标注	公差值	表面粗糙度
0	±0.2	Ra3.2~6.3
0.0	±0.1	Ra1.6~3.2
0.00	±0.01	Ra0.8~1.6
0.000	±0.005	Ra0.4~0.8
0.0000	±0.002	Ra0.2~0.4

0≤D,D'≤0.15
NOTES:1.PKG SURFACE Ra=1.14 ± 0.20um.
2.EJECTION MARK DEPTH 0.10 +0.10 -0.05.
3.ALL DIMENSIONS IN MILLIMETERS.