



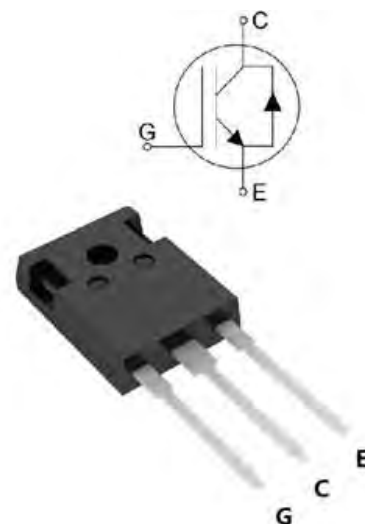
FEATURES

- High breakdown voltage to 1200V for improved reliability
- Trench-Stop Technology offering :
 - High speed switching
 - High ruggedness, temperature stable
 - Short circuit withstand time – 10μs
 - Low V_{CEsat}
 - Easy parallel switching capability due to positive temperature coefficient in V_{CEsat}
- Enhanced avalanche capability

V_{CE}	1200	V
I_C	40	A
$V_{CE(SAT)} \quad I_C=40A$	1.8	V

APPLICATION

- Uninterruptible Power Supplies
- Solar inverter
- Welding
- PFC applications



Product	Package	Packaging
LGEGW40N120F2	TO-247	Tube

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-Emitter Breakdown Voltage	V_{CE}	1200	V
DC collector current, limited by T_{jmax} $T_C = 25^{\circ}C$ $T_C = 100^{\circ}C$	I_C	80 40	A
Diode Forward current, limited by T_{jmax} $T_C = 25^{\circ}C$ $T_C = 100^{\circ}C$	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 $V_{CE} \leq 1200V$, $T_j \leq 150^{\circ}C$	-	160	A
Pulsed Collector Current, $V_{GE} = 15V$, t_p limited by T_{jmax}	I_{CM}	160	A
Diode Pulsed Current, t_p limited by T_{jmax}	I_{Fpuls}	160	A
Short Circuit Withstand Time, $V_{GE} = 15V$, $V_{CE} \leq 600V$	T_{sc}	10	μs
Power dissipation , $T_j = 25^{\circ}C$	P_{tot}	417	W
Max. Junction Temperature (Under switching conditions)	T_{Jmax}	175	$^{\circ}C$
Operating junction temperature	T_{Jop}	-40...+150	$^{\circ}C$
Storage temperature	T_s	-55...+150	$^{\circ}C$
Soldering temperature, wave soldering 1.6mm (0.063in.) from case for 10s	-	260	$^{\circ}C$

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT thermal resistance, junction - case	$R_{\theta(j-c)}$	0.3	K/W
Diode thermal resistance, junction - case	$R_{\theta(j-c)}$	0.6	K/W
Thermal resistance, junction - ambient	$R_{\theta(j-a)}$	40	K/W



Electrical Characteristics of the IGBT (T_j= 25°C unless otherwise specified) :

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Collector-Emitter breakdown voltage	BV _{CES} ①	V _{GE} =0V, I _C =250μA	1200	1300	-	V
Gate threshold voltage	V _{GE(th)}	V _{GE} =V _{CE} , I _C =250μA	5.2	5.9	6.5	V
Collector-Emitter Saturation voltage	V _{CE(sat)}	V _{GE} =15V, I _C =40A T _j = 25°C T _j = 150°C	- -	1.8 2.3	2.3 -	V
Zero gate voltage collector current	I _{CES}	V _{CE} = 1200V, V _{GE} = 0V T _j = 25°C T _j = 150°C	- -	- -	250 2500	μA
Gate-emitter leakage current	I _{GES}	V _{CE} = 0V, V _{GE} = ± 20V	-	-	100	nA
Transconductance	g _{fs}	V _{CE} =20V, I _C =15A	-	20	-	S

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic						
Input capacitance	C _{ies}	V _{CE} = 25V, V _{GE} = 0V, f = 1MHz	-	6400	-	pF
Output capacitance	C _{oes}		-	180	-	
Reverse transfer capacitance	C _{res}		-	90	-	
Gate charge	Q _G	V _{CC} = 960V, I _C = 40A, V _{GE} = 15V	-	250	-	nC
Short circuit collector current	I _{C(SC)}	V _{GE} =15V, t _{sc} ≤10us V _{CC} =600V, T _{j, start} =25°C	-	350	-	A

Note:

① BV_{CES} testing without filter could damage the device. BV_{CES} is guaranteed by I_{CES}@1200V test.

Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at $T_j = 25^\circ \text{C}$						
Turn-on delay time	$t_{d(on)}$	$V_{CC} = 600V, I_C = 40A,$ $V_{GE} = 0/15V,$ $R_g = 10\Omega$	-	85	-	ns
Rise time	t_r		-	50	-	ns
Turn-on energy	E_{on}		-	4.3	-	mJ
Turn-off delay time	$t_{d(off)}$		-	200	-	ns
Fall time	t_f		-	70	-	ns
Turn-off energy	E_{off}		-	1.2	-	mJ

Electrical Characteristics of the DIODE ($T_j = 25^\circ \text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic						
Diode Forward Voltage	V_{FM}	$I_F = 40A$	-	3.5	-	V
Reverse Recovery Time	T_{rr}	$I_F = 40A,$ $V_R = 600V,$ $di/dt = 400A/\mu s,$	-	190	-	ns
Reverse Recovery Current	I_{rr}		-	6	-	A
Reverse Recovery Charge	Q_{rr}		-	530	-	nC

Fig. 1 FBSOA characteristics

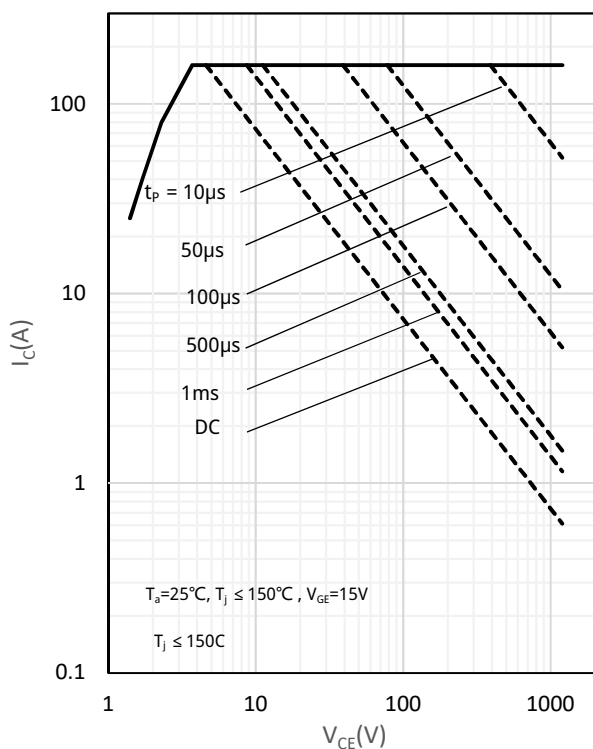


Fig. 2 Output characteristics

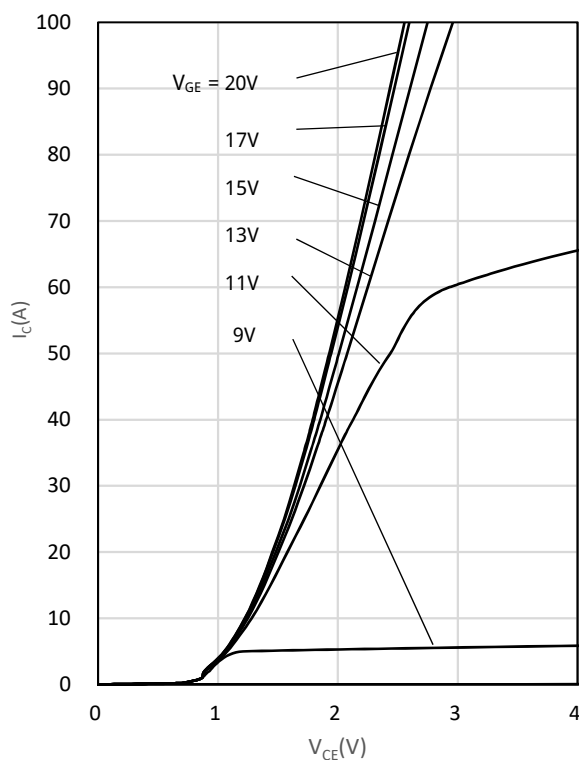


Fig. 3 Saturation voltage characteristics

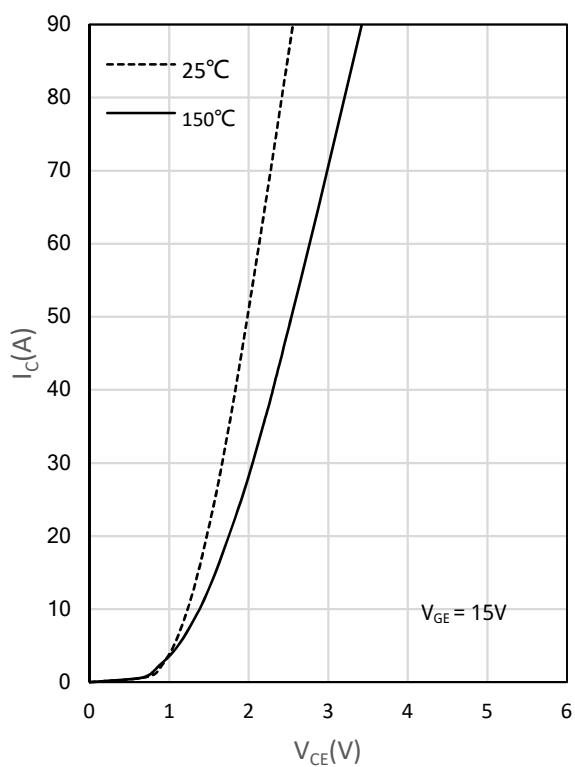


Fig. 4 Gate charge characteristics

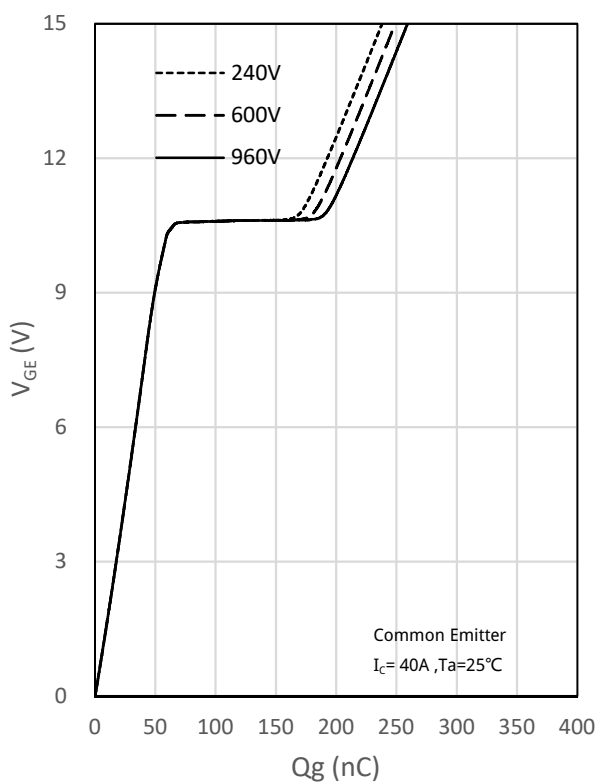


Fig. 5 Switching times vs. gate resistor

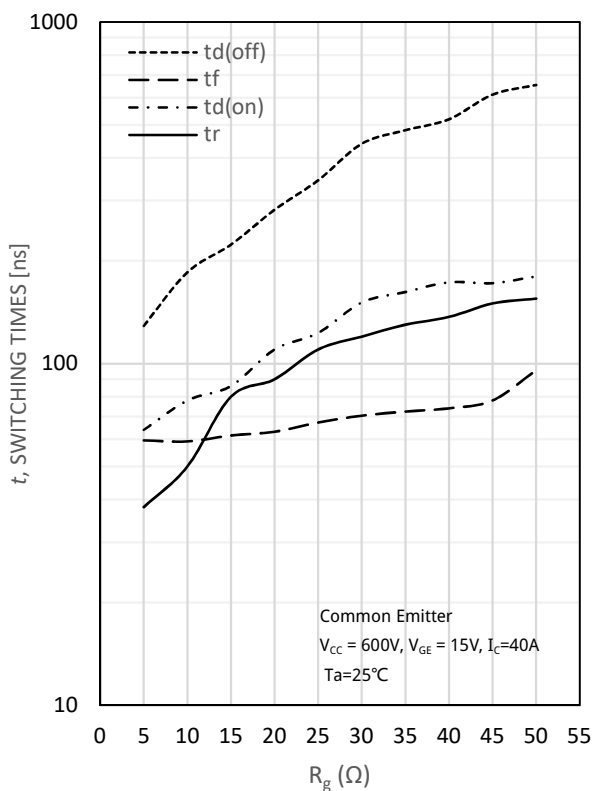


Fig. 6 Switching times vs. collector current

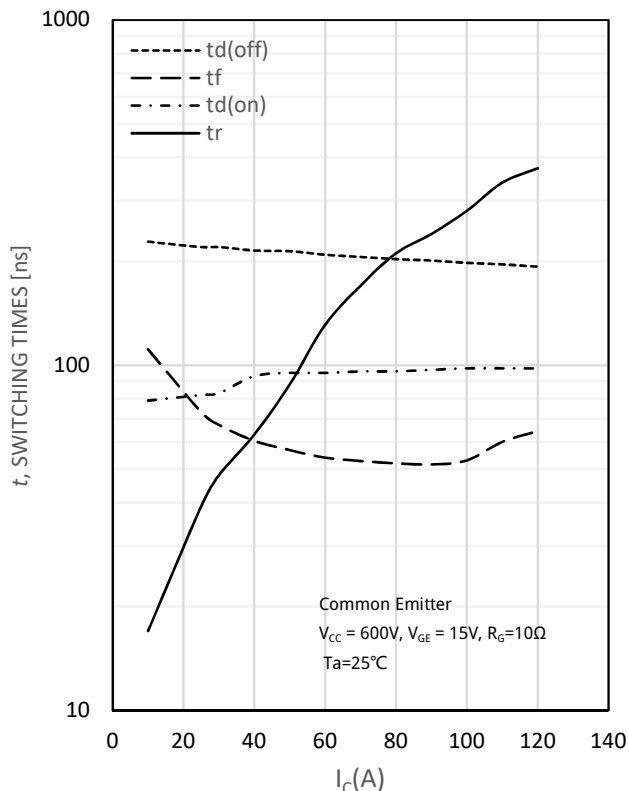


Fig. 7 Switching loss vs. gate resistor

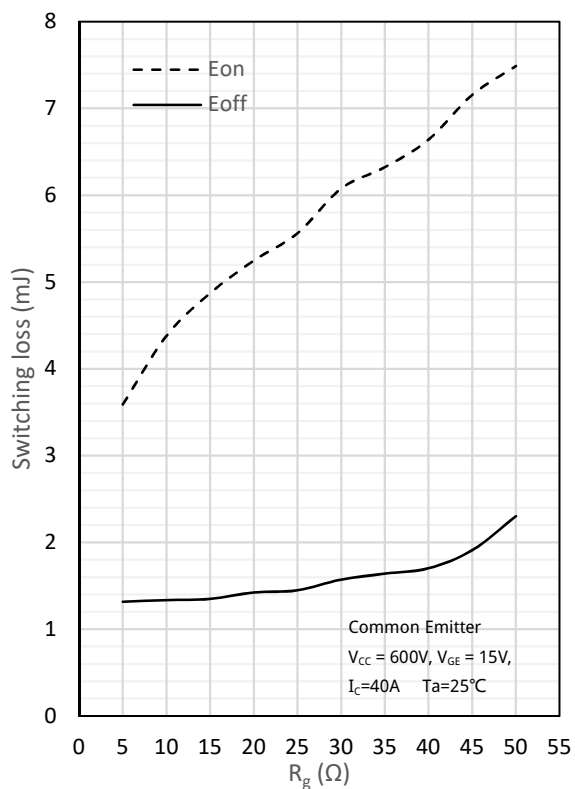


Fig. 8 Switching loss vs. collector current

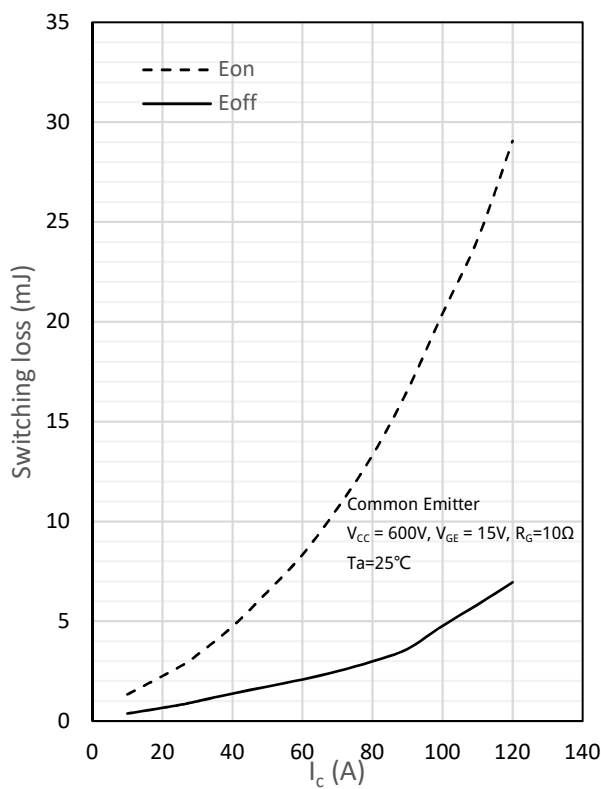
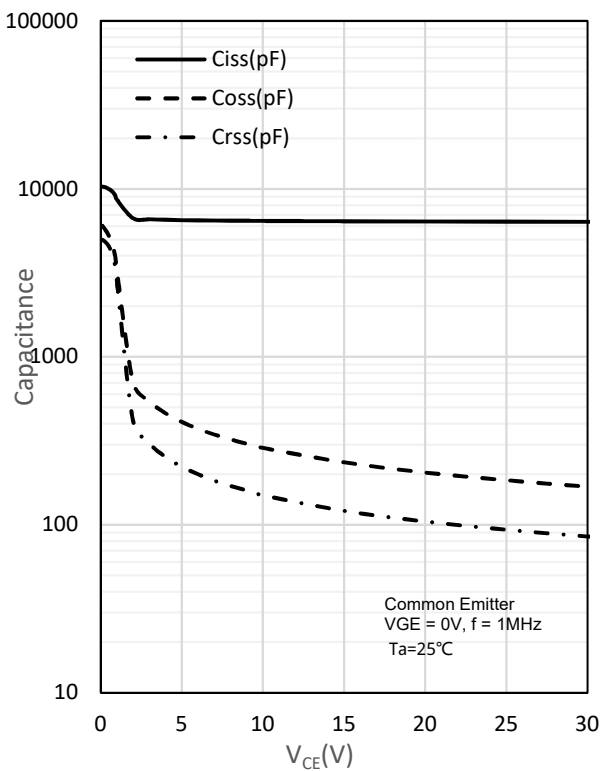
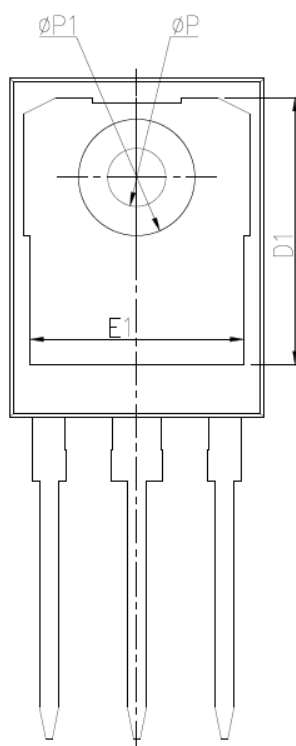
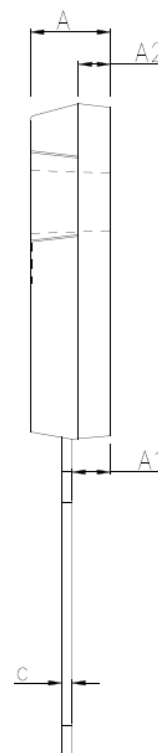
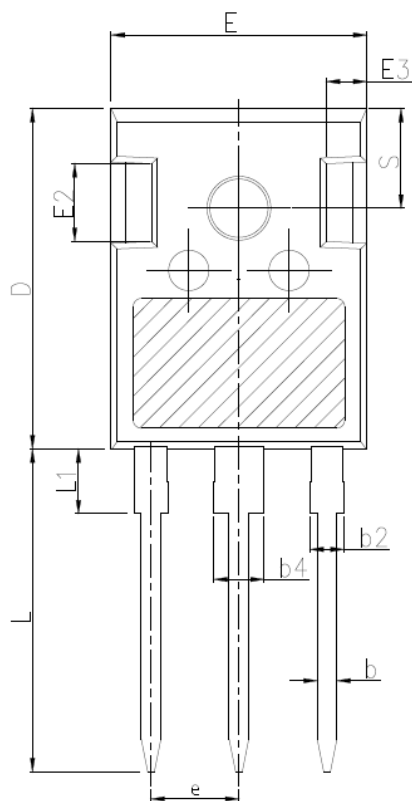


Fig. 9 Capacitance characteristics



TO247 package information



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.80	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.82	19.92	20.22
L1	—	—	4.30
ΦP	3.40	3.60	3.80
ΦP1	—	—	7.30
S	6.15BSC		