



芯长协科技

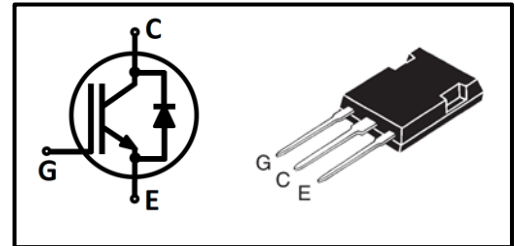
### Features

- Easy parallel switching capability due to positive temperature coefficient in  $V_{CEsat}$
- Low  $V_{CEsat}$ , fast switching
- High ruggedness, good thermal stability
- Very tight parameter distribution

### Applications

- Motor drives
- Main inverter
- PTC heater

Type	Marking	Package Code
AMPBQ200N75GS FA	AB200N75GSFA	TO-247-3L Plus



### Maximum Rated Values

Parameter	Symbol	Value	Unit
Collector-emitter voltage	$V_{CE}$	750	V
DC collector current, limited by $T_{vjmax}$ $T_C=25^\circ C$ $T_C=100^\circ C$	$I_C$	200 200	A
Pulsed collector current, $t_p$ limited by $T_{vjmax}^{1)}$	$I_{Cpuls}$	600	
Diode forward current, limited by $T_{vjmax}$ $T_C=25^\circ C$ $T_C=100^\circ C$	$I_F$	200 200	
Diode pulsed current, $t_p$ limited by $T_{vjmax}^{1)}$	$I_{Fpuls}$	600	
Gate-emitter voltage	$V_{GE}$	$\pm 20$	V
Transient Gate-emitter voltage ( $t_p \leq 10\mu s, D < 0.01$ )		$\pm 30$	
Short circuit withstand time $V_{GE}=15V, V_{CC} \leq 470V, T_{vj}=25^\circ C$ Allowed number of short circuits < 1000 Time between short circuits: $\geq 1.0s$	$t_{SC}$	5	$\mu s$
Power dissipation $T_C=25^\circ C$	$P_{tot}$	1071	W
Power dissipation $T_C=100^\circ C$		535	
Operating junction temperature	$T_{vj}$	-40~175	$^\circ C$
Storage temperature	$T_{stg}$	-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

<sup>1)</sup> Defined by design. Not subject to production test.



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### Thermal Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
IGBT thermal resistance, junction-case	$R_{thJC}$	-	-	0.14	K/W
Diode thermal resistance, junction-case	$R_{thJCD}$	-	-	0.26	
Thermal Resistance, junction-ambient	$R_{thJA}$	-	-	40	

### Electrical Characteristics (at $T_{vj}=25^{\circ}C$ , unless otherwise specified) Static Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-emitter breakdown voltage	$V_{(BR)CES}$	$V_{GE}=0V, I_C=0.25mA$	750	-	-	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=200A$ $T_{vj}=25^{\circ}C$	-	1.5	1.7	
		$T_{vj}=150^{\circ}C$	-	1.71	-	
		$T_{vj}=175^{\circ}C$	-	1.75	-	
G-E threshold voltage	$V_{GE(th)}$	$I_C=2.6mA, V_{CE}=V_{GE}$	5.0	5.8	6.5	
C-E leakage current	$I_{CES}$	$V_{CE}=750V, V_{GE}=0V$ $T_{vj}=25^{\circ}C$	-	-	0.01	mA
		$T_{vj}=175^{\circ}C$	-	-	4.0	
G-E leakage current	$I_{GES}$	$V_{CE}=0V, V_{GE}=20V$	-	-	250	nA

### Dynamic Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input capacitance	$C_{iss}$	$V_{CE}=25V,$ $V_{GE}=0V,$ $f=100KHz$	-	17855	-	pF
Output capacitance	$C_{oss}$		-	608	-	
Reverse transfer capacitance	$C_{riss}$		-	122	-	
Gate charge	$Q_G$	$V_{CC}=600V,$ $I_C=200A,$ $V_{GE}=15V$	-	tbd	-	nC
Short circuit collector current	$I_{C(SC)}$	$V_{GE}=15V,$ $V_{CC}\leq 470V, t_{SC}\leq 5\mu s,$ $T_{vj}=25^{\circ}C$	-	950	-	A



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# AMPBQ200N75GSFA

## Preliminary data

### IGBT Switching Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit	
Turn-on delay time	$t_{d(on)}$	$T_{vj}=25^{\circ}\text{C}$ , $V_{CC}=470\text{V}$ , $I_C=200\text{A}$ , $V_{GE}=-8/15\text{V}$ , $R_G=5\Omega$ , Inductive load	-	202	-	ns	
Rise time	$t_r$		-	109	-		
Turn-off delay time	$t_{d(off)}$		-	365	-		
Fall time	$t_f$		-	70	-		
Turn-on energy	$E_{on}$		Inductive load	-	19.4	-	mJ
Turn-off energy	$E_{off}$			-	10.6	-	
Total switching energy	$E_{ts}$			-	30.0	-	
Turn-on delay time	$t_{d(on)}$	$T_{vj}=175^{\circ}\text{C}$ , $V_{CC}=470\text{V}$ , $I_C=200\text{A}$ , $V_{GE}=-8/15\text{V}$ , $R_G=5\Omega$ , Inductive load	-	214	-	ns	
Rise time	$t_r$		-	173	-		
Turn-off delay time	$t_{d(off)}$		-	422	-		
Fall time	$t_f$		-	93	-		
Turn-on energy	$E_{on}$		Inductive load	-	34.9	-	mJ
Turn-off energy	$E_{off}$			-	13.5	-	
Total switching energy	$E_{ts}$			-	48.4	-	

### Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Diode forward voltage	$V_F$	$V_{GE}=0\text{V}$ , $I_F=200\text{A}$ , $T_{vj}=25^{\circ}\text{C}$	-	1.65	-	V
		$T_{vj}=150^{\circ}\text{C}$	-	1.83	-	
		$T_{vj}=175^{\circ}\text{C}$	-	1.85	-	
Diode reverse recovery time	$t_{rr}$	$T_{vj}=25^{\circ}\text{C}$ , $V_R=470\text{V}$ , $I_F=200\text{A}$ , $di_F/dt=1810\text{A}/\mu\text{s}$	-	435	-	ns
Diode reverse recovery charge	$Q_{rr}$		-	9.4	-	$\mu\text{C}$
Diode peak reverse recovery current	$I_{rrm}$		-	41	-	A
Diode reverse recovery time	$t_{rr}$	$T_{vj}=175^{\circ}\text{C}$ , $V_R=470\text{V}$ , $I_F=200\text{A}$ , $di_F/dt=1250\text{A}/\mu\text{s}$	-	541	-	ns
Diode reverse recovery charge	$Q_{rr}$		-	17.4	-	$\mu\text{C}$
Diode peak reverse recovery current	$I_{rrm}$		-	47	-	A

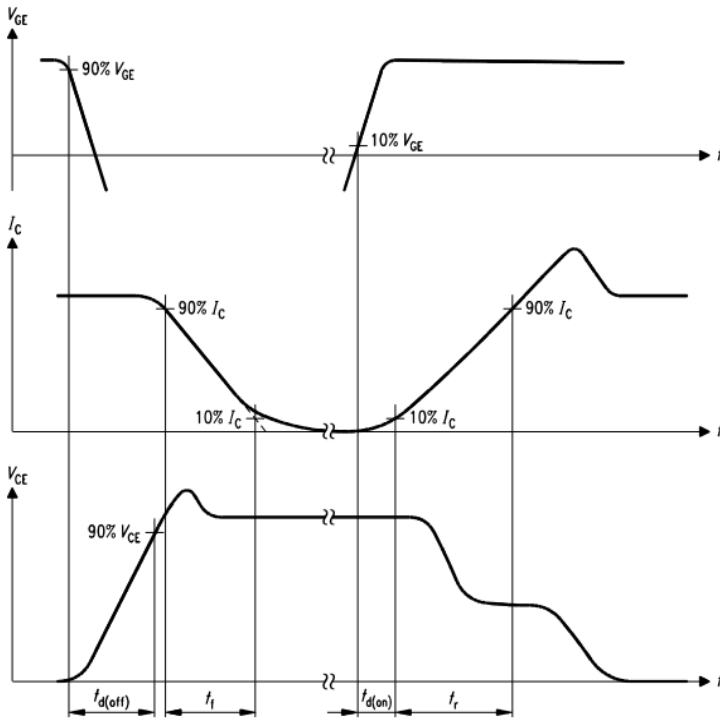


Figure A. Definition of switching times

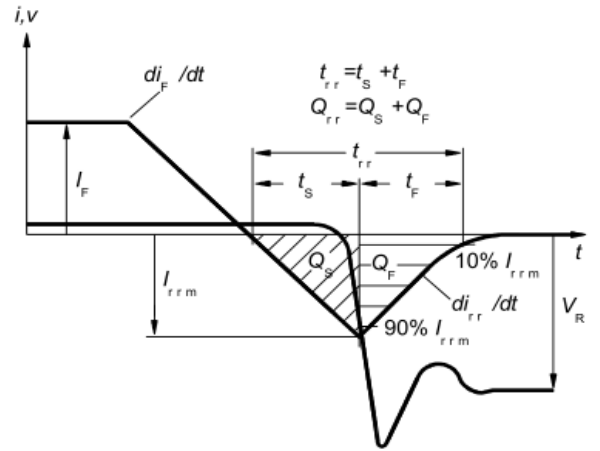


Figure C. Definition of diodes switching characteristics

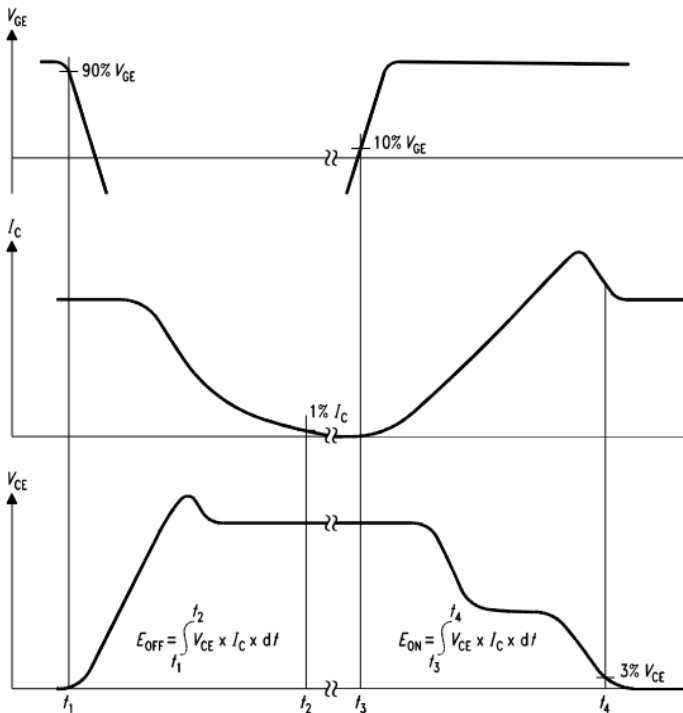


Figure B. Definition of switching losses

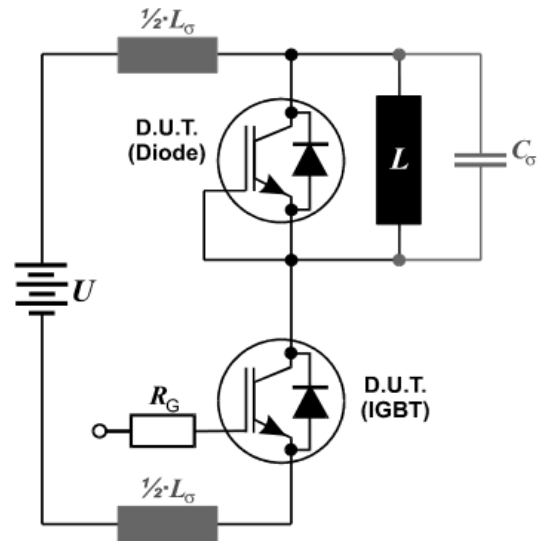
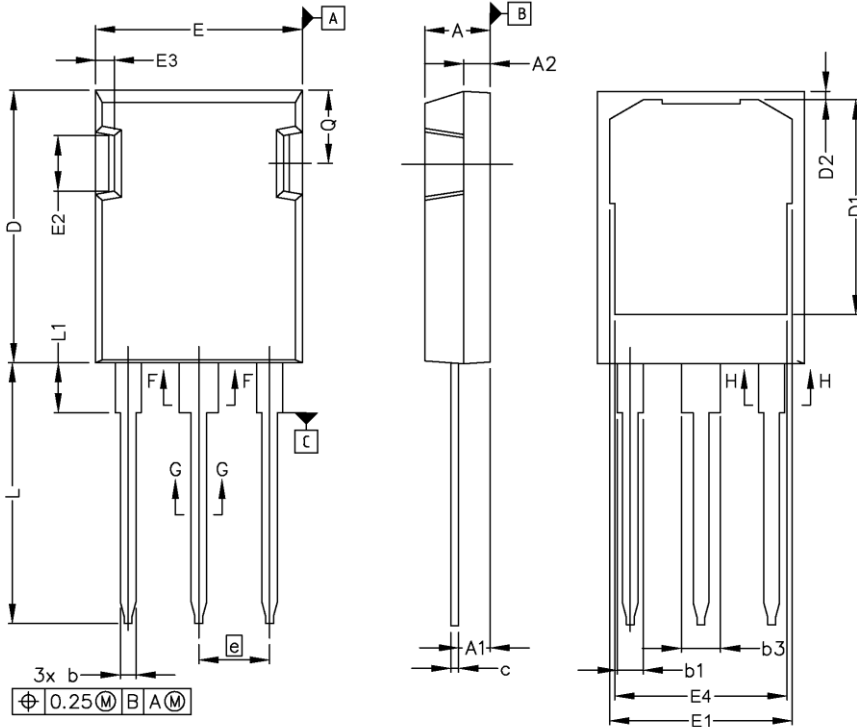


Figure D. Switching test circuit

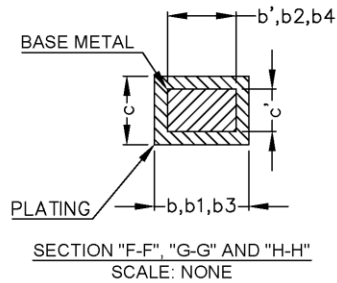
### TO-247-3L Plus



SYMBOL	MIN	MAX
A	4.83	5.21
A1	2.29	2.54
A2	1.91	2.16
b'	1.07	1.28
b	1.07	1.33
b1	1.91	2.41
b2	1.91	2.16
b3	2.87	3.38
b4	2.87	3.13
c'	0.55	0.65
c	0.55	0.68
D	20.80	21.10
D1	16.25	17.65
D2	0.50	0.80
E	15.75	16.13
E1	13.10	14.15
E2	3.68	5.10
E3	1.00	1.90
E4	12.38	13.43
e	5.44 BSC	
N	3	
L	19.81	20.32
L1	3.70	4.00
Q	5.49	6.00

NOTE:  
 1. ALL METAL SURFACES, TIN PLATED, EXCEPT AREA OF CUT  
 2. DIMENSIONING & TOLERANCING CONFIRM TO ASME Y14.5M-1994  
 3. ALL DIMENSIONS ARE IN MILLIMETERS. ANGLES ARE IN DEGREES.  
 4. THIS DRAWING WILL MEET ALL DIMENSIONS REQUIREMENT OF JEDEC outlines TO-247 AD.

- 1 - GATE
- 2 - DRAIN (COLLECTOR)
- 3 - SOURCE (EMITTER)
- 4 - DRAIN (COLLECTOR)





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## Revision History

Revision	Subjects (major changes since last revision)	Date
0.1	Preliminary data	2023.7
0.2	Add data	2023.9

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