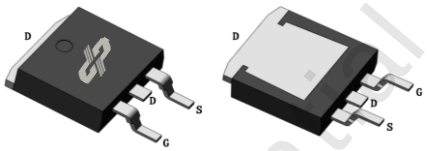
DP05N65DBDQ1

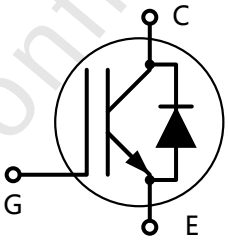
650V, 6A Power IGBT with Diode

Product Summary

Part #	V_{CE}	I_C@100℃	V_{CEsat}, T_{vj}=25℃
DP05N65DBDQ1	650V	6A	1.7V

TO-252





Features

- Uses advanced FS IGBT technology
- Excellent conduction and switching loss
- Excellent stability and uniformity
- Fast and soft antiparallel diode

Applications

- Induction converters
- Uninterruptible power supplies
- Home Appliances

Package Marking and Ordering Information

Part #	Marking	Package	Packing
DP05N65DBDQ1	05N65DBDQ1	TO-252	Tape/Reel

Halogen-Free

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-Emmiter voltage	V_{CE}	650	V
Continuous collector current T_C = 25°C T_C = 100°C	I_C	 12 6	A
Pulsed collector current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\ pulse}$	24	A
Turn off safe operating area V_{CE} ≤ 650V, T_{vj} ≤ 175°C	-	24	A
Diode forward current T_C = 25°C T_C = 100°C	I_F	 12 6	A
Diode pulsed current (T_C = 25°C, t_p limited by T_{jmax})	$I_{F\ pulse}$	24	A
Gate-emitter voltage	V_{GE}	±20	V
Power dissipation (T_C = 25°C)	P_{tot}	136	W
Operating junction temperature	T_j , T_{stg}	-40...+175	°C
Storage temperature	T_j , T_{stg}	-55...+150	°C

Thermal Resistance

Parameter	Symbol	Max	Unit
IGBT thermal resistance,junction case. Max	R_{thJC}	1	°C/W
Diode thermal resistance,junction case. Max	R_{thJC}	3.8	
Thermal resistance, junction – ambient. Max	R_{thJA}	85	

Electrical Characteristic (at Tj = 25 °C, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Static Characteristic						
Collector-emitter breakdown voltage	$V_{(BR)CES}$	650	-	-	V	V_{GE}=0V, I_C=250uA
Collector-emitter saturation voltage	V_{CEsat}	-	1.7	-	V	V_{GE} = 15V, I_C = 10A T_{vj}=25°C
		-	2.2	-		T_{vj}=175°C
Diode forward voltage	V_F	-	1.7	-	V	V_{GE} = 0V, I_F = 6A T_{vj}=25°C
		-	1.6	-		T_{vj}=175°C
Gate-emitter threshold voltage	$V_{GE(th)}$	5.7	6.1	6.6	V	V_{GE} =V_{CE}, I_C = 1mA
Zero gate voltage collector current	I_{CES}	-	-	10	μA	V_{CE}=650V,V_{GS}=0V T_{vj}=25°C
		-	200	-		T_{vj}=150°C
Gate-emitter leakage current	I_{GES}	-	-	100	nA	V_{CE} = 0V, V_{GE} =±20V
Transconductance	g_{fs}	-	14	-	S	V_{CE} = 20V, I_{CE} = 10A

Dynamic Characteristic

Input Capacitance	C_{ies}	-	480	-	pF	V_{CE} = 30V, V_{GE} = 0V, f = 100KHz
Output Capacitance	C_{oes}	-	22	-		
Reverse Transfer Capacitance	C_{res}	-	8	-		
Gate Total Charge	Q_g	-	19	-	nC	V_{CC} = 520V, I_C =6A, V_{GE} = 15V
Gate-Source charge	Q_{ge}	-	1.3	-		
Gate-Drain charge	Q_{gc}	-	12.5	-		
Turn-on delay time	$t_{d(on)}$	-	10	-	ns	T_{vj} = 25°C, V_{CC}=400V, I_C=6A, V_{GE}=15.0V, R_G=10.0Ω
Rise time	t_r	-	8	-		
Turn-off delay time	$t_{d(off)}$	-	79	-		
Fall time	t_f	-	56	-		
Turn-on energy	E_{on}	-	0.11	-	mJ	
Turn-off energy	E_{off}	-	0.10	-		
Turn-on delay time	$t_{d(on)}$	-	11	-	ns	T_{vj} = 175°C, V_{CC}=400V, I_C=6A, V_{GE}=15.0V, R_G=10.0Ω
Rise time	t_r	-	10	-		
Turn-off delay time	$t_{d(off)}$	-	108	-		
Fall time	t_f	-	89	-		
Turn-on energy	E_{on}	-	0.16	-	mJ	
Turn-off energy	E_{off}	-	0.16	-		

Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Diode peak reverse recovery curren	I_{rrm}	-	-2.1	-	A	T_{vj} = 25°C, V_R = 400V, IF = 6.0A, diF /dt = 500A/μs
Body Diode Reverse Recovery Time	t_{rr}	-	55	-	ns	
Body Diode Reverse Recovery Charge	Q_{rr}	-	306	-	nC	

Typical Performance Characteristics

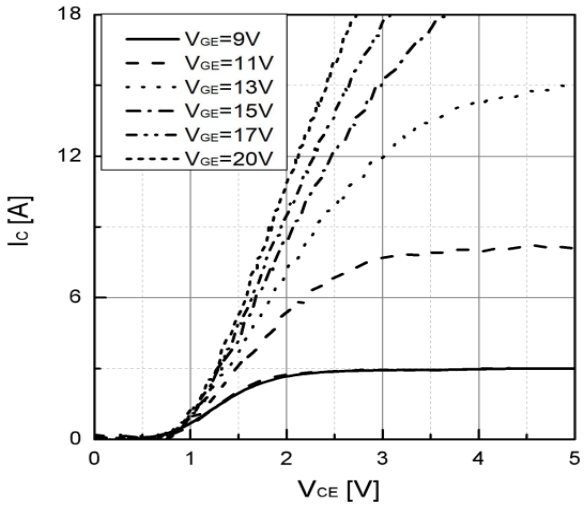


Fig 1. Typical output characteristic (T_{vj}=25℃)

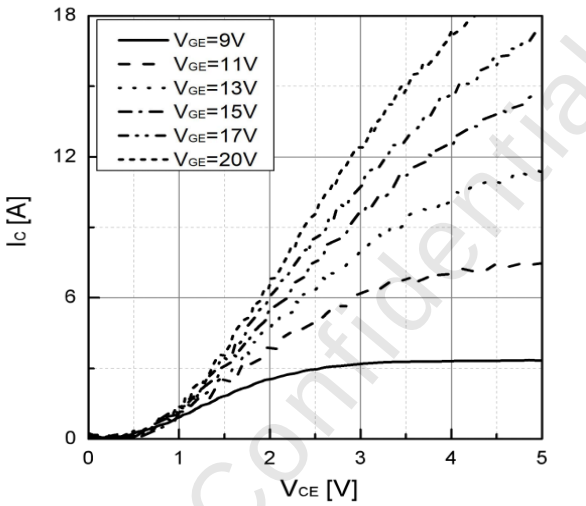


Fig 2. Typical output characteristic(T_{vj}=175℃)

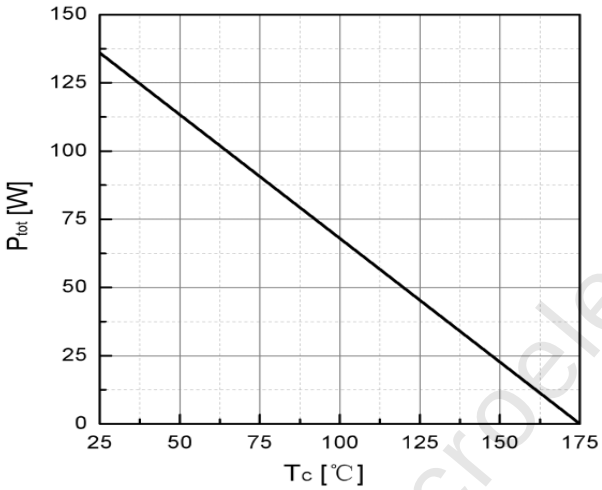


Fig 3.Power dissipation as a function of T_C

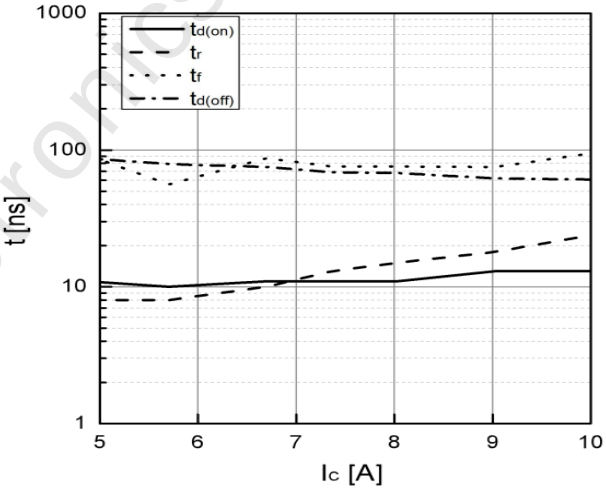


Fig 4. Typical switching time as a function of I_C

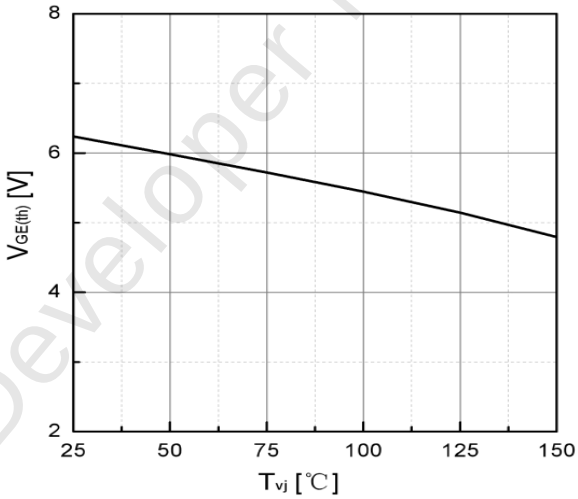


Fig 5. Typical $V_{GE(th)}$ as a function of T_{vj} (I_C=1mA)

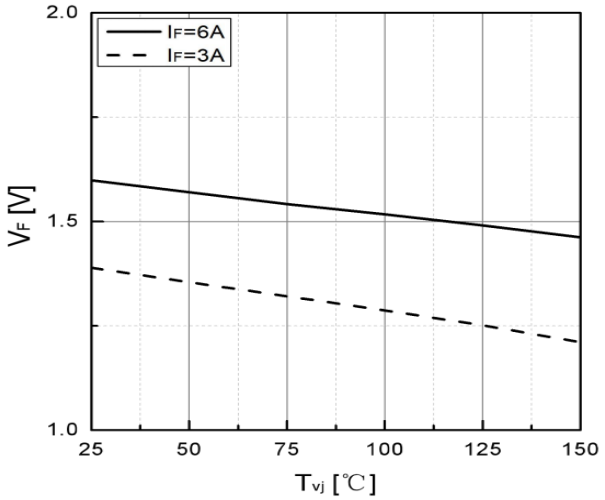


Fig 6. Typical V_F as a function of T_{vj}

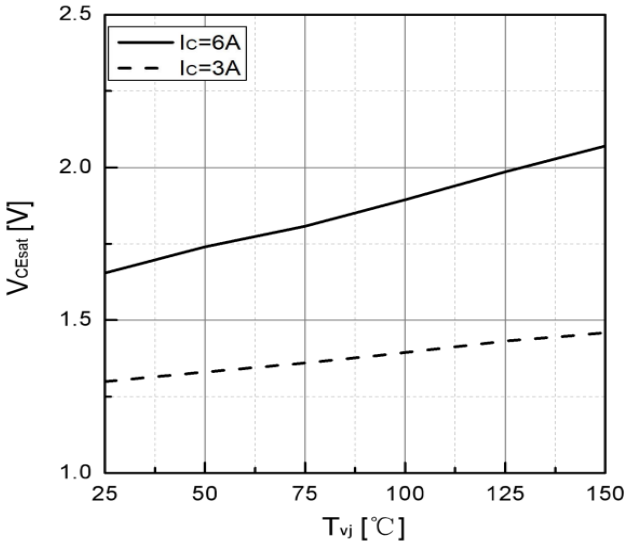


Fig 7. Typical V_{CEsat} as a function of T_{vj}

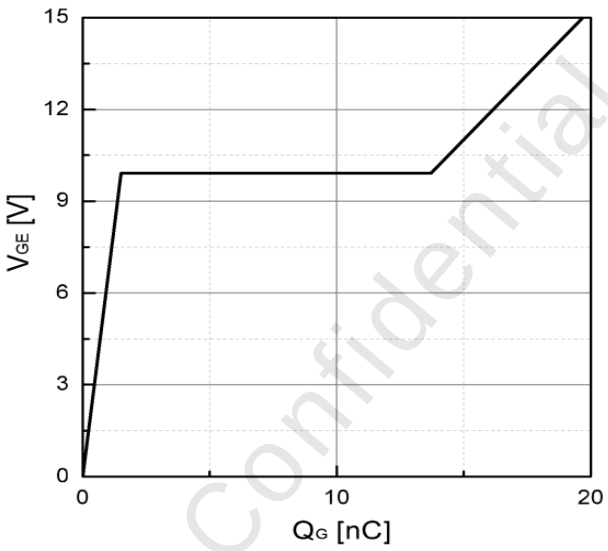
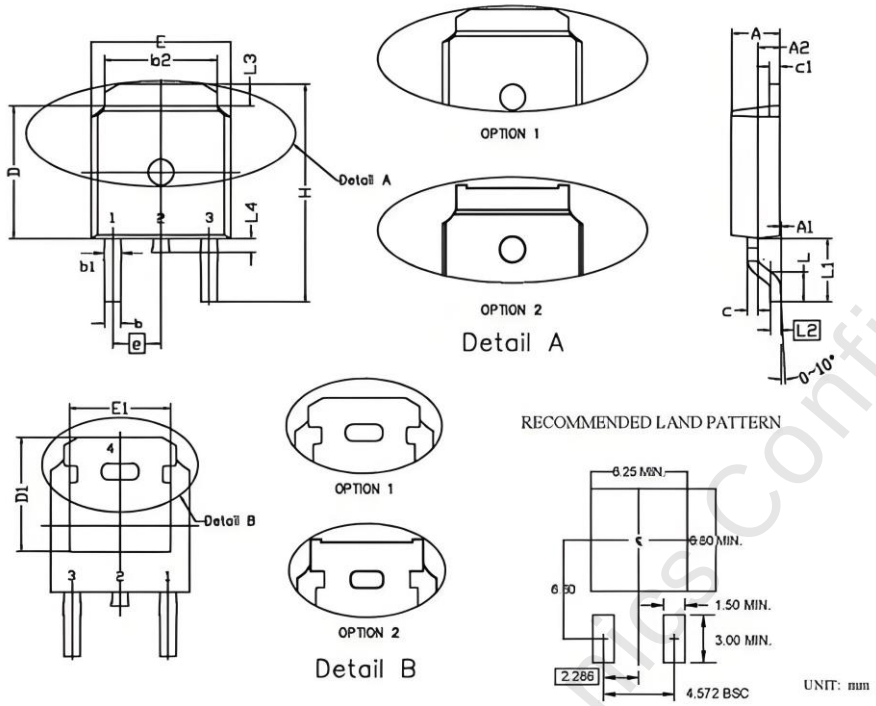


Fig 8. Typical Gate charge

Package Outline: TO252



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.15	2.45	0.085	0.096
A1	0.00	0.15	0.000	0.006
A2	0.76	1.36	0.030	0.054
b	0.60	0.91	0.024	0.036
b1	0.65	1.15	0.026	0.045
b2	5.00	5.64	0.197	0.222
c	0.45	0.61	0.018	0.024
c1	0.36	0.66	0.014	0.026
D	5.80	6.30	0.228	0.248
D1	5.00	6.00	0.197	0.236
e	2.29 BSC.		0.090 BSC.	
E	6.30	6.90	0.248	0.272
E1	4.55	5.30	0.179	0.209
H	9.40	10.48	0.370	0.413
L	1.18	1.70	0.046	0.067
L1	2.92 REF		0.115 REF	
L2	0.36	0.66	0.014	0.026
L3	0.72	1.35	0.028	0.053
L4	0.60	1.20	0.024	0.047

Revision History

Revison	Major changes
0.5	Release for initial version

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