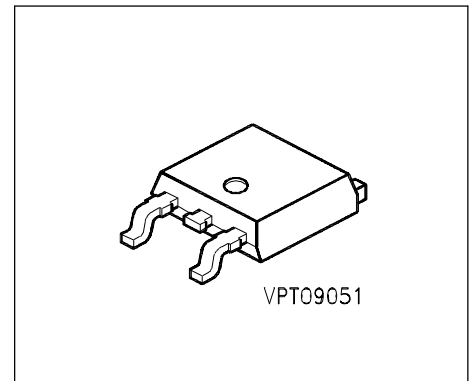


IGBT

- Low forward voltage drop
- High switching speed
- Low tail current
- Latch-up free
- Avalanche rated



Pin 1	Pin 2	Pin 3
G	C	E

Type	V_{CE}	I_C	Package	Ordering Code
SGD04N60	600V	4A	P-TO252	Q67040-A

Maximum Ratings

Parameter	Symbol	Values	Unit
Collector-emitter voltage	V _{CE}	600	V
Collector-gate voltage	V _{CGR}	600	
R _{GE} = 20 kΩ			
Gate-emitter voltage	V _{GE}	± 20	
DC collector current	I _C		A
T _C = 25 °C		10	
T _C = 100 °C		4	
Pulsed collector current, t _p = 1 ms	I _{Cpuls}		
T _C = 25 °C		20	
T _C = 100 °C		8	
Avalanche energy, single pulse	E _{AS}		mJ
I _C = 4 A, V _{CC} = 50 V, R _{GE} = 25 Ω		4	
L = 500 μH, T _j = 25 °C			
Power dissipation	P _{tot}		W
T _C = 25 °C		50	

Preliminary data

Maximum Ratings

Parameter	Symbol	Values	Unit
Chip or operating temperature	T_j	-55 ... + 150	°C
Storage temperature	T_{stg}	-55 ... + 150	
IEC climatic category, DIN IEC 68-1	-	55 / 150 / 56	-

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Thermal resistance , junction - case	R_{thJC}	-	-	2.5	K/W
Thermal resistance, junction - ambient (PCB mount)**	R_{thJA}	-	50	-	

** Device on 50mm x 50 mm x 1.5 mm epoxy PCB (FR-4) with 6 cm² copper area around the heat slug footprint (one layer, 70 μm copper).
PCB is vertical without blown air.

Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Static Characteristics

Collector-emitter breakdown voltage $V_{GE} = 0\text{ V}, I_C = 0.5\text{ mA}, T_j = -55\text{ °C}$	$V_{(BR)CES}$	600	-	-	V
Gate threshold voltage $V_{GE} = V_{CE}, I_C = 0.2\text{ mA}, T_j = 25\text{ °C}$ $V_{GE} = V_{CE}, I_C = 0.2\text{ mA}, T_j = 150\text{ °C}$	$V_{GE(th)}$	3 2	4 3	5 -	
Collector-emitter saturation voltage $V_{GE} = 15\text{ V}, I_C = 4\text{ A}, T_j = 25\text{ °C}$ $V_{GE} = 15\text{ V}, I_C = 4\text{ A}, T_j = 150\text{ °C}$	$V_{CE(sat)}$	1.6 -	2 2.3	2.5 2.8	
Zero gate voltage collector current $V_{CE} = 600\text{ V}, V_{GE} = 0\text{ V}, T_j = 25\text{ °C}$ $V_{CE} = 600\text{ V}, V_{GE} = 0\text{ V}, T_j = 150\text{ °C}$	I_{CES}	- -	- -	20 500	μA
Gate-emitter leakage current $V_{GE} = 25\text{ V}, V_{CE} = 0\text{ V}$	I_{GES}	-	-	100	nA

Preliminary data

Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

AC Characteristics

Transconductance $V_{CE} = 20\text{ V}, I_C = 4\text{ A}$	g_{fs}	0.8	3.2	-	S
Input capacitance $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$	C_{iss}	-	270	340	pF
Output capacitance $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$	C_{oss}	-	30	40	
Reverse transfer capacitance $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$	C_{rss}	-	18	23	

Preliminary data

Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Switching Characteristics, Inductive Load at $T_j = 150\text{ °C}$

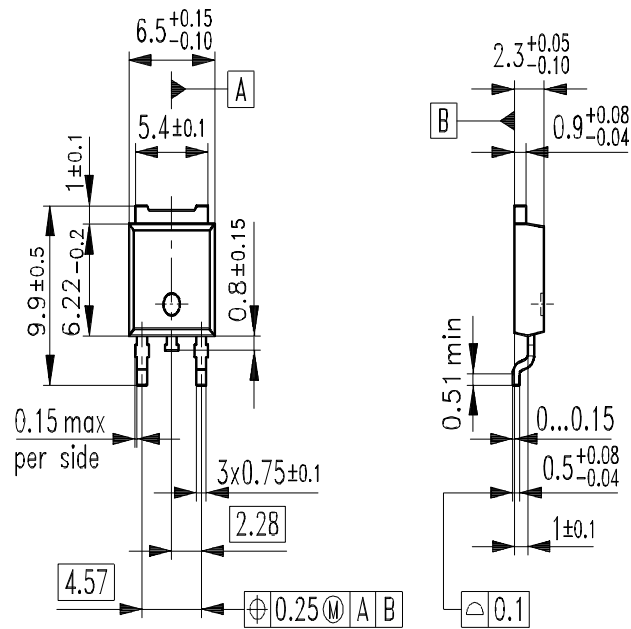
Turn-on delay time $V_{CC} = 400\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 4\text{ A}$ $R_{Gon} = 67\ \Omega$	$t_{d(on)}$	-	20	30	ns
Rise time $V_{CC} = 400\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 4\text{ A}$ $R_{Gon} = 67\ \Omega$	t_r	-	20	30	
Turn-off delay time $V_{CC} = 400\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 4\text{ A}$ $R_{Goff} = 67\ \Omega$	$t_{d(off)}$	-	260	390	
Fall time $V_{CC} = 400\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 4\text{ A}$ $R_{Goff} = 67\ \Omega$	t_f	-	100	150	
Total turn-on loss energy * $V_{CC} = 400\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 4\text{ A}$ $R_{Gon} = 67\ \Omega$, $T_j = 150\text{ °C}$	E_{on}	-	0.2	0.26	
Total turn-off loss energy $V_{CC} = 400\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 4\text{ A}$ $R_{Goff} = 67\ \Omega$, $T_j = 150\text{ °C}$	E_{off}	-	0.1	0.13	
Total Gate Charge $V_{CC} = 480\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 4\text{ A}$	$Q_{G(on)}$	-	24	36	nC

* includes the reverse recovery losses caused by the FWD of the BUP410D

Package Outlines

Dimensions in mm

Weight:



GPT09051

All metal surfaces tin plated, except area of cut.