IGBT

GD10PJK120L2S Preliminary

Molding Type Module

1200V/10A PIM in one-package

Features

- 10μs short circuit capability
- $V_{CE(sat)}$ with positive temperature coefficient
- Square RBSOA
- Low inductance case
- Fast & soft reverse recovery anti-parallel FWD

Typical Applications

- Inverter for motor drive
- AC and DC servo drive amplifier
- Uninterruptible power supply

IGBT-inverter T_C=25℃ unless otherwise noted

Maximum Rated Values

Symbol	Description	GD10PJK120L2S	Units
V_{CES}	Collector-Emitter Voltage @ T_j=25℃	1200	V
V_{GES}	Gate-Emitter Voltage	±20	V
I_C	Collector Current @ T_C=25℃ @ T_C=80℃	20 10	A
I_{CM}	Pulsed Collector Current t_p=1ms	20	A
P_{tot}	Total Power Dissipation @ T_j=150℃	124	W

Off Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	T_j=25℃	1200			V
I_{CES}	Collector Cut-Off Current	V_{CE}=V_{CES},V_{GE}=0V, T_j=25℃			5.0	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=V_{GES},V_{CE}=0V, T_j=25℃			400	nA

On Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=125μA,V_{CE}=V_{GE}, T_j=25℃	4.4	5.0	6.0	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C=10A,V_{GE}=15V, T_j=25℃		2.45	2.70	V
		I_C=10A,V_{GE}=15V, T_j=125℃		2.75		

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
E_{on}	Turn-On Switching Loss	V_{CC}=600V,I_C=10A, R_G=22Ω,V_{GE}=±15V, T_j=25℃		0.96		mJ
E_{off}	Turn-Off Switching Loss			0.46		mJ
E_{tot}	Total Switching Loss			1.42		mJ
E_{on}	Turn-On Switching Loss	V_{CC}=600V,I_C=10A, R_G=22Ω,V_{GE}=±15V, T_j=125℃		1.25		mJ
E_{off}	Turn-Off Switching Loss			0.69		mJ
E_{tot}	Total Switching Loss			1.94		mJ

$t_{d(on)}$	Turn-On Delay Time	V_{CC}=600V,I_C=10A, R_G=22Ω,V_{GE}=±15V, T_j=125℃		86		ns
t_r	Rise Time			21		ns
$t_{d(off)}$	Turn-Off Delay Time			118		ns
t_f	Fall Time			274		ns
C_{ies}	Input Capacitance	V_{CE}=30V,f=1Mhz, V_{GE}=0V		750		pF
C_{oes}	Output Capacitance			190		pF
C_{res}	Reverse Transfer Capacitance			20		pF
Q_G	Gate Charge	V_{CC}=600V,I_C=10A, V_{GE}=-15…+15V		48		nC
R_{Gint}	Internal Gate Resistance			/		Ω
I_{SC}	SC Data	T_P≤10μs,V_{GE}=15V, T_j=125℃,V_{CC}=900V, V_{CEM}≤1200V		TBD		A

DIODE-inverter T_C=25℃ unless otherwise noted

Maximum Rated Values

Symbol	Description	GD10PJK120L2S	Units
V_{RRM}	Collector-Emitter Voltage @ T_j=25℃	1200	V
I_F	DC Forward Current @ T_C=80℃	10	A
I_{FRM}	Repetitive Peak Forward Current t_p=1ms	20	A

Characteristics Values

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	I_F=10A,V_{GE}=0V	T_j=25℃		1.85	2.20	V
			T_j=125℃		2.00		
Q_{rr}	Recovered Charge	I_F=10A, V_R=600V, di/dt=-400A/μs, V_{GE}=-15V	T_j=25℃		0.82		ns
			T_j=125℃		1.51		
I_{RM}	Peak Reverse Recovery Current		T_j=25℃		12		A
			T_j=125℃		13		
E_{rec}	Reverse Recovery Energy		T_j=25℃		0.31		mJ
			T_j=125℃		0.55		

DIODE-rectifier T_C=25℃ unless otherwise noted

Maximum Rated Values

Symbol	Description	GD10PJK120L2S	Units
V_{RRM}	Collector-Emitter Voltage @ T_j=25℃	1600	V
$I_{F(AV)}$	Average On-state Current @ T_C=100℃	12	A
I_{RMSM}	Maximum RMS Current at Rectifier Output @ T_C=80℃	25	A
I_{FSM}	Surge Forward Current V_R=0V,t_p=10ms,T_j=45℃	150	A
I^2t	I^2t-value,V_R=0V,t_p=10ms,T_j=150℃	250	A^2s

Characteristics Values

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	I_F=7A	T_j=25℃			1.11	V
			T_j=150℃			1.01	
I_R	Reverse Current	T_j=150℃,V_R=1600V				0.7	mA

IGBT-brake-chopper T_C=25℃ unless otherwise noted

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DIODE-brake-chopper T_C=25℃ unless otherwise noted

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			T_j=125℃		1.51		
I_{RM}	Peak Reverse Recovery Current		T_j=25℃		12		A
			T_j=125℃		13		
E_{rec}	Reverse Recovery Energy		T_j=25℃		0.31		mJ
			T_j=125℃		0.55		

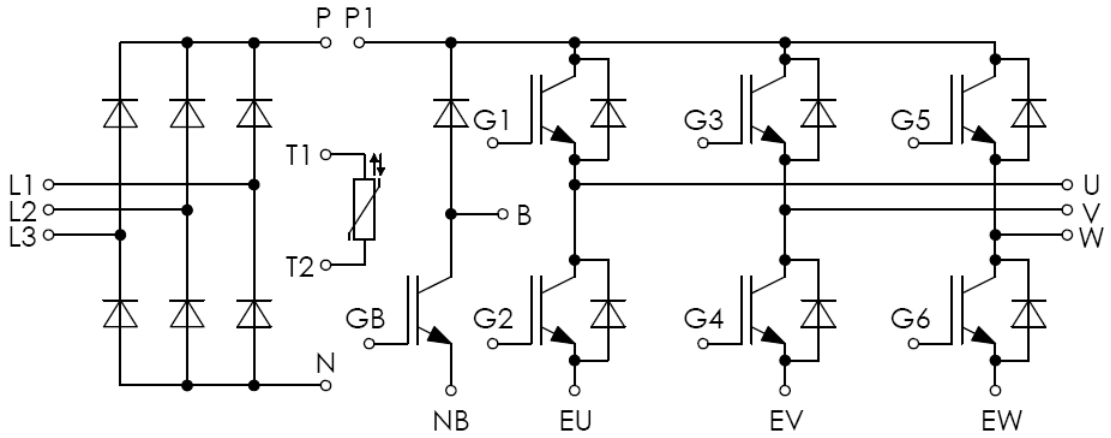
Electrical Characteristics of NTC T_C=25℃ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
R_{25}	Rated resistance			5.0		kΩ
ΔR/R	Deviation of R_{100}	T_C=100℃,R_{100}=493.3Ω	-5		5	%
P_{25}	Power dissipation				20.0	mW
$B_{25/50}$	B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$		3375		K

IGBT Module

Symbol	Parameter	Min.	Typ.	Max.	Units
V_{ISO}	Isolation Voltage RMS,f=50Hz,t=1min	2500			V
L_{CE}	Stray Inductance		30		nH
$R_{CC'+EE'}$	Module Lead Resistance, Terminal to Chip @ T_C=25℃		8.0		mΩ
$R_{\theta JC}$	Junction-to-Case (per IGBT-inverter)			1.01	K/W
	Junction-to-Case (per DIODE-inverter)			1.74	
	Junction-to-Case (per DIODE-rectifier)			1.74	
	Junction-to-Case (per IGBT-brake-chopper)			0.98	
	Junction-to-Case (per DIODE-brake-chopper)			1.70	
$R_{\theta CS}$	Case-to-Sink (Conductive grease applied)		0.08		K/W
T_j	Maximum Junction Temperature			150	℃
T_{STG}	Storage Temperature Range	-40		125	℃
F	Mounting Force Per Clamp	20		50	N
G	Weight of Module		24		g

Equivalent Circuit Schematic



Package Dimension

Dimensions in Millimeters