DOSEMI

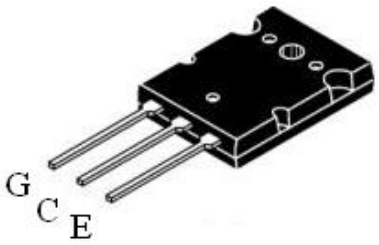
IGBT

DG50F12T3

1200V/50A IGBT with Diode

General Description

DOSEMI IGBT Power Discrete provides ultra low conduction loss as well as low switching loss. They are designed for the applications such as general inverters and UPS.



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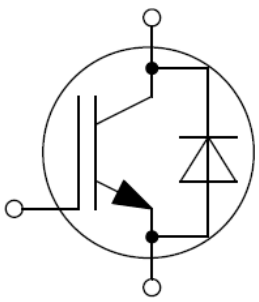
Features

- Low $V_{CE(sat)}$ Fast IGBT technology
- 10μs short circuit capability
- Low switching loss
- Maximum junction temperature 175°C
- Low inductance case
- $V_{CE(sat)}$ with positive temperature coefficient
- Fast & soft reverse recovery anti-parallel FWD
- Lead free package

Typical Applications

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

Equivalent Circuit Schematic



Absolute Maximum Ratings T_C=25°C unless otherwise noted

IGBT

Symbol	Description	Value	Unit
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	±20	V
I_C	Collector Current @ T_C=25°C @ T_C=100°C	100 50	A
I_{CM}	Pulsed Collector Current t_p=1ms	100	A
P_D	Maximum Power Dissipation @ T_j=175°C	837	W

Diode

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	50	A
I_{FM}	Diode Maximum Forward Current t_p=1ms	100	A

Discrete

Symbol	Description	Values	Unit
T_{jmax}	Maximum Junction Temperature	175	°C
T_{jop}	Operating Junction Temperature	-40 to +150	°C
T_{STG}	Storage Temperature Range	-40 to +150	°C
T_S	Soldering Temperature,1.6mm from case for 10s	260	°C

IGBT Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C=50A,V_{GE}=15V, T_j=25°C		1.85	2.30	V
		I_C=50A,V_{GE}=15V, T_j=125°C		2.25		
		I_C=50A,V_{GE}=15V, T_j=150°C		2.30		
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=1.25mA,V_{CE}=V_{GE}, T_j=25°C	5.2	6.0	6.8	V
I_{CES}	Collector Cut-Off Current	V_{CE}=V_{CES},V_{GE}=0V, T_j=25°C			1.0	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=V_{GES},V_{CE}=0V, T_j=25°C			100	nA
R_{Gint}	Internal Gate Resistance			/		Ω
C_{ies}	Input Capacitance	V_{CE}=30V,f=1MHz, V_{GE}=0V		5.18		nF
C_{res}	Reverse Transfer Capacitance			0.15		nF
Q_G	Gate Charge	V_{GE}=15V		0.39		μC
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=600V,I_C=50A, R_G=15Ω,V_{GE}=±15V, T_j=25°C		84		ns
t_r	Rise Time			42		ns
$t_{d(off)}$	Turn-Off Delay Time			338		ns
t_f	Fall Time			169		ns
E_{on}	Turn-On Switching Loss			3.9		mJ
E_{off}	Turn-Off Switching Loss			3.1		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=600V,I_C=50A, R_G=15Ω,V_{GE}=±15V, T_j=125°C		76		ns
t_r	Rise Time			45		ns
$t_{d(off)}$	Turn-Off Delay Time			364		ns
t_f	Fall Time			192		ns
E_{on}	Turn-On Switching Loss			5.2		mJ
E_{off}	Turn-Off Switching Loss			3.5		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=600V,I_C=50A, R_G=15Ω,V_{GE}=±15V, T_j=150°C		75		ns
t_r	Rise Time			46		ns
$t_{d(off)}$	Turn-Off Delay Time			368		ns
t_f	Fall Time			195		ns
E_{on}	Turn-On Switching Loss			5.5		mJ
E_{off}	Turn-Off Switching Loss			3.7		mJ

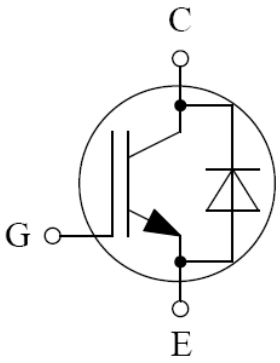
Diode Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	I_F=50A,V_{GE}=0V,T_j=25°C		1.80	2.25	V
		I_F=50A,V_{GE}=0V,T_j=125°C		1.85		
		I_F=50A,V_{GE}=0V,T_j=150°C		1.85		
Q_r	Recovered Charge	V_R=600V,I_F=50A, -di/dt=1400A/μs,V_{GE}=-15V T_j=25°C		4.6		μC
I_{RM}	Peak Reverse Recovery Current			30		A
E_{rec}	Reverse Recovery Energy			1.8		mJ
Q_r	Recovered Charge	V_R=600V,I_F=50A, -di/dt=1400A/μs,V_{GE}=-15V T_j=125°C		8.9		μC
I_{RM}	Peak Reverse Recovery Current			45		A
E_{rec}	Reverse Recovery Energy			3.4		mJ
Q_r	Recovered Charge	V_R=600V,I_F=50A, -di/dt=1400A/μs,V_{GE}=-15V T_j=150°C		10.5		μC
I_{RM}	Peak Reverse Recovery Current			50		A
E_{rec}	Reverse Recovery Energy			4.2		mJ

Discrete Characteristics T_C=25°C unless otherwise noted

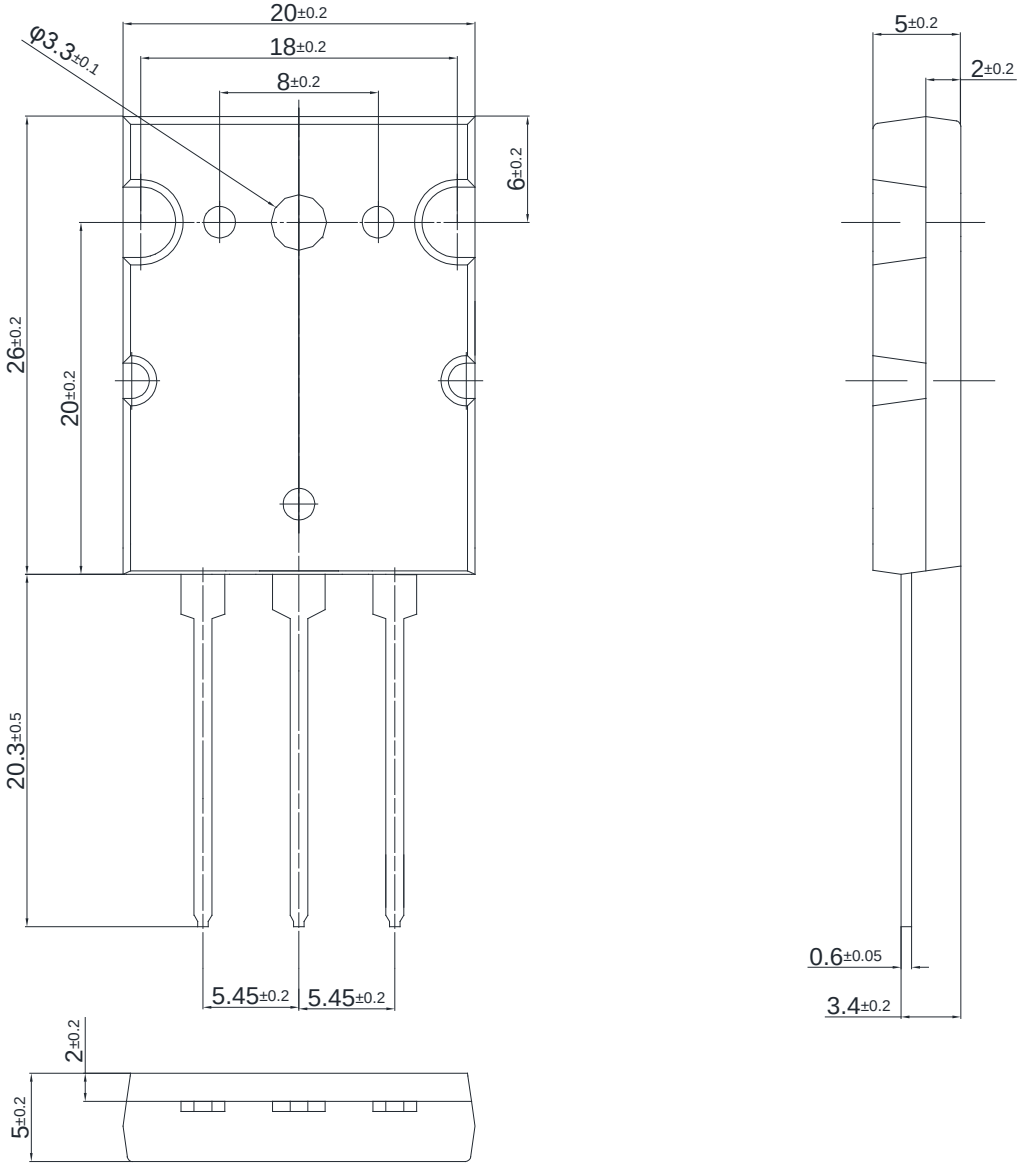
Symbol	Parameter	Min.	Typ.	Max.	Unit
R_{thJC}	Junction-to-Case (per IGBT) Junction-to-Case (per Diode)			0.179 0.581	K/W
R_{thJA}	Junction-to-Ambient		40		K/W

Circuit Schematic



Package Dimensions

Dimensions in Millimeters



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