DOSEMI

IGBT

DG120X07T2

650V/120A 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.

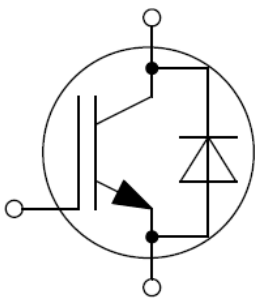
Features

- Low $V_{CE(sat)}$ Trench IGBT technology
- Low switching loss
- Maximum junction temperature 175°C
- $V_{CE(sat)}$ 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	650	V
V_{GES}	Gate-Emitter Voltage	±20	V
I_C	Collector Current @ T_C=25°C @ T_C=135°C	240 120	A
I_{CM}	Pulsed Collector Current t_p limited by T_{jmax}	480	A
P_D	Maximum Power Dissipation @ T_j=175°C	1250	W

Diode

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	650	V
I_F	Diode Continuous Forward Current @ T_C=25°C @ T_C=110°C	228 120	A
I_{FM}	Diode Maximum Forward Current t_p limited by T_{jmax}	480	A

Discrete

Symbol	Description	Values	Unit
T_{jop}	Operating Junction Temperature	-40 to +175	°C
T_{STG}	Storage Temperature Range	-55 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=120A,V_{GE}=15V, T_j=25°C		1.30	1.75	V
		I_C=120A,V_{GE}=15V, T_j=125°C		1.45		
		I_C=120A,V_{GE}=15V, T_j=150°C		1.50		
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=1.92mA,V_{CE}=V_{GE}, T_j=25°C	5.1	5.8	6.5	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			400	nA
R_{Gint}	Internal Gate Resistance			/		Ω
C_{ies}	Input Capacitance	V_{CE}=25V,f=100kHz, V_{GE}=0V		14.1		nF
C_{res}	Reverse Transfer Capacitance			0.42		nF
Q_G	Gate Charge	V_{GE}=-15…+15V		TBD		uC
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=300V,I_C=120A, R_G=7.5Ω,V_{GE}=±15V, T_j=25°C		150		ns
t_r	Rise Time			87		ns
$t_{d(off)}$	Turn-Off Delay Time			424		ns
t_f	Fall Time			41		ns
E_{on}	Turn-On Switching Loss			3.15		mJ
E_{off}	Turn-Off Switching Loss			2.71		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=300V,I_C=120A, R_G=7.5Ω,V_{GE}=±15V, T_j=125°C		135		ns
t_r	Rise Time			93		ns
$t_{d(off)}$	Turn-Off Delay Time			455		ns
t_f	Fall Time			58		ns
E_{on}	Turn-On Switching Loss			4.05		mJ
E_{off}	Turn-Off Switching Loss			3.18		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=300V,I_C=120A, R_G=7.5Ω,V_{GE}=±15V, T_j=150°C		149		ns
t_r	Rise Time			102		ns
$t_{d(off)}$	Turn-Off Delay Time			500		ns
t_f	Fall Time			64		ns
E_{on}	Turn-On Switching Loss			4.46		mJ
E_{off}	Turn-Off Switching Loss			3.50		mJ
I_{SC}	SC Data	t_P≤6μs,V_{GE}=15V, T_j=150 °C,V_{CC}=300V, V_{CEM}≤650V		600		A

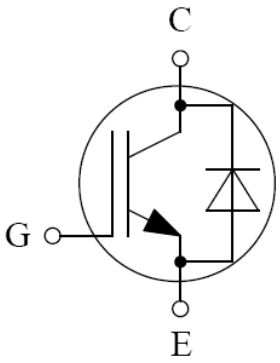
Diode Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	I_F=120A,V_{GE}=0V,T_i=25°C		1.60	2.05	V
		I_F=120A,V_{GE}=0V,T_j=125°C		1.50		
		I_F=120A,V_{GE}=0V,T_j=150°C		1.45		
Q_r	Recovered Charge	V_R=300V,I_F=120A, -di/dt=1300A/μs,V_{GE}=-15V T_j=25°C		0.9		μC
I_{RM}	Peak Reverse Recovery Current			22		A
E_{rec}	Reverse Recovery Energy			0.22		mJ
Q_r	Recovered Charge	V_R=300V,I_F=120A, -di/dt=1300A/μs,V_{GE}=-15V T_j=125°C		1.7		μC
I_{RM}	Peak Reverse Recovery Current			26		A
E_{rec}	Reverse Recovery Energy			0.44		mJ
Q_r	Recovered Charge	V_R=300V,I_F=120A, -di/dt=1300A/μs,V_{GE}=-15V T_j=150°C		1.9		μC
I_{RM}	Peak Reverse Recovery Current			29		A
E_{rec}	Reverse Recovery Energy			0.51		mJ

Discrete Characteristics T_C=25°C unless otherwise noted

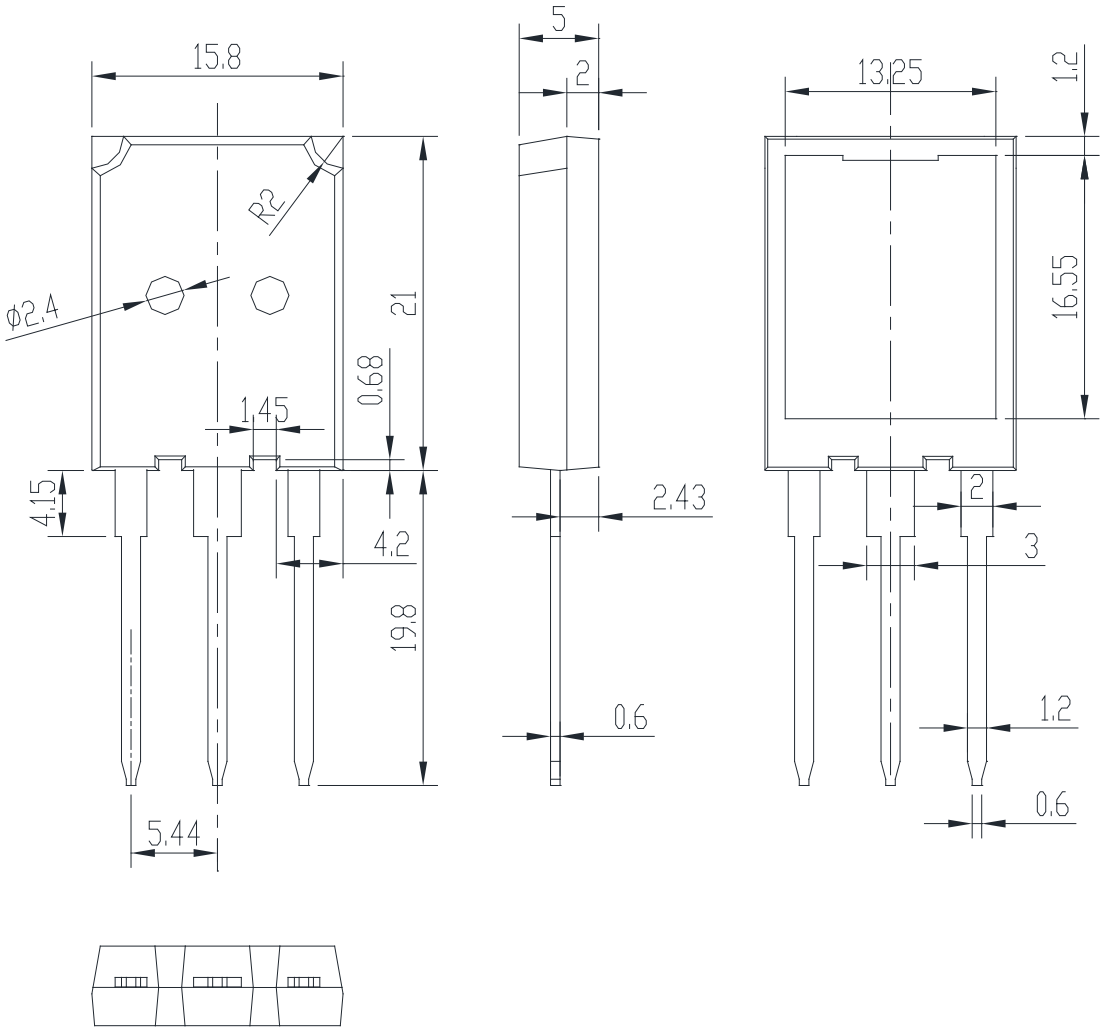
Symbol	Parameter	Min.	Typ.	Max.	Unit
R_{thJC}	Junction-to-Case (per IGBT) Junction-to-Case (per Diode)			0.120 0.261	K/W
R_{thJA}	Junction-to-Ambient		40		K/W

Circuit Schematic



Package Dimensions

Dimensions in Millimeters



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