

DOSEMI

IGBT

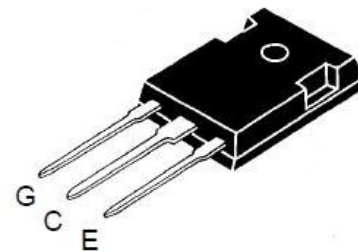
DG10N12T2

Molding Type Discretes

1200V/10A IGBT with Anti-Parallel Diode

General Description

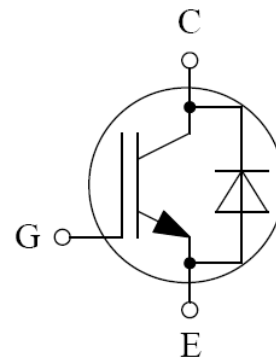
DOSEMI IGBT Power Discretes provides ultra low conduction loss as well as short circuit ruggedness. They are designed for the applications such as general inverters and electronic welders.



TO-247

Features

- Low $V_{CE(sat)}$ NPT IGBT technology
- Low switching loss
- Maximum junction temperature 150°C
- 10 μ s short circuit capability
- Square RBSOA
- $V_{CE(sat)}$ with positive temperature coefficient
- Fast & soft reverse recovery anti-parallel FWD
- Tight parameter distribution
- Lead free package



Equivalent Circuit Schematic

Typical Applications

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

Absolute Maximum Ratings $T_C=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Description	DG10N12T2	Units
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	± 20	V
I_C	Collector Current @ $T_C=25^{\circ}\text{C}$	20	A
	@ $T_C=100^{\circ}\text{C}$	10	
I_{CM}	Pulsed Collector Current $t_p=1\text{ms}$	20	A
I_F	Diode Continuous Forward Current	10	A
I_{FM}	Diode Maximum Forward Current $t_p=1\text{ms}$	20	A
P_D	Maximum Power Dissipation @ $T_j=150^{\circ}\text{C}$	321	W
T_{jmax}	Maximum Junction Temperature	150	$^{\circ}\text{C}$
T_{jop}	Operating Junction Temperature	-40 to +150	$^{\circ}\text{C}$
T_{stg}	Storage Temperature Range	-40 to +125	$^{\circ}\text{C}$
T_s	Soldering Temperature, 1.6mm from case for 10s	260	$^{\circ}\text{C}$

Electrical Characteristics of IGBT $T_C=25^{\circ}\text{C}$ unless otherwise noted**Off Characteristics**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	$T_j=25^{\circ}\text{C}$	1200			V
I_{CES}	Collector Cut-Off Current	$V_{CE}=V_{CES}, V_{GE}=0\text{V}, T_j=25^{\circ}\text{C}$			25	μA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=V_{GES}, V_{CE}=0\text{V}, T_j=25^{\circ}\text{C}$			100	nA

On Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=500\mu\text{A}, V_{CE}=V_{GE}, T_j=25^{\circ}\text{C}$	5.0	5.9	6.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C=10\text{A}, V_{GE}=15\text{V}, T_j=25^{\circ}\text{C}$		2.05	2.50	V
		$I_C=10\text{A}, V_{GE}=15\text{V}, T_j=125^{\circ}\text{C}$		2.40		

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=600V, I_C=10A,$ $R_G=82\Omega, V_{GE}=\pm 15V,$ $T_j=25^\circ C$		181		ns
t_r	Rise Time			58		ns
$t_{d(off)}$	Turn-Off Delay Time			255		ns
t_f	Fall Time			347		ns
E_{on}	Turn-On Switching Loss			1.79		mJ
E_{off}	Turn-Off Switching Loss			0.73		mJ
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=600V, I_C=10A,$ $R_G=82\Omega, V_{GE}=\pm 15V,$ $T_j=25^\circ C$		185		ns
t_r	Rise Time			59		ns
$t_{d(off)}$	Turn-Off Delay Time			266		ns
t_f	Fall Time			480		ns
E_{on}	Turn-On Switching Loss			2.13		mJ
E_{off}	Turn-Off Switching Loss			0.94		mJ
C_{ies}	Input Capacitance	$V_{CE}=30V, f=1MHz,$ $V_{GE}=0V$		0.70		nF
C_{oes}	Output Capacitance			0.11		nF
C_{res}	Reverse Transfer Capacitance			0.05		nF
Q_G	Gate Charge	$V_{CC}=400V, I_C=10A,$ $V_{GE}=15V$		84		nC
I_{SC}	SC Data	$t_p \leq 10\mu s, V_{GE}=15V,$ $T_j=125^\circ C, V_{CC}=900V,$ $V_{CEM} \leq 1200V$		90		A
R_{Gint}	Internal Gate Resistance			/		Ω

Electrical Characteristics of Diode $T_C=25^\circ C$ unless otherwise noted

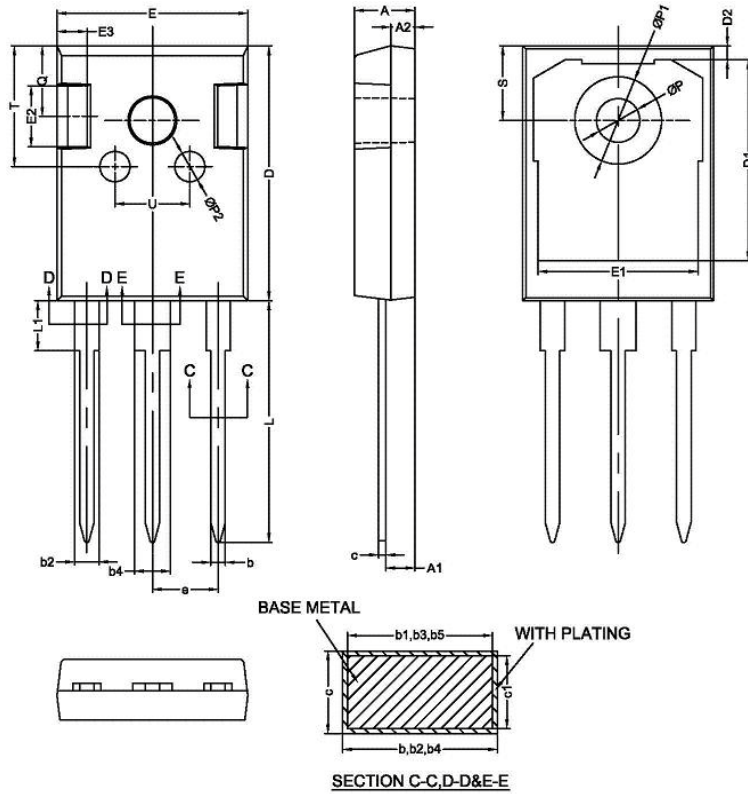
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	$I_F=10A, V_{GE}=0V$	$T_j=25^\circ C$	1.85	2.30	V
			$T_j=125^\circ C$	2.00		
Q_r	Recovered Charge	$I_F=10A,$ $V_R=600V,$ $R_G=82\Omega,$ $V_{GE}=-15V$	$T_j=25^\circ C$	0.4		μC
			$T_j=125^\circ C$	1.4		
I_{RM}	Peak Reverse Recovery Current		$T_j=25^\circ C$	8		A
			$T_j=125^\circ C$	9		
E_{rec}	Reverse Recovery Energy		$T_j=25^\circ C$	0.27		mJ
			$T_j=125^\circ C$	0.45		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case (per IGBT)		0.389	K/W
$R_{\theta JC}$	Junction-to-Case (per Diode)		0.961	K/W
$R_{\theta JA}$	Junction-to-Ambient	40		K/W

Package Dimensions

Dimensions in Millimeters



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
b	1.16	-	1.26
b1	1.15	1.2	1.22
b2	1.96	-	2.06
b3	1.95	2.00	2.02
b4	2.96	-	3.06
b5	2.95	3.00	3.02
c	0.59	-	0.66
c1	0.58	0.60	0.62
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.20	1.35
E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	4.90	5.00	5.10
E3	2.40	2.50	2.60
e	5.44BSC		
L	19.80	19.92	20.10
L1	-	-	4.30
P	3.50	3.60	3.70
P1	-	-	7.40
P2	2.40	2.50	2.60
Q	5.60	-	6.00
S	6.15BSC		
T	9.80	-	10.20
U	6.00	-	6.40

NOTES:
1. ALL DIMENSIONS REFER TO JEDEC STANDARD TO-247 AD DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
2. EJECTION MARK DEPTH $0.10^{+0.15}_{-0.05}$.

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