High Power Rugged Type IGBT Module

Description

DAWIN'S IGBT module devices are optimized to reduce losses and switching noise in high frequency power conditioning electrical systems. These IGBT modules are ideally suited for power inverters, motors drives and other applications where switching losses are significant portion of the total losses.

Features

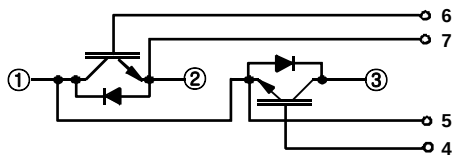
- ☞ High Speed Switching
- ☞ BV_{CES} = 600V
- ☞ Low Conduction Loss : $V_{CE(sat)}$ = 2.1 V (typ.)
- ☞ Fast & Soft Anti-Parallel FWD
- ☞ Short circuit rated : Min.10uS at T_C=100℃
- ☞ Reduced EMI and RFI
- ☞ Isolation Type Package

Applications

Motor Drives, High Power Inverters, Welding Machine, Induction Heating, UPS , CVCF, Robotics , Servo Controls, High Speed SMPS

Equivalent Circuit and Package

Equivalent Circuit



Package : 7DM-1 Series

Please see the package out line information

Absolute Maximum Ratings @ T_j=25℃ (Per Leg)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Collector-Emitter Voltage	-	600	V
V_{GES}	Gate-Emitter Voltage	-	±20	V
I_C	Collector Current	T_C = 25℃	125	A
		T_C = 75℃	100	A
$I_{CM\,(1)}$	Pulsed Collector Current	-	200	A
I_F	Diode Continuous Forward Current	T_C = 100℃	100	A
I_{FM}	Diode Maximum Forward Current	-	200	A
T_{SC}	Short Circuit Withstand Time	T_C = 100℃	10	uS
P_D	Maximum Power Dissipation	T_C = 25℃	480	W
Tj	Operating Junction Temperature	-	-40 ~ 150	℃
Tstg	Storage Temperature Range	-	-40 ~ 125	℃
Viso	Isolation Voltage	AC 1 minute	2500	V
	Mounting screw Torque :M6	-	4.0	N.m
	Power terminals screw Torque :M5	-	2.0	N.m

Note : (1) Repetitive rating : Pulse width limited by max. junction temperature

Electrical Characteristics of IGBT @ T_C=25℃ (unless otherwise specified)

Symbol	Parameter	Conditions	Values			Unit
			Min.	Typ.	Max.	
BV_{CES}	C - E Breakdown Voltage	V_{GE} = 0V , I_C =250uA	600	-	-	V
$\Delta BV_{CES}/\Delta T_J$	Temperature Coeff. of Breakdown Voltage	V_{GE} = 0V , I_C = 1.0mA	-	0.6	-	V/℃
$V_{GE(th)}$	G - E threshold voltage	I_C = 500uA , V_{CE} = V_{GE}	5	-	8.5	V
I_{CES}	Collector cutoff Current	V_{CE} = 600V , V_{GE} = 0V	-	-	250	uA
I_{GES}	G - E leakage Current	V_{GE} = ±20V	-	-	±100	nA
$V_{CE(sat)}$	Collector to Emitter saturation voltage	I_C= 100A, V_{GE}= 15V @T_C= 25℃	-	2.1	2.8	V
		I_C= 100A, V_{GE}= 15V @T_C= 100℃	-	2.4	-	V
C_{ies}	Input capacitance	V_{GE} = 0V , f = 1MHz	-	10000	-	pF
C_{oes}	Output capacitance	V_{CE} = 30V	-	950	-	pF
C_{res}	Reverse transfer capacitance		-	230	-	pF
$t_{d(on)}$	Turn on delay time	V_{CC} = 300V , I_C = 100A	-	25	-	nS
tr	Turn on rise time	V_{GE} = 15V	-	50	-	nS
$t_{d(off)}$	Turn off delay time	R_G = 6.8Ω	-	80	-	nS
t_f	Turn off fall time	Inductive Load, @ Tc=25℃	-	110	200	nS
E_{on}	Turn on Switching Loss		-	4.8	-	mJ
E_{off}	Turn off Switching Loss		-	9.6	-	mJ
E_{ts}	Total Switching Loss		-	14.4	-	mJ
T_{sc}	Short Circuit Withstand Time	Vcc = 300V, V_{GE} = 15V @T_C = 100℃	10	-	-	uS
Q_g	Total Gate Charge	Vcc = 300V	-	400	510	nC
Q_{ge}	Gate-Emitter Charge	V_{GE} = 15V	-	76	125	nC
Q_{gc}	Gate-Collector Charge	I_C = 100A	-	175	260	nC

Electrical Characteristics of FRD @ T_C=25℃ (unless otherwise specified)

Symbol	Parameter	Conditions		Values			Unit
				Min.	Typ.	Max.	
V_{FM}	Diode Forward Voltage	I_F=100A	Tc =25℃	-	1.6	2.0	V
			Tc =100℃	-	1.5	-	
t_{rr}	Diode Reverse Recovery Time	I_F=100A, V_R=300V di/dt= -200A/uS	Tc =25℃	-	120	-	nS
			Tc =100℃	-	130	-	
I_{rr}	Diode Peak Reverse Recovery Current		Tc =25℃	-	7.5	-	A
			Tc =100℃	-	9	-	
Q_{rr}	Diode Reverse Recovery Charge		Tc =25℃	-	450	-	nC
			Tc =100℃	-	585	-	

Thermal Characteristics and Weight

Symbol	Parameter	Conditions	Values			Unit
			Min.	Typ.	Max.	
$R_{\theta JC}$	Junction-to-Case(IGBT Part, Per 1/2 Module)		-	-	0.26	℃/W
$R_{\theta JC}$	Junction-to-Case(DIODE Part, Per 1/2 Module)		-	-	0.6	℃/W
$R_{\theta CS}$	Case-to-Sink (Conductive grease applied)		0.05	-	-	℃/W
Weight	Weight of Module		-	-	200	g

Performance Curves

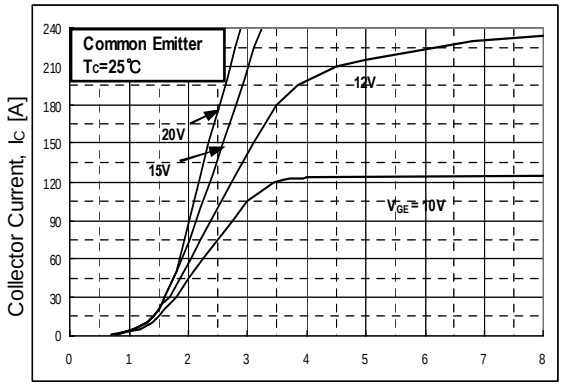


Fig 1. Typical Output characteristics

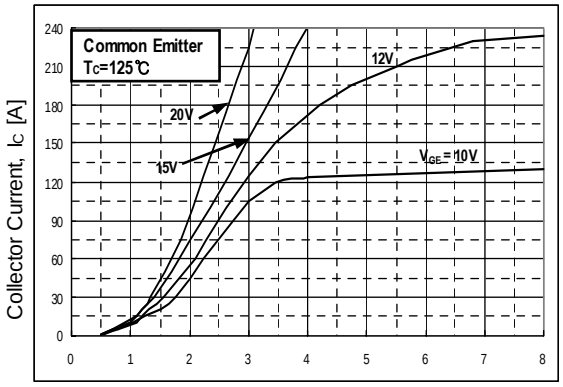


Fig 2. Typical Output characteristics

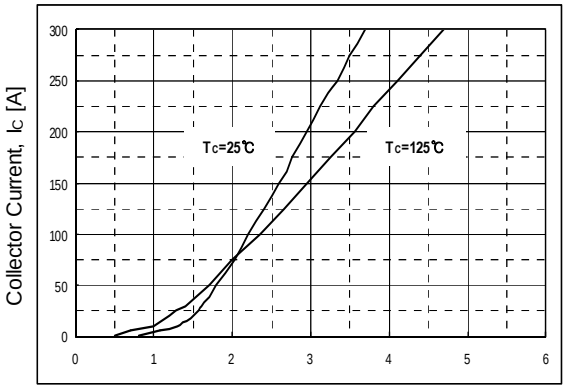


Fig 3. Typical Output characteristics

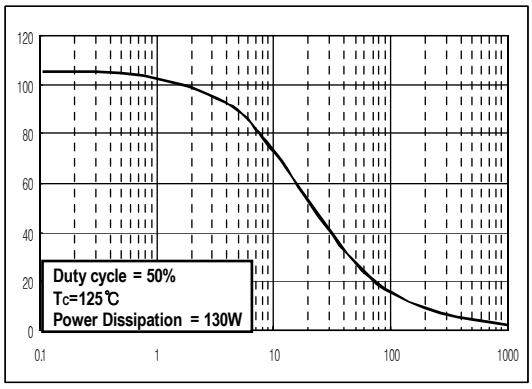


Fig 4. Load Current vs. Frequency

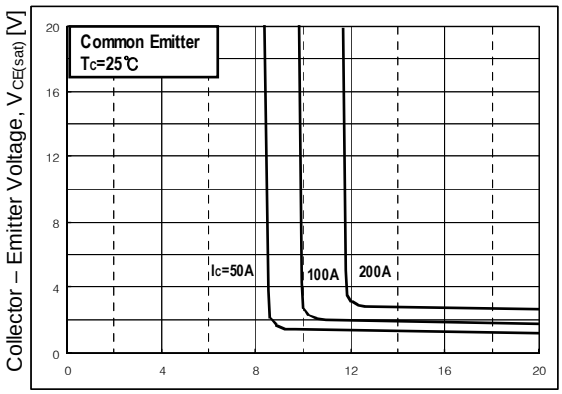


Fig 5. Typical Saturation Voltage vs. V_{GE}

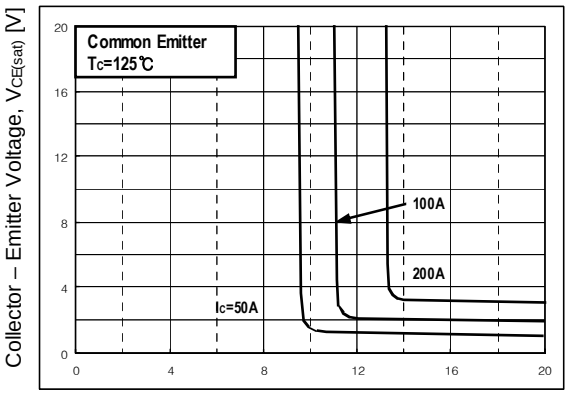


Fig 6. Typical Saturation Voltage vs. V_{GE}

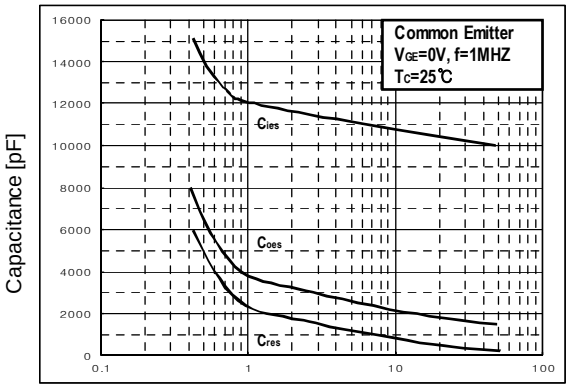


Fig 7. Capacitance characteristics

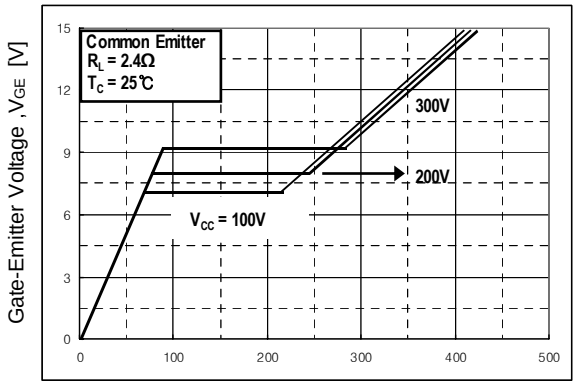


Fig 8. Gate Charge Characteristics

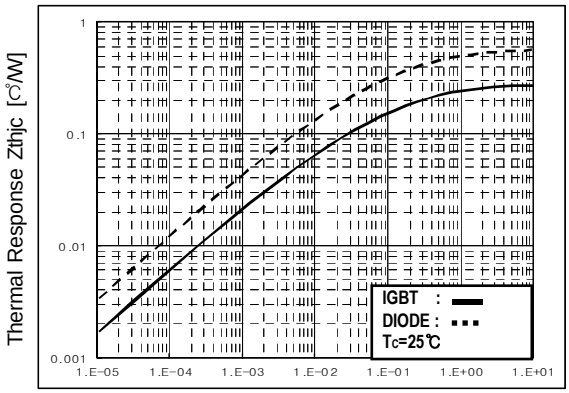


Fig 9. Transient Thermal Impedance

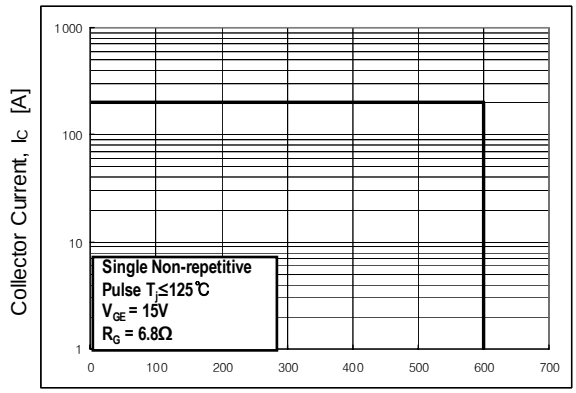


Fig 10. RBSOA Characteristic

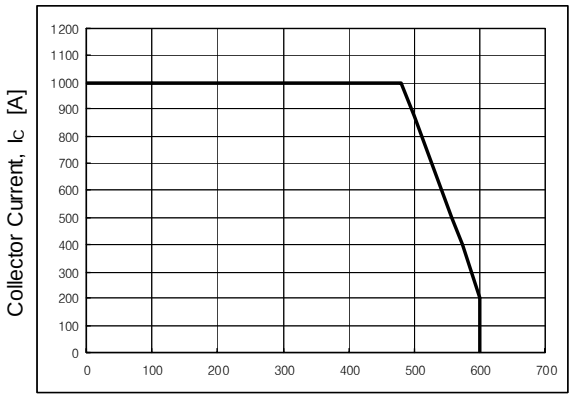


Fig 11. SCSOA Characteristic

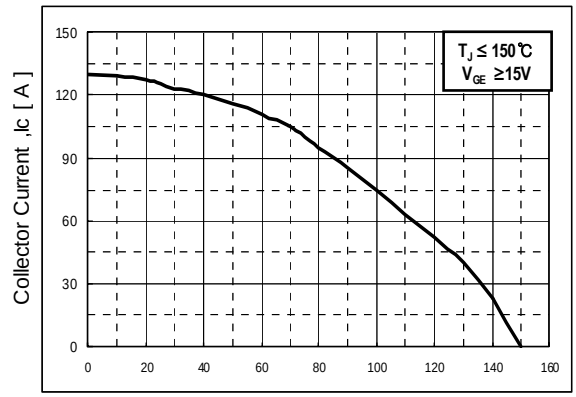


Fig 12. rated Current vs. Case Temperature

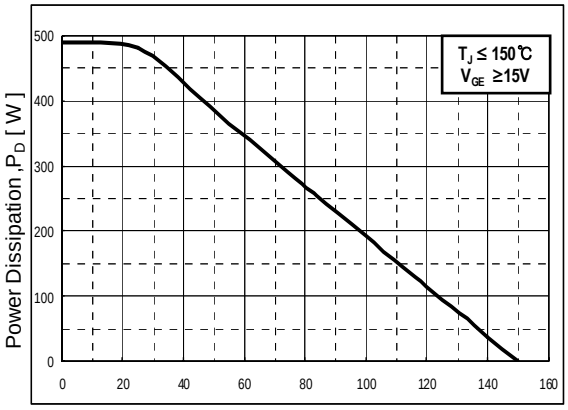


Fig 13. Power Dissipation vs. Case Temperature

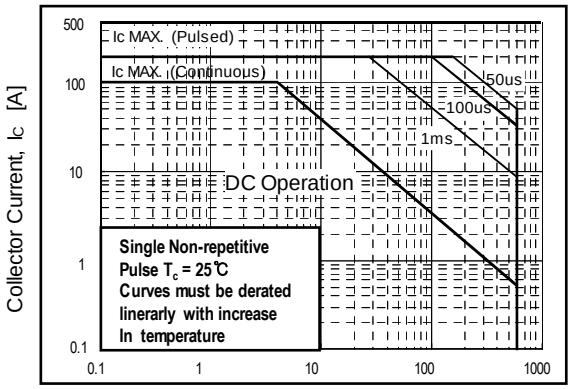


Fig14. SOA characteristics

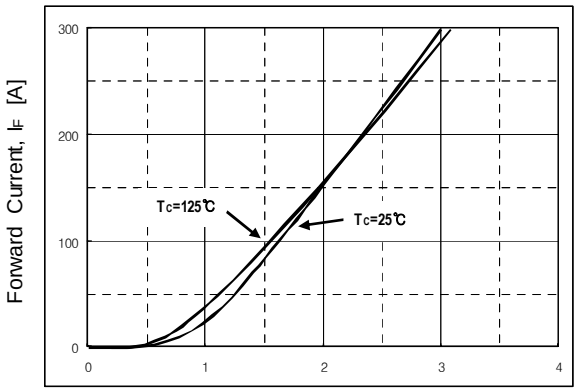


Fig 15. Forward characteristics

Package Out Line Information

7DM-1

UNIT : mm