

## High Power Lugged 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.

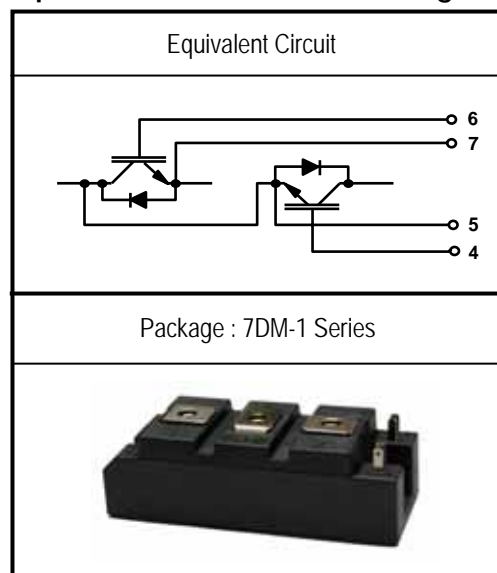
### Features

- 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



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	-	$\pm 20$	V
$I_C$	Collector Current	$T_C = 25$	75	A
		$T_C = 75$	50	A
$I_{CM(1)}$	Pulsed Collector Current	-	100	A
$I_F$	Diode Continuous Forward Current	$T_C = 100$	50	A
$I_{FM}$	Diode Maximum Forward Current	-	100	A
$T_{SC}$	Short Circuit Withstand Time	$T_C = 100$	10	uS
$P_D$	Maximum Power Dissipation	$T_C = 25$	275	W
$T_j$	Operating Junction Temperature	-	-40 ~ 150	
$T_{stg}$	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

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

Symbol	Parameter	Conditions	Values			Unit
			Min.	Typ.	Max.	
$BV_{CES}$	C - E Breakdown Voltage	$V_{GE} = 0V, I_C = 250\mu A$	600	-	-	V
$BV_{CES}/T_J$	Temperature Coeff. of Breakdown Voltage	$V_{GE} = 0V, I_C = 1.0mA$	-	0.6	-	V/
$V_{GE(th)}$	G - E threshold voltage	$I_C = 50mA, V_{CE} = V_{GE}$	5	6.0	8.5	V
$I_{CES}$	Collector cutoff Current	$V_{CE} = 600V, V_{GE} = 0V$	-	-	250	$\mu A$
$I_{GES}$	G - E leakage Current	$V_{GE} = \pm 20V$	-	-	$\pm 100$	nA
$V_{CE(sat)}$	Collector to Emitter saturation voltage	$I_C = 50A, V_{GE} = 15V @ T_C = 25$	-	2.1	2.8	V
		$I_C = 50A, V_{GE} = 15V @ T_C = 100$	-	2.4	-	V
$C_{ies}$	Input capacitance	$V_{GE} = 0V, f = 1MHz$	-	3460	-	pF
$C_{oes}$	Output capacitance	$V_{CE} = 30V$	-	480	-	pF
$C_{res}$	Reverse transfer capacitance		-	140	-	pF
$t_{d(on)}$	Turn on delay time	$V_{CC} = 300V, I_C = 50A$	-	20	-	nS
$t_r$	Turn on rise time	$V_{GE} = 15V$	-	30	-	nS
$t_{d(off)}$	Turn off delay time	$R_G = 6.2$	-	60	-	nS
$t_f$	Turn off fall time	Inductive Load	-	100	200	nS
$E_{on}$	Turn on Switching Loss		-	1.1	-	mJ
$E_{off}$	Turn off Switching Loss		-	2.4	-	mJ
$E_{ts}$	Total Switching Loss		-	3.5	-	mJ
$T_{sc}$	Short Circuit Withstand Time	$V_{CC} = 300V, V_{GE} = 15V, R_G = 6.2$ $@ T_C = 100$	10	-	-	$\mu S$
$Q_g$	Total Gate Charge	$V_{CC} = 300V$	-	145	210	nC
$Q_{ge}$	Gate-Emitter Charge	$V_{GE} = 15V$	-	28	40	nC
$Q_{gc}$	Gate-Collector Charge	$I_C = 50A$	-	65	95	nC

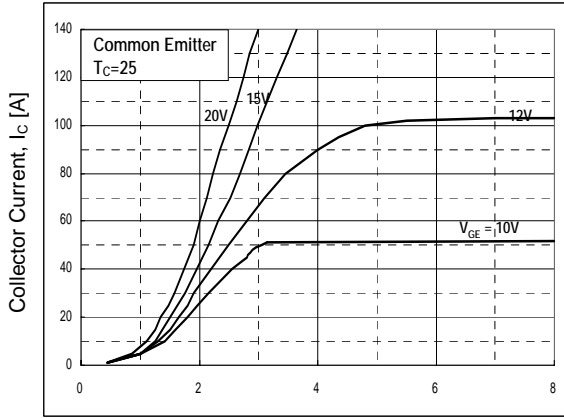
**Electrical Characteristics of FRD @  $T_c=25$  (unless otherwise specified)**

Symbol	Parameter	Conditions	Values			Unit
			Min.	Typ.	Max.	
$V_{FM}$	Diode Forward Voltage	$I_F=50A$	$T_c=25$	-	1.3	V
			$T_c=100$	-	1.2	
$t_{rr}$	Diode Reverse Recovery Time	$I_F=50A, V_R=300V$ $di/dt= -200A/\mu S$	$T_c=25$	-	110	nS
			$T_c=100$	-	120	
$I_{rr}$	Diode Peak Reverse Recovery Current		$T_c=25$	-	9	A
			$T_c=100$	-	13	
$Q_{rr}$	Diode Reverse Recovery Charge		$T_c=25$	-	495	nC
			$T_c=100$	-	780	

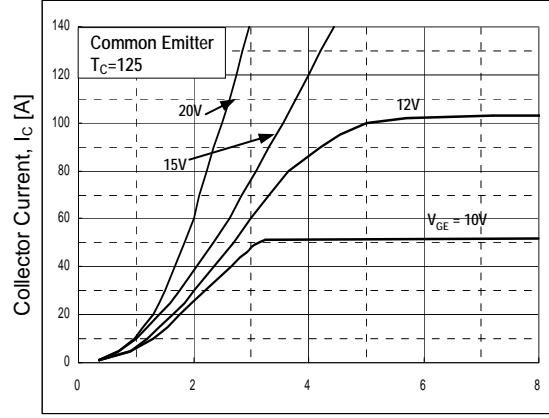
**Thermal Characteristics and Weight**

Symbol	Parameter	Conditions	Values			Unit
			Min.	Typ.	Max.	
$R_{JC}$	Junction-to-Case(IGBT Part, Per 1/2 Module)		-	-	0.45	/W
$R_{JC}$	Junction-to-Case(DIODE Part, Per 1/2 Module)		-	-	0.8	/W
$R_{CS}$	Case-to-Sink (Conductive grease applied)		0.05	-	-	/W
Weight	Weight of Module		-	-	200	g

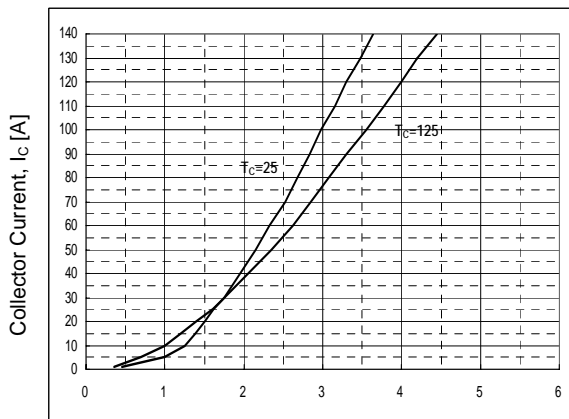
**Performance Curves**



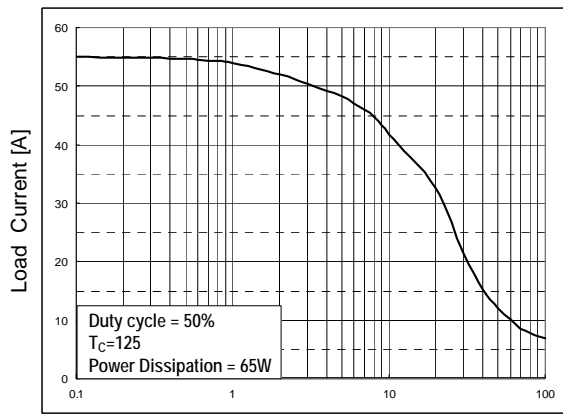
**Fig 1. Typical Output characteristics**



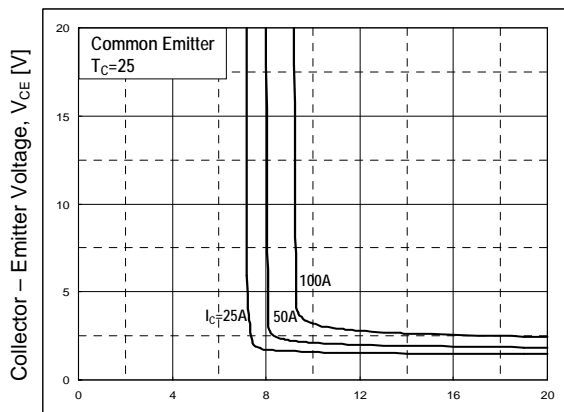
**Fig 2. Typical Output characteristics**



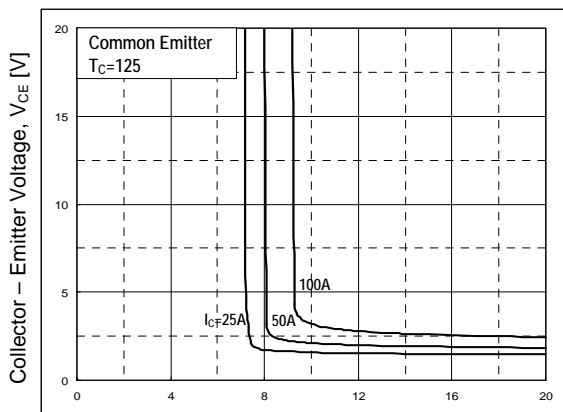
**Fig 3. Typical Saturation Voltage characteristics**



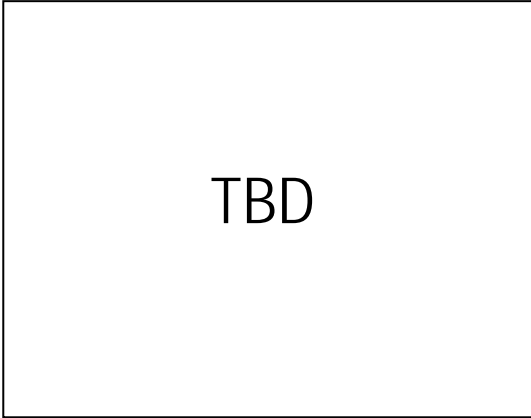
**Fig 4. Load Current vs. Frequency**



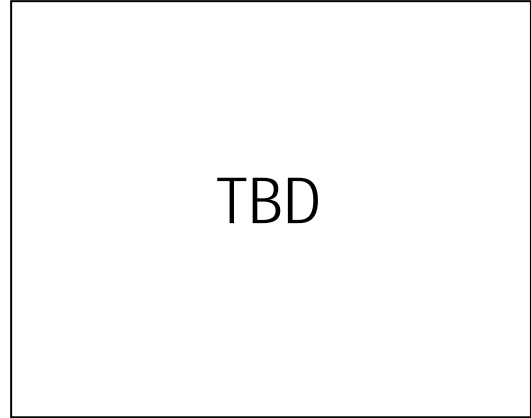
**Fig 5. Typical Saturation Voltage vs. Vge**



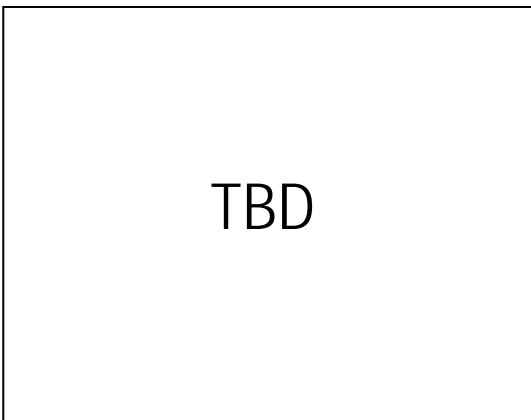
**Fig 6. Typical Saturation Voltage vs. Vge**



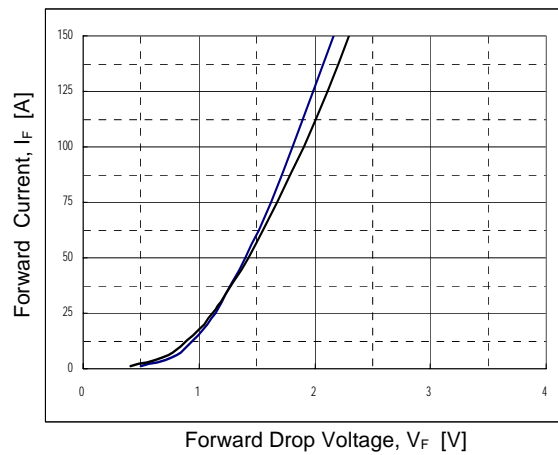
**Fig 7. Capacitance characteristics**



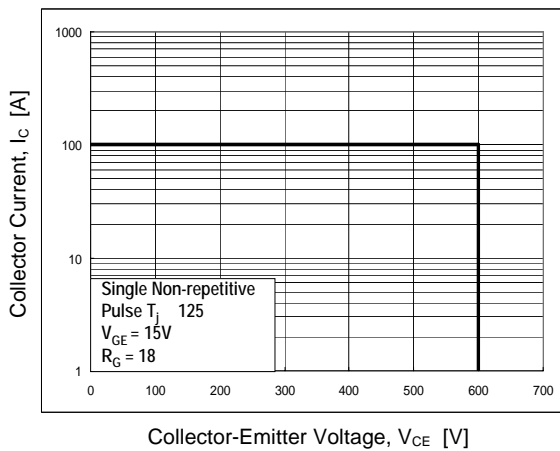
**Fig 8. Gate Charge characteristics**



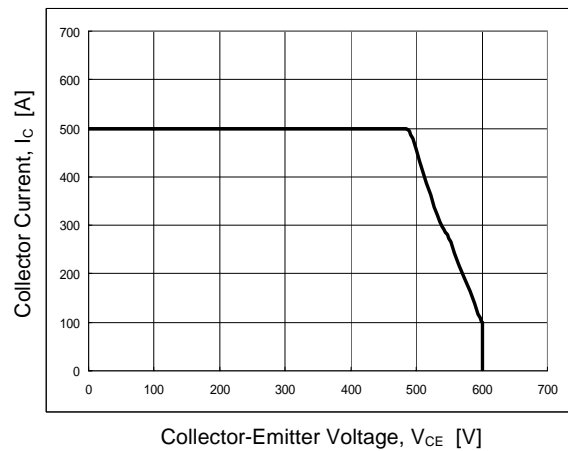
**Fig 9. Transient Thermal Impedance**



**Fig 10. Forward characteristics**



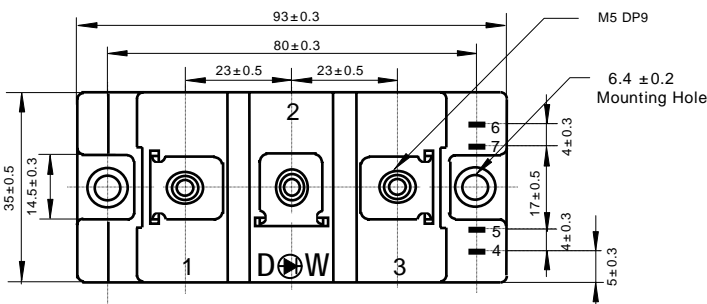
**Fig 11. RBSOA Characteristic**



**Fig 12. SCSOA Characteristic**

Package Out Line Information

7DM-1



Dimensions in mm

