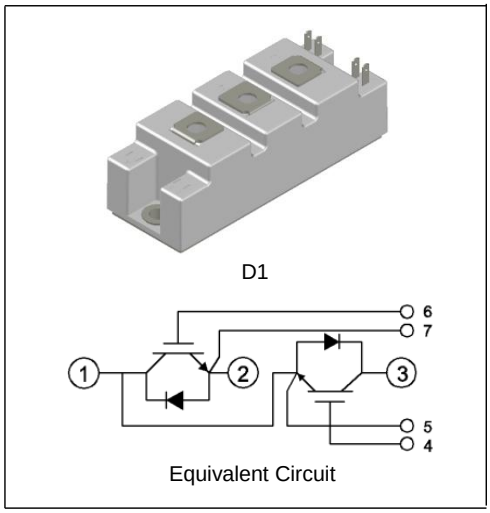
NPT & The Third Generation Technology 1200V IGBT Module

Description

The IGBT Module D1 package devices are optimized to reduce losses and switching noise in high frequency power conditioning electrical systems.

These IGBT Module series are ideally suited for IH ,High Power inverters, Motors drives and other applications where switching losses are significant portion of the total losses.



Features

- BV_{CES}=1200V
- Low Conduction Loss: $V_{CE(sat)}$ =2.8V @I_C=75A
- Fast & Soft Anti-Parallel FWD
- Short Circuit rated:10us at T_C=100℃
- Isolation Type Package

Applications

- Induction Heating, Motor Drives, High Power Inverters
- Welding Machine, UPS

Absolute Maximum Ratings (at T_C=25 ℃ unless otherwise noted)

Symbol	Parameter		Ratings	Unit
V_{CES}	Collector to Emitter Voltage		1200	V
V_{GES}	Gate to Emitter Voltage		±20	V
I_C	Collector Current	T_C=25℃	100	A
		T_C=100℃	75	A
I_{CM}	Pulsed Collector Current , tp=1ms		150	A
I_F	Diode Continuous Forward Current	T_C=100℃	75	A
I_{FM}	Diode Maximum Forward Current		150	A
P_D	Maximum Power Dissipation		300	W
T_J	Operating Junction Temperature Range		-55~+150	℃
T_{STG}	Storage Temperature Range		-55~+125	℃
V_{iso}	Isolation Voltage	AC 1minute	2500	V
	Mounting screw Torque: M5		4	N.M
	Weight		155	g

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{th\ (J\text{-}C)}$ (Per IGBT)	Thermal Resistance, Junction to case for IGBT	0.41	℃/W
$R_{th\ (J\text{-}C)}$ (Per Diode)	Thermal Resistance, Junction to case for Diode	0.6	℃/W
$R_{th\ (C\text{-}S)}$ (Per Package)	Thermal Resistance, Case to Sink	0.05	℃/W

Electrical Characteristics of IGBT @T_C=25 ℃ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{CES}	Collector to Emitter Breakdown Voltage	V_{GE}=0V, I_C=1mA	1200	-	-	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C=75A, V_{GE}=15V	-	2.8	3.4	V
		I_C=75A, V_{GE}=15V, T_C=100℃	-	3.4	-	V
$V_{GE(th)}$	Gate Threshold Voltage	V_{CE}=V_{GE}, I_C=2mA	4.5	-	7.5	V
I_{CES}	Zero Gate Voltage Collector Current	V_{CE}=V_{CES}, V_{GE}=0V	-	-	1	mA
I_{GES}	Gate to Emitter Leakage Current	V_{GE}=V_{GES}, V_{CE}=0V	-	-	±250	nA

Electrical Characteristics of Diode @T_C=25 ℃ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	I_F=75A	-	3.0	3.5	V
		I_F=75A, T_C=100℃	-	2.4	-	V
t_{rr}	Diode Reverse Recovery Time	I_F=75A, di/dt=-200A/us	-	120	-	ns
I_{rr}	Diode Peak Reverse Recovery Current		-	12.3	-	A
Q_{rr}	Diode Reverse Recovery Charge		-	700	-	nC
t_{rr}	Diode Reverse Recovery Time	I_F=75A, di/dt=-200A/us T_C=100℃	-	300	-	ns
I_{rr}	Diode Peak Reverse Recovery Current		-	20.0	-	A
Q_{rr}	Diode Reverse Recovery Charge		-	3200	-	nC

Switching Characteristics @T_C=25 ℃ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	I_C=75A, V_{CC}=600V, V_{GE}=±15V, R_G=10Ω, Inductive Load	-	50	-	ns
t_r	Turn-on Rise Time		-	60	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	240	-	ns
t_f	Turn-off Fall Time		-	60	-	ns
E_{on}	Turn-on Switching Loss		-	2.7	-	mJ
E_{off}	Turn-off Switching Loss		-	3.6	-	mJ
E_{ts}	Total Switching Loss		-	6.1	-	mJ
C_{ies}	Input Capacitance	V_{GE}=0V, V_{CE}=30V, f=1.0MHz	-	4080	-	pF
C_{res}	Reverse Transfer Capacitance		-	444	-	pF
C_{oes}	Output Capacitance		-	150	-	pF
Q_g	Total Gate Charge	I_C=75A, V_{CC}=600V V_{GE}=±15V	-	300	-	nC
Q_{ge}	Gate to Emitter Charge		-	33	-	nC
Q_{gc}	Gate to Collector Charge		-	177	-	nC
t_{sc}	Short Circuit Withstand Time	V_{CC}=600V,V_{GE}=±15V R_G=10Ω @T_C=100℃	10	-	-	us

Typical Performance Characteristics

Fig. 1. Typical Output Characteristics

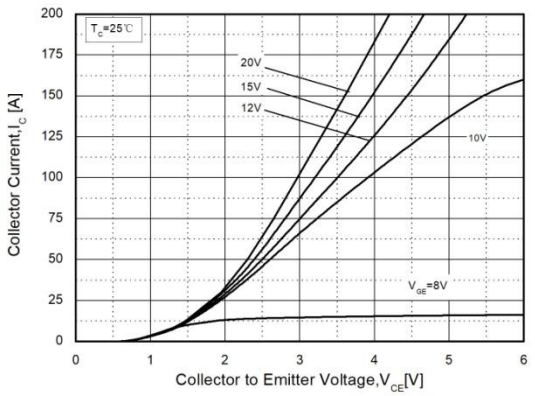


Fig. 2. Typical Output Characteristics

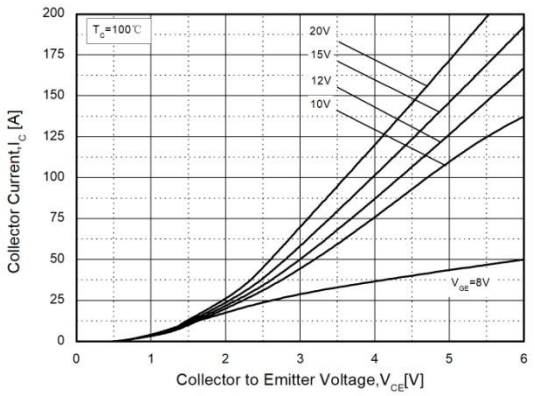


Fig. 3. Typical Saturation Voltage Characteristics

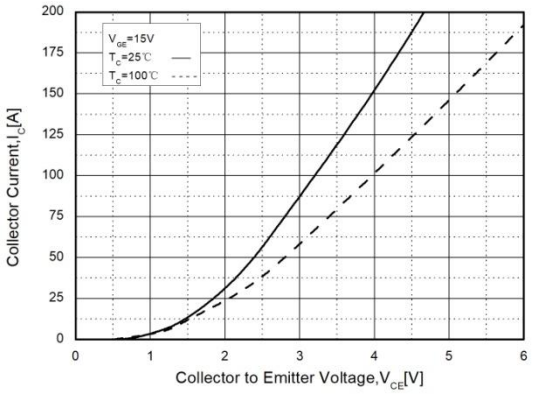


Fig. 4. Gate Charge Characteristics

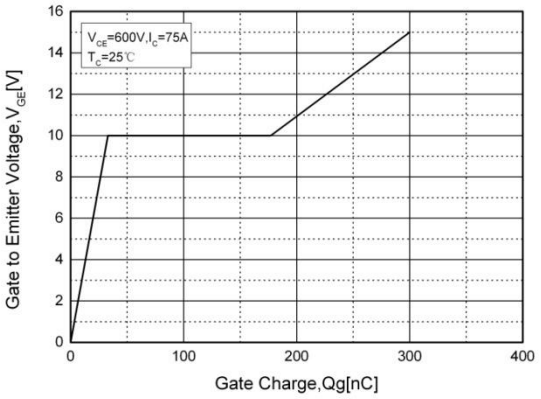


Fig. 5. Turn-on Characteristics vs. R_G

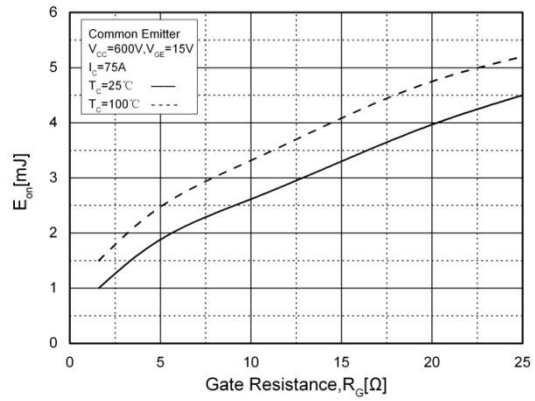
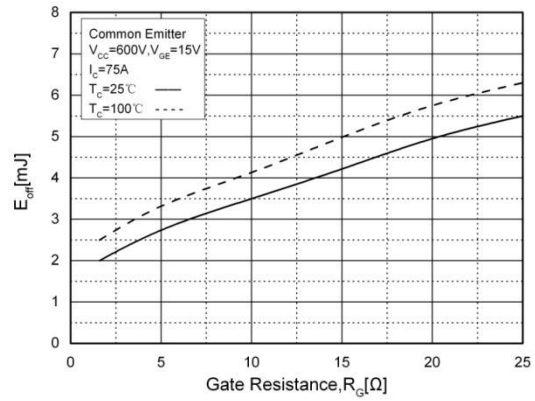


Fig. 6. Turn-off Characteristics vs. R_G



Typical Performance Characteristics

Fig. 7. Rate Current vs. T_C

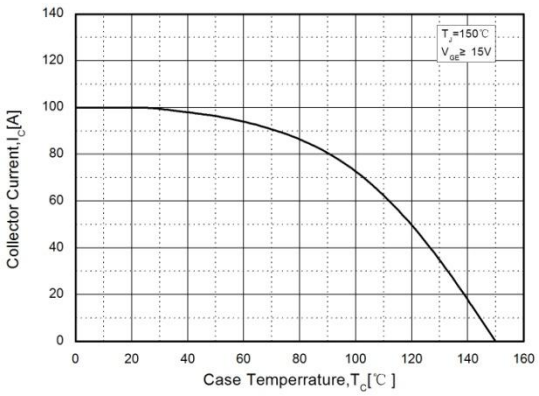


Fig. 8. Power Dissipation vs. T_C

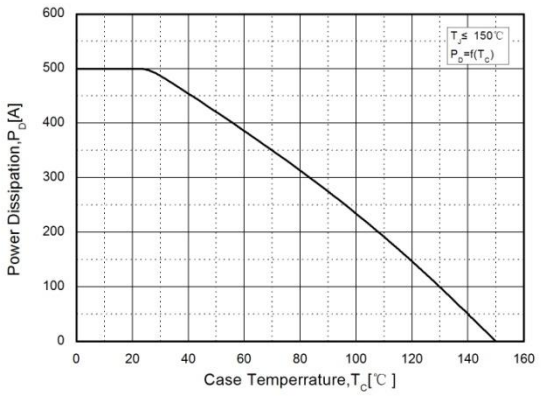


Fig. 9. Transient Thermal Impedance

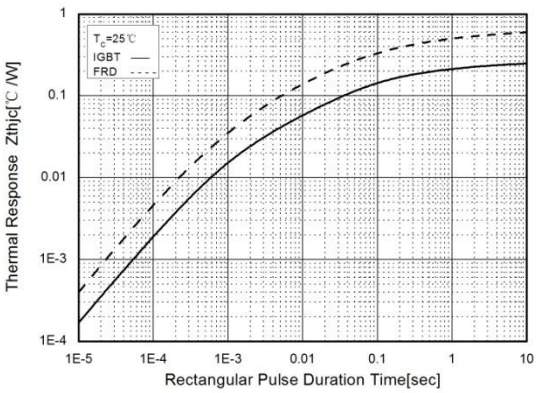
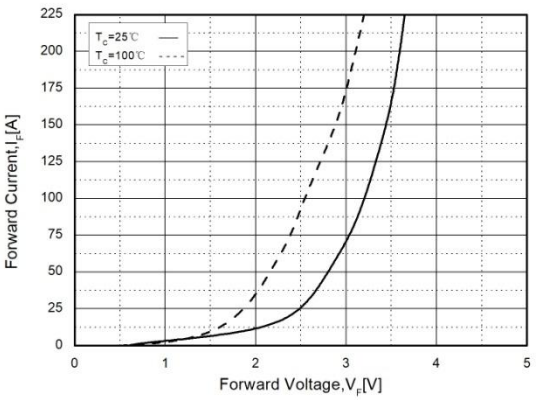
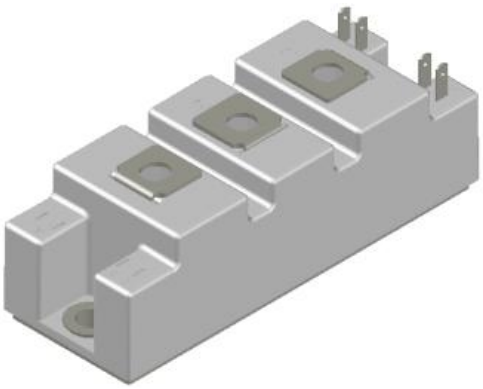


Fig. 10. Forward Characteristics



Package Dimensions

D1



(Dimensions in Millimeters)