

# NP100RT12K2T

## NPT & Rugged Type 1200V IGBT Module

### Features

- $BV_{CES}=1200V$
- Low Conduction Loss:  $V_{CE(sat)} = 3.0V @ I_C=100A$
- Fast & Soft Anti-Parallel FWD
- Short Circuit rated: 10us at  $T_C=100^\circ C$
- Isolation Type Package

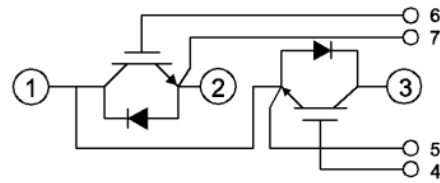
### Applications

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

### Description

The IGBT Module 7SM-1 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.



Equivalent Circuit



package

### Absolute Maximum Ratings(at $T_C=25^\circ C$ )

Symbol	Parameter	Ratings	Unit	
$V_{CES}$	Collector to Emitter Voltage	1200	V	
$V_{GES}$	Gate to Emitter Voltage	$\pm 20$	V	
$I_C$	Collector Current	$T_C=25^\circ C$	150	A
		$T_C=100^\circ C$	100	A
$I_{CM}$	Pulsed Collector Current , $t_p=1ms$	200	A	
$I_F$	Diode Continuous Forward Current	$T_C=100^\circ C$	75	A
$I_{FM}$	Diode Maximum Forward Current		150	A
$P_D$	Maximum Power Dissipation	$T_C=25^\circ C$	625	W
$T_J$	Operating Junction Temperature Range		-55~+150	$^\circ C$
$T_{STG}$	Storage Temperature Range		-55~+125	$^\circ C$
$V_{iso}$	Isolation Voltage	AC 1minute	2500	V
	Mounting screw Torque: M6		4	N.M
	Weight		155	g

### Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{th(J-C)}$ (IGBT)	Thermal Resistance, Junction to case for IGBT	0.2	$^\circ C/W$
$R_{th(J-C)}$ (Diode)	Thermal Resistance, Junction to case for Diode	0.45	$^\circ C/W$
$R_{th(J-A)}$	Thermal Resistance, Junction to Ambient	0.05	$^\circ C/W$

### Electrical Characteristics of IGBT@T<sub>c</sub>=25 °C

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>CES</sub>	Collector to Emitter Breakdown Voltage	V <sub>GE</sub> =0V, I <sub>C</sub> =1mA	1200	-	-	V
V <sub>CE(sat)</sub>	Collector to Emitter Saturation Voltage	I <sub>C</sub> =100A, V <sub>GE</sub> =15V	-	3.0	3.6	V
		I <sub>C</sub> =100A, V <sub>GE</sub> =15V, T <sub>C</sub> =100°C	-	3.9	-	V
V <sub>GE(th)</sub>	Gate Threshold Voltage	V <sub>CE</sub> =V <sub>GE</sub> , I <sub>C</sub> =2mA	4.5	-	7.5	V
I <sub>CES</sub>	Zero Gate Voltage Collector Current	V <sub>CE</sub> =V <sub>CES</sub> , V <sub>GE</sub> =0V	-	-	1	mA
I <sub>GES</sub>	Gate to Emitter Leakage Current	V <sub>GE</sub> =V <sub>GES</sub> , V <sub>CE</sub> =0V	-	-	±250	nA

### Electrical Characteristics of Diode@T<sub>c</sub>=25 °C

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit		
V <sub>F</sub>	Diode Forward Voltage	I <sub>F</sub> =75A	-	2.15	2.5	V		
		I <sub>F</sub> =75A, T <sub>C</sub> =100°C	-	1.8	-	V		
t <sub>rr</sub>	Diode Reverse Recovery Time	I <sub>F</sub> =75A, di/dt=-200A/us	-	160	-	ns		
I <sub>rr</sub>	Diode Peak Reverse Recovery Current		-	16	-	A		
Q <sub>rr</sub>	Diode Reverse Recovery Charge		-	1400	-	nC		
t <sub>rr</sub>	Diode Reverse Recovery Time	I <sub>F</sub> =75A, di/dt=-200A/us T <sub>C</sub> =100°C	-	320	-	ns		
			I <sub>rr</sub>	Diode Peak Reverse Recovery Current	-	28	-	A
			Q <sub>rr</sub>	Diode Reverse Recovery Charge	-	10000	-	nC

### Switching Characteristics@T<sub>c</sub>=25 °C

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit	
t <sub>d(on)</sub>	Turn-on Delay Time	I <sub>C</sub> =100A, V <sub>CC</sub> =600V, V <sub>GE</sub> =±15V, R <sub>G</sub> =10Ω, Inductive Load	-	95	-	ns	
t <sub>r</sub>	Rise Time		-	70	-	ns	
t <sub>d(off)</sub>	Turn-off Delay Time		-	400	-	ns	
t <sub>f</sub>	Fall Time		-	60	-	ns	
E <sub>on</sub>	Turn-on Switching Loss		-	5.0	-	mJ	
E <sub>off</sub>	Turn-off Switching Loss		-	7.0	-	mJ	
E <sub>ts</sub>	Total Switching Loss		-	12.0	-	mJ	
C <sub>ies</sub>	Input Capacitance		V <sub>GE</sub> =0V, V <sub>CE</sub> =30V, f=1.0MHz	-	4760	-	pF
C <sub>res</sub>	Reverse Transfer Capacitance			-	518	-	pF
C <sub>oes</sub>	Output Capacitance			-	175	-	pF
Q <sub>g</sub>	Total Gate Charge	I <sub>C</sub> =100A, V <sub>CC</sub> =600V V <sub>GE</sub> =±15V	-	400	-	nC	
Q <sub>ge</sub>	Gate to Emitter Charge		-	44	-	nC	
Q <sub>gc</sub>	Gate to Collector Charge		-	236	-	nC	
t <sub>sc</sub>	Short Circuit Withstand Time	V <sub>CC</sub> =600V, V <sub>GE</sub> =±15V R <sub>G</sub> =10Ω @T <sub>C</sub> =100°C	10	-	-	us	

# Typical Performance Characteristics

Fig. 1. Typical Output Characteristics

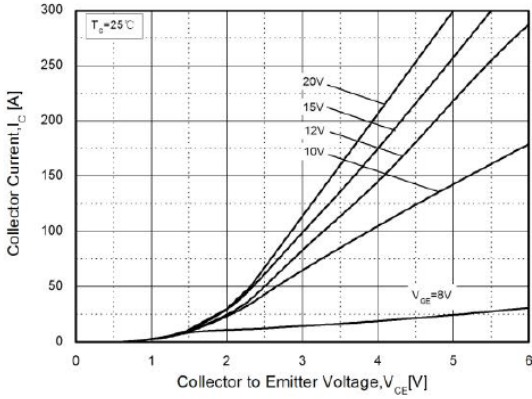


Fig. 2. Typical Output Characteristics

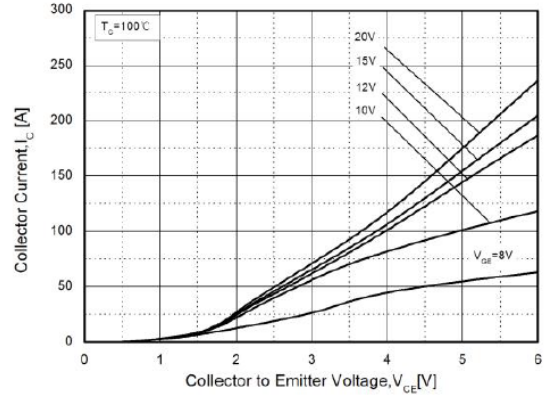


Fig. 3. Typical Saturation Voltage Characteristics

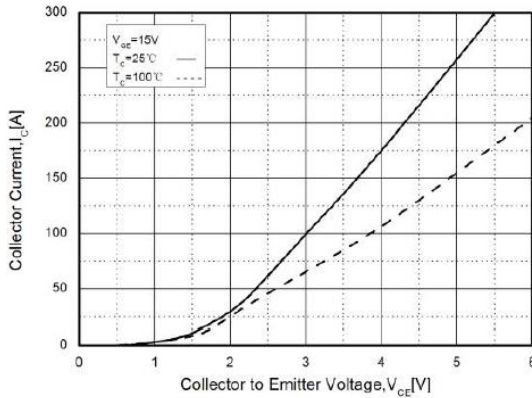


Fig. 4. Gate Charge Characteristics

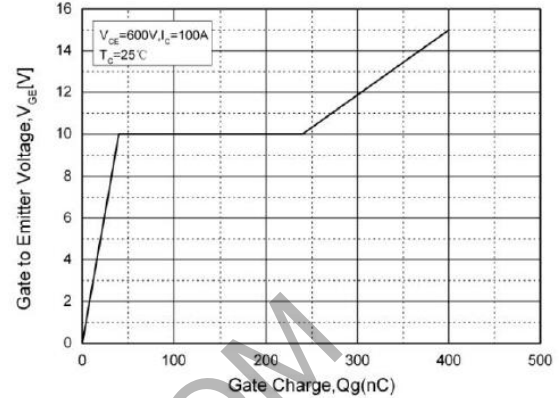


Fig. 5. Turn-on Characteristics vs.  $R_G$

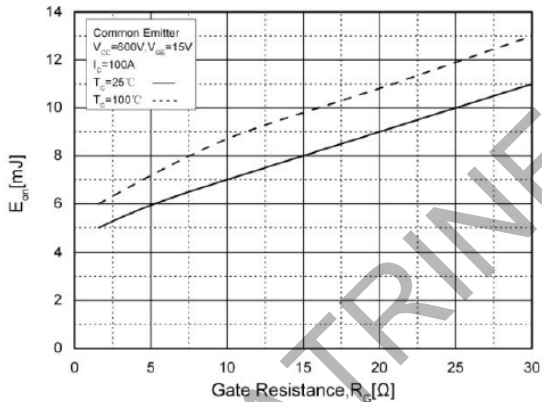
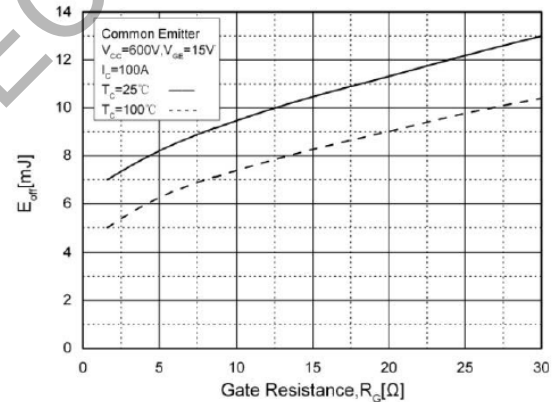


Fig. 6. Turn-off Characteristics vs.  $R_G$



## Typical Performance Characteristics

Fig. 7. Rate Current vs.  $T_C$

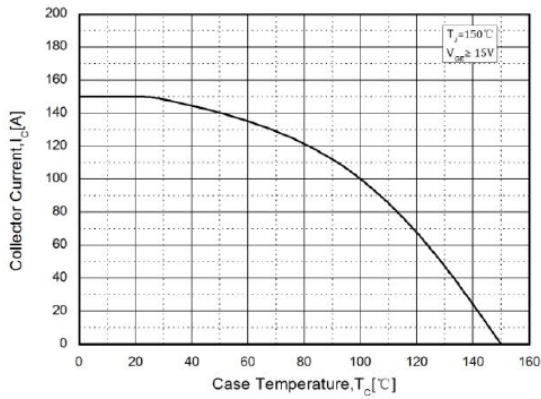


Fig. 8. Power Dissipation vs.  $T_C$

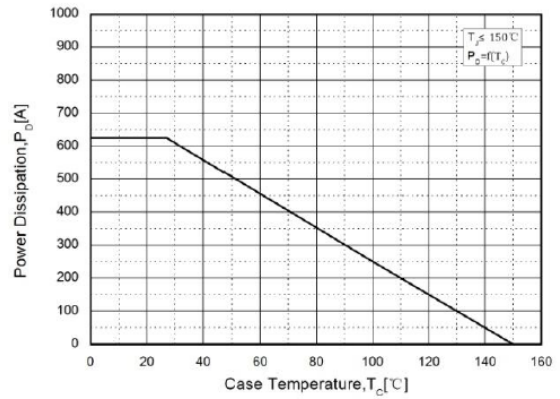


Fig. 9. Transient Thermal Impedance

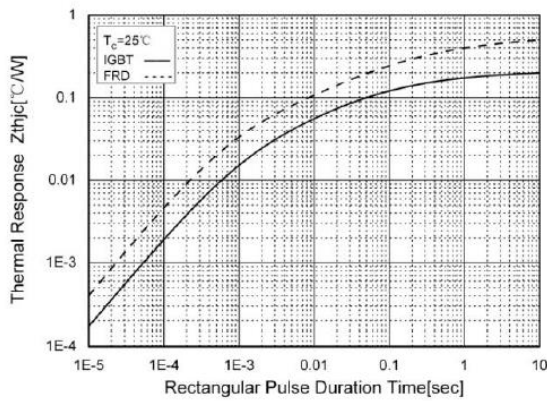
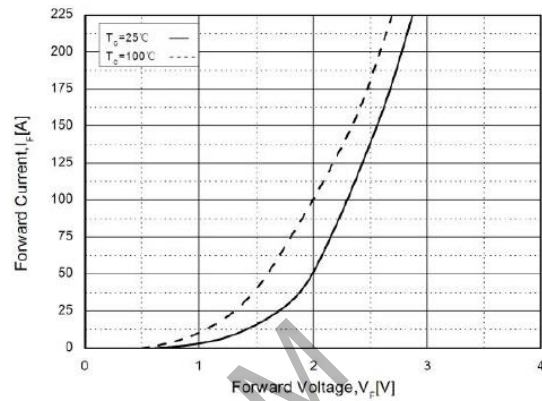
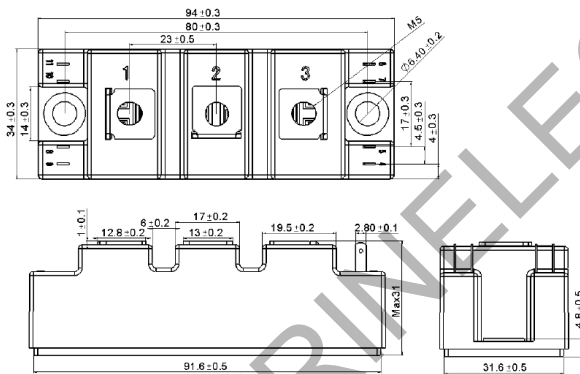


Fig. 10. Forward Characteristics



(Dimensions in Millimeters)



**DISCLAIMER:**

The products are not designed for use in hostile environments, including, without limitation, aircraft, nuclear power generation, medical appliances, and devices or systems in which malfunction of any product can reasonably be expected to result in a personal injury. Seller's customers using or selling seller's products for use in such applications do so at their own risk and agree to fully defend and indemnify Seller.