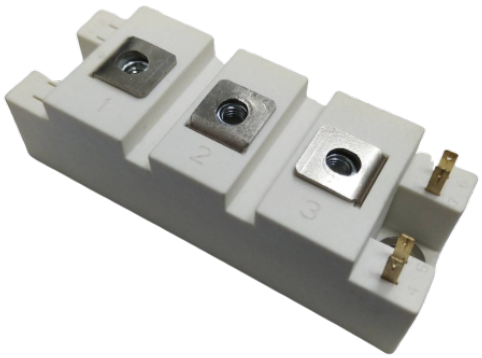
IGBT Module-Dual
75A / 1200V



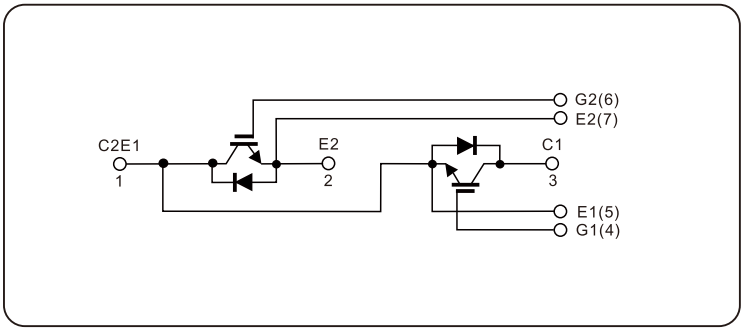
FEATURES

- Square RBSOA
- Ultra low saturation voltage:
  $V_{CE(sat)}$ = 2.00V(typ.) @ I_C = 75A, V_{GE} = 15V, T_J = 25°C
- High speeding switching
- Less power dissipation
- Low switching losses
- $T_{vj(op)}$ = 150°C
- Suitable for working up to 20KHz
- Minimized internal stray inductance

APPLICATIONS

- Uninterruptible Power Supplies
- Inverters
- Welders
- High power converters
- Motor drives

Equivalent Circuit



ABSOLUTE MAXIMUM RATINGS (at T_C=25°C unless otherwise specified)				
SYMBOL	PARAMETER AND TEST CONDITIONS		VALUE	UNIT
V_{CES}	Collector to emitter voltage (G-E short)		1200	V
V_{GES}	Gate to emitter voltage (C-E short)		±30	V
I_C	DC collector current	T_C = 100 °C	75	A
I_{CM}[1]	Pulsed collector current (Pulse ≤ 1ms)	T_C = 25 °C	150	
I_F	Diode forward current (DC)	T_C = 25 °C	75	
I_{FM}[1]	Maximum diode pulsed forward current (Pulse ≤ 1ms)		150	
t_{SC}[2]	Minimum short circuit withstand time, V_{GE} = 15V, V_{CC} ≤ 720V, T_j = 150°C		10	μS
P_D	Maximum power dissipation	T_J = 25 °C	350	W
T_J	Operation junction temperature		-40 to 150	°C
T_{stg}	Storage temperature range		-40 to 125	
V_{ISO}	Isolation voltage (Terminal to Base, AC, f=60Hz, 1 minute)		3500	$V_{(RMS)}$
F_T	Mounting torque	Module base to heatsink, M6	3.0	N.m
		Busbar to terminal, M5	2.0	

Notes:
1. Repetitive rating: Pulse width limited by max. junction temperature.
2. Allowed number of short circuits: <1000; time between short circuits: >1s.

THERMAL RESISTANCE

SYMBOL	PARAMETER AND TEST CONDITIONS	VALUE			UNIT
		MIN.	TYP.	MAX.	
$R_{th(j-c)}$	IGBT thermal resistance, junction to case (per leg)	-	-	0.36	°C/W
$R_{th(j-c)}$	Diode thermal resistance, junction to case (per leg)	-	-	0.56	
$R_{th(c-h)}$	IGBT thermal resistance, case to heatsink (per leg)	-	0.08	-	
$R_{th(c-h)}$	Diode thermal resistance, case to heatsink (per leg)	-	0.14	-	
W_t	Weight	-	150(5.3)	-	g (oz.)

◎ ELECTRICAL CHARACTERISTIC OF IGBT (at T_J = 25°C, unless otherwise specified)

STATIC CHARACTERISTIC

SYMBOL	PARAMETER	TEST CONDITIONS		VALUE			UNIT
				Min.	TYP.	MAX.	
I_{CES}	Collector to Emitter cut-off current	V_{CE} = 1200V, V_{GE} = 0V		-	-	10	μA
I_{GES}	Gate to emitter leakage current	V_{GE} = V_{GES}, V_{CE} = 0V		-	-	100	nA
$V_{(BR)CES}$	Collector to emitter breakdown voltage	V_{GE} = 0V, I_C= 250μA		1200	-	-	V
$V_{CE(sat)}$	Collector to emitter saturation voltage	V_{GE} = 15V, I_C = 75A	T_C = 25 °C	-	2.00	2.30	
			T_C = 125 °C	-	2.30	-	
$V_{GE(th)}$	Gate to emitter threshold voltage	V_{CE} = 10V, I_C = 1mA		5.0	-	6.5	

DYNAMIC CHARACTERISTIC

SYMBOL	PARAMETER	TEST CONDITIONS	VALUE			UNIT
			Min.	TYP.	MAX.	
C_{ies}	Input capacitance	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz	-	5500	-	pF
C_{oes}	Output capacitance		-	360	-	
C_{res}	Reverse transfer capacitance		-	260	-	
Q_g	Gate charge	V_{CE} = 600V, I_C = 75A, V_{GE} = -15V~+15V	-	800	-	nC

SWITCHING CHARACTERISTIC

SYMBOL	PARAMETER	TEST CONDITIONS	VALUE			UNIT
			Min.	TYP.	MAX.	
$t_{d(on)}$	Turn-on delay time	V_{CE} = 600V, I_C = 75A, V_{GE} = ±15V R_G = 10Ω, inductive load, T_J= 25°C	-	-	180	nS
t_r	Rise time		-	-	100	
$t_{d(off)}$	Turn-off delay time		-	-	400	
t_f	Fall time		-	-	200	
E_{on}	Turn-on energy loss per pulse	V_{CE} = 600V, I_C = I_E =75A, V_{GE} = ±15V R_G = 10Ω, L_S = 60 nH,inductive load, T_J= 125°C	-	8.5	-	mJ
E_{off}	Turn-off energy loss per pulse		-	10	-	
E_{rec}	Reverse recovery energy per pulse		-	5.0	-	

◎ ELECTRICAL CHARACTERISTIC OF DIODE (at T_J = 25°C, unless otherwise specified)

SYMBOL	PARAMETER	TEST CONDITIONS		VALUE			UNIT
				Min.	TYP.	MAX.	
V_{FM}	Maximum diode forward voltage	I_F = 75A, V_{GE} = 0V	T_J = 25 °C	-	2.10	2.35	V
			T_J = 125 °C	-	1.80	-	
			T_J = 150 °C	-	1.80	-	
t_{rr}	Diode reverse recovery time	I_F = 0.5A, I_R = 1.0A, I_{RR} = 0.25A	T_C = 25 °C	-	100	-	nS
		V_R = 600V, I_F = 75A, V_{GE} = ±15V, di/dt = 2000A/μs, R_G = 3.9Ω		-	-	250	
Q_{rr}	Diode reverse recovery charge			-	7.5	-	μC
$R_{CC'+EE'}$	Internal lead resistance	Main terminal to chip (per leg)		-	-	2	mΩ
L_{SCE}	Stray inductance	Main terminal 3 to 2		-	40	-	nH

Ordering Information Tabel

Device code

NSGM	75	GB	120	A	S
①	②	③	④	⑤	⑥

1 - NSGM: for Nell's IGBT Module
2 - Current rating(A): I_C
3 - Circuit type, Dual IGBT with Anti-Parallel FRED(FWD)
4 - Voltage code(V), V_{CES} = code x 10
5 - Case style, "A" for 34 mm IAP Package
6 - Switching speed,"S" for standard speed (below 20KHz)

Fig.1 Typical Output Characteristics

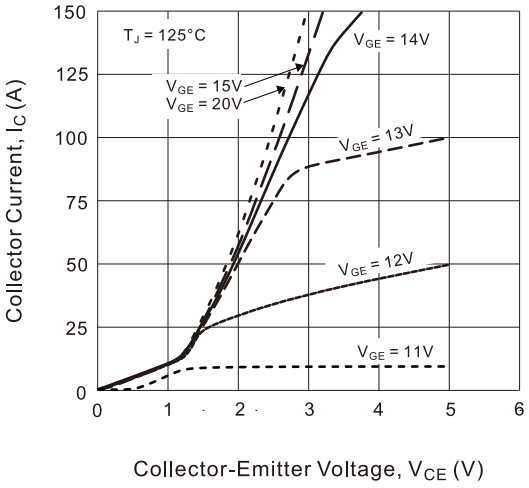


Fig.2 Typical Saturation Voltage Characteristics

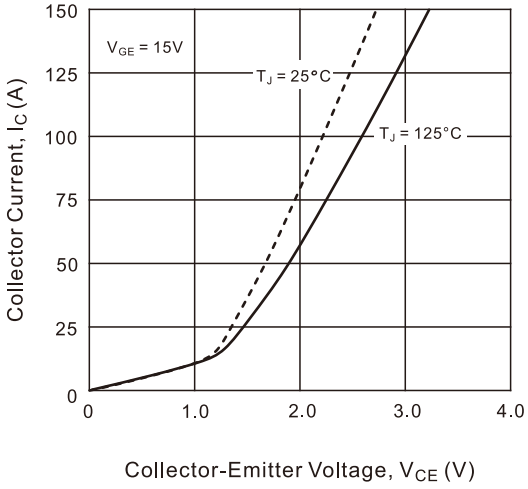


Fig.3 Typical Transfer Characteristics

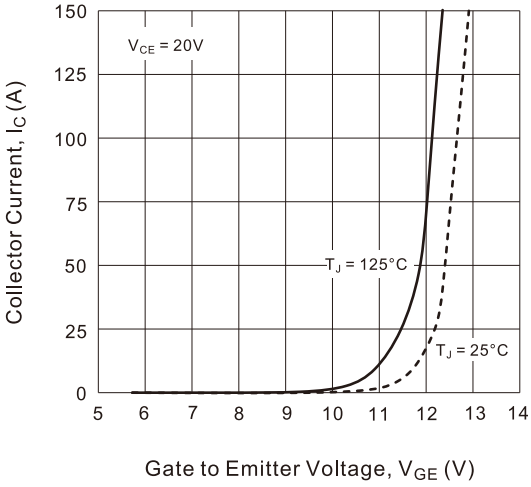


Fig.4 Typical Forward Characteristics of Free Wheeling Diode

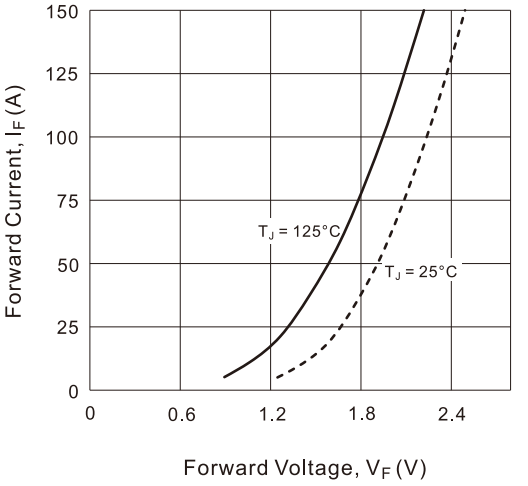


Fig.5a Typical Collector Current vs. Switching Loss

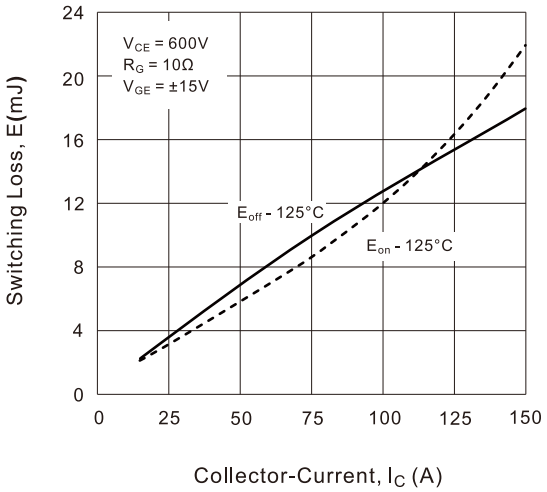


Fig.5b Typical Collector Current vs. Switching Loss

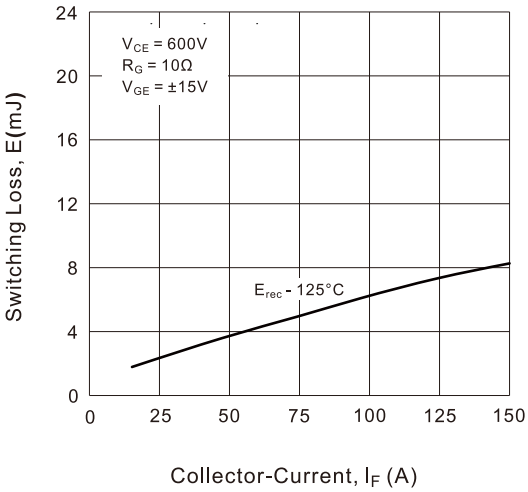


Fig.6a Typical Series Gate Impedance vs. Switching Loss

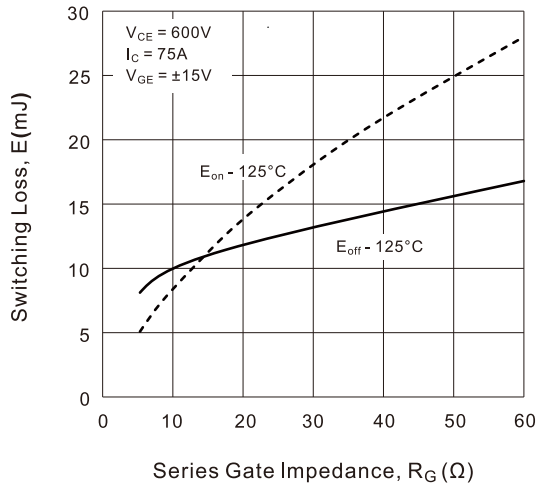


Fig.6b Typical Series Gate Impedance vs. Switching Loss

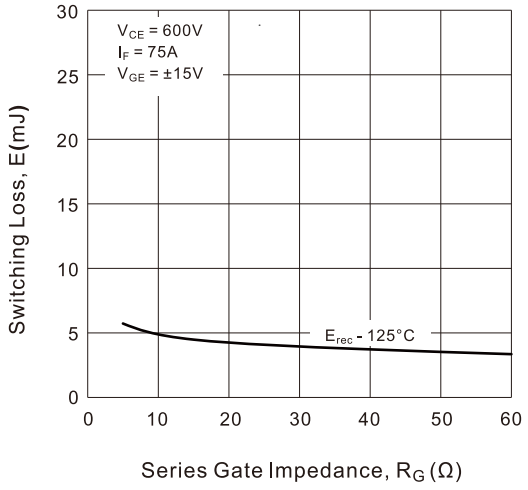


Fig.7 Reverse Bias Safe Operating Area

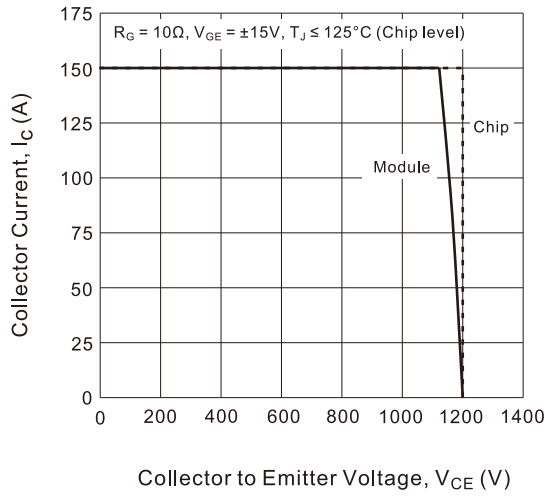
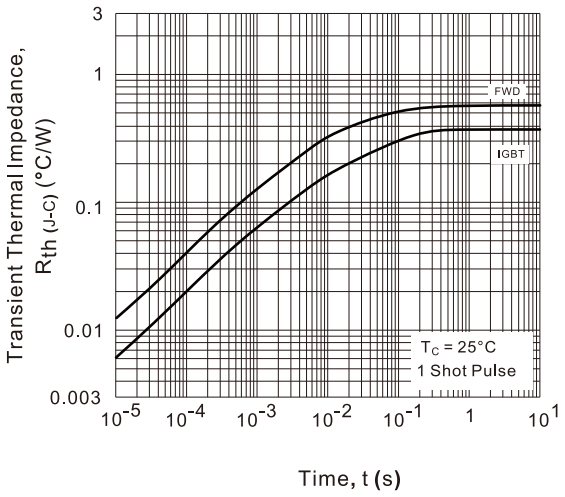
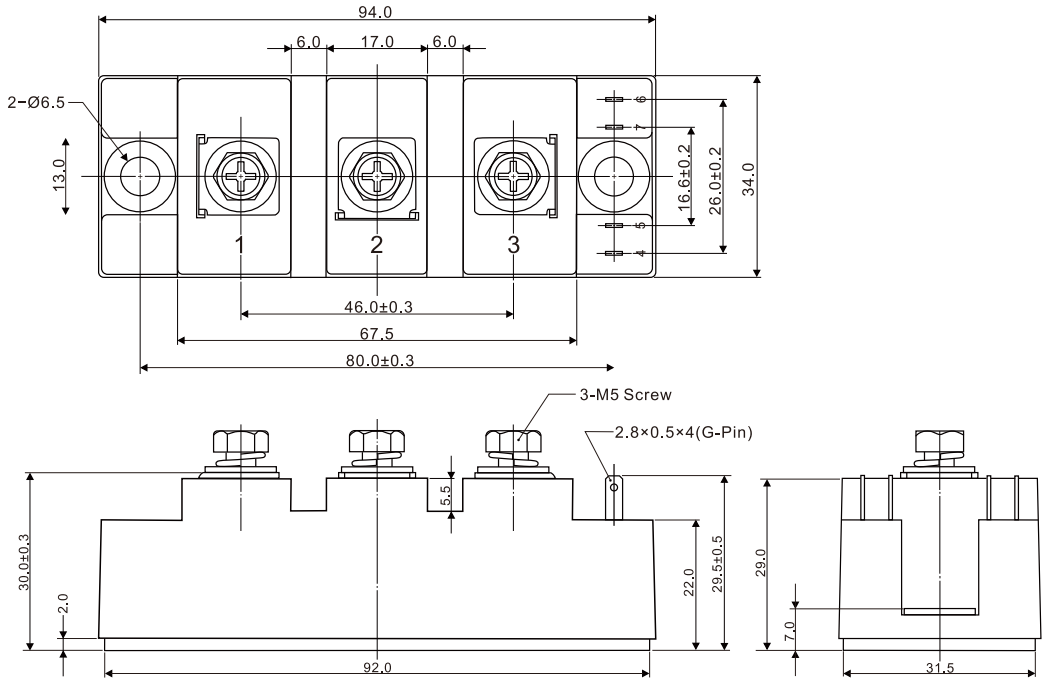


Fig.8 Transient Thermal Impedance





All dimensions in millimeters