



SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

TIG111GMH — N-Channel Non Punch Through IGBT High Power High Speed Switching Applications

Features

- Low-saturation voltage
- Ultrahigh speed switching
- Enhancement type

Specifications

Absolute Maximum Ratings at Ta=25°C, Unless otherwise specified

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Emitter Voltage	V _{CE} S		600	V
Gate-to-Emitter Voltage	V _{GE} S		±30	V
Collector Current (DC)	I _C *1	Limited by T _j max	32	A
	I _C *2	Limited by T _j max	@T _c =25°C*3	21
			@T _c =100°C*3	10
Collector Current (Pulse)	I _{CP}	Pulse width Limited by T _j max	128	A
Allowable Power Dissipation	P _D		3	W
		T _c =25°C (SANYO's ideal heat dissipation condition)*3	55	W
Junction Temperature	T _j		150	°C
Storage Temperature	T _{stg}		-55 to +150	°C

Note : *1 Shows chip capability

*2 Collector current is calculated from the following formula

$$I_C(T_C) = \frac{T_{jmax} - T_C}{R_{th(j-c)} \times V_{CE(sat)max}(T_{jmax}, I_C(T_C))}$$

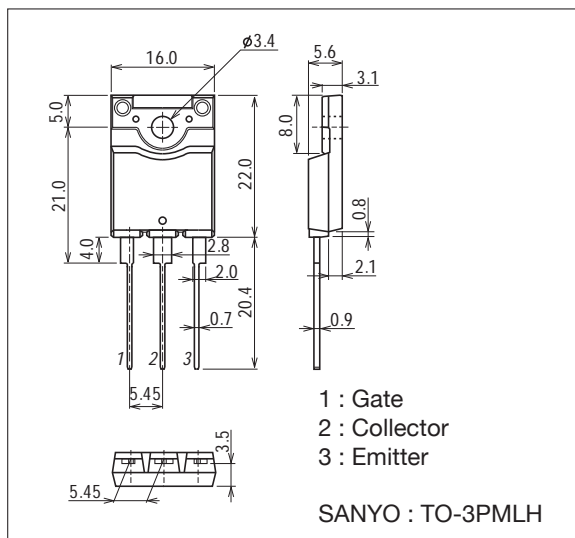
*3 SANYO's condition is radiation from backside.

The method is applying silicone grease to the backside of the device and attaching the device to water-cooled radiator made of aluminium.

Package Dimensions

unit : mm (typ)

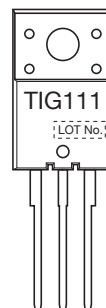
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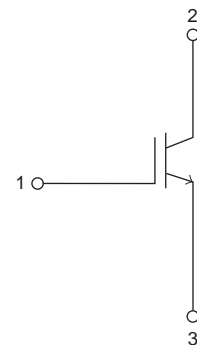
Product & Package Information

- Package : TO-3PMLH
- JEITA, JEDEC : SC-93, TO-247, SOT-199
- Minimum Packing Quantity : 100 pcs./tray

Marking



Electrical Connection



TIG111GMH

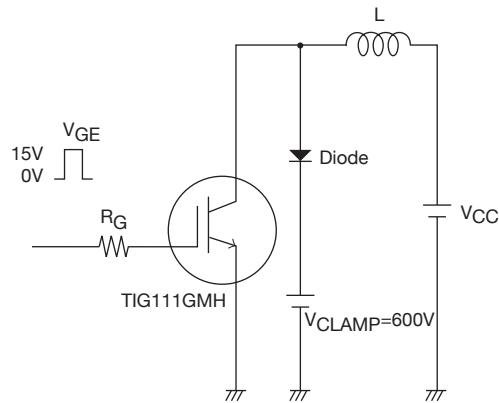
Electrical Characteristics at $T_j=25^\circ\text{C}$, Unless otherwise specified

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CES}$	$I_C=1\text{mA}, V_{GE}=0\text{V}$	600			V
Collector-to-Emitter Cutoff Current	I_{CES}	$V_{CE}=600\text{V}, V_{GE}=0\text{V}$			100	μA
					1	mA
Gate-to-Emitter Leakage Current	I_{GES}	$V_{GE}=\pm 30\text{V}, V_{CE}=0\text{V}$			± 100	nA
Gate-to-Emitter Threshold Voltage	$V_{GE(off)}$	$V_{CE}=10\text{V}, I_C=1\text{mA}$	4.0	5.0	6.0	V
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)1}$	$V_{GE}=15\text{V}, I_C=10\text{A}$		1.6	2.0	V
	$V_{CE(sat)2}$	$V_{GE}=15\text{V}, I_C=25\text{A}$		2.2		V
Input Capacitance	C_{ies}	$V_{CE}=30\text{V}, f=1\text{MHz}$		1880		pF
Output Capacitance	C_{oes}			30		pF
Reverse Transfer Capacitance	C_{res}			22		pF
Turn-ON Delay Time	$t_{d(on)}$			43		ns
Rise Time	t_r	$L=200\mu\text{H}, V_{GE}=15\text{V}, I_C=10\text{A}, V_{CC}=300\text{V}, R_g=30\Omega$, See specified Test Circuit.		25		ns
Turn-ON Time	t_{on}			250		ns
Turn-OFF Delay Time	$t_{d(off)}$			175		ns
Fall Time	t_f			115		ns
Turn-OFF Time	t_{off}			360		ns
Total Gate Charge	Q_g				63	
Gate-to-Source Charge	Q_{gs}	$V_{CE}=300\text{V}, V_{GE}=15\text{V}, I_C=10\text{A}$		12		nC
Gate-to-Drain "Miller" Charge	Q_{gd}			22		nC

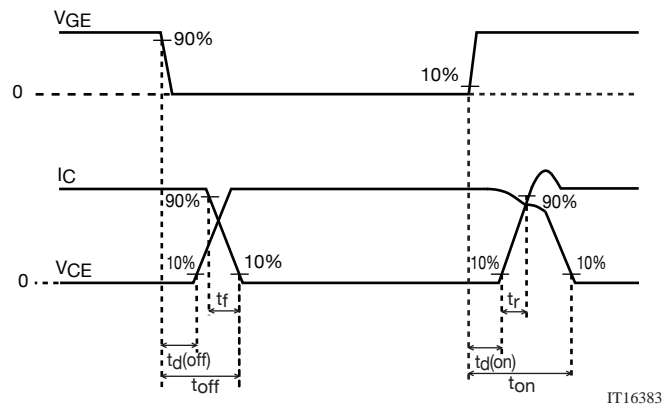
Thermal Characteristics at $T_a=25^\circ\text{C}$, Unless otherwise specified

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Thermal Resistance (Junction- Case)	$R_{th(j-c)}$	$T_c=25^\circ\text{C}$ (SANYO's ideal heat dissipation condition)*3			2.27	$^\circ\text{C} / \text{W}$
Thermal Resistance (Junction- at mosphere)	$R_{th(j-a)}$				41.7	$^\circ\text{C} / \text{W}$

Switching Time Test Circuit

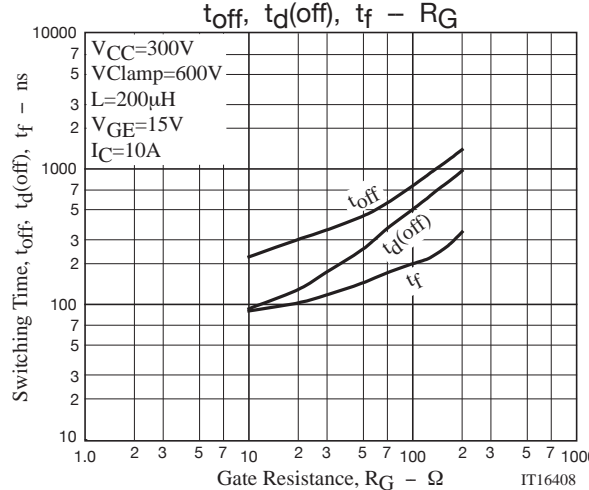
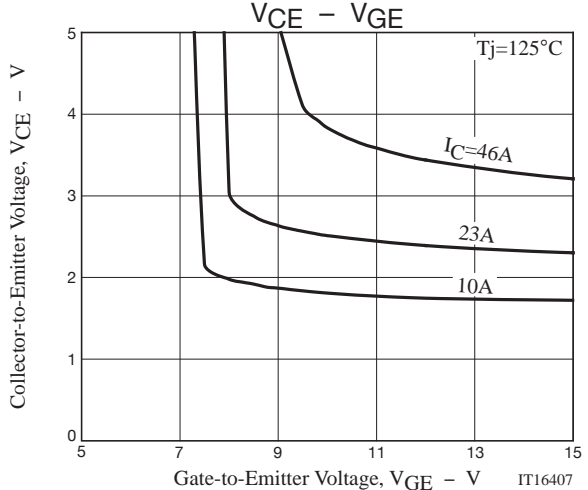
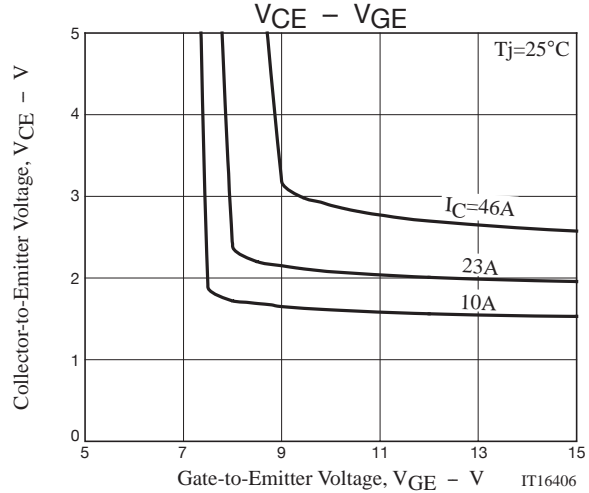
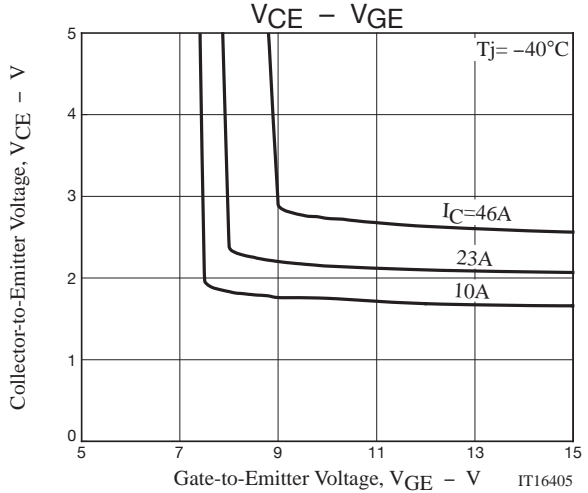
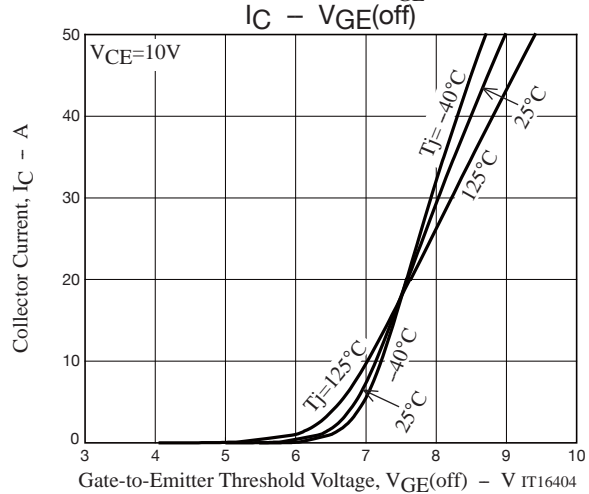
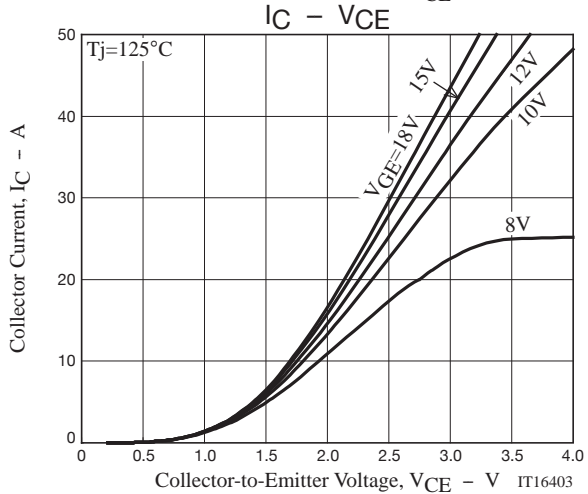
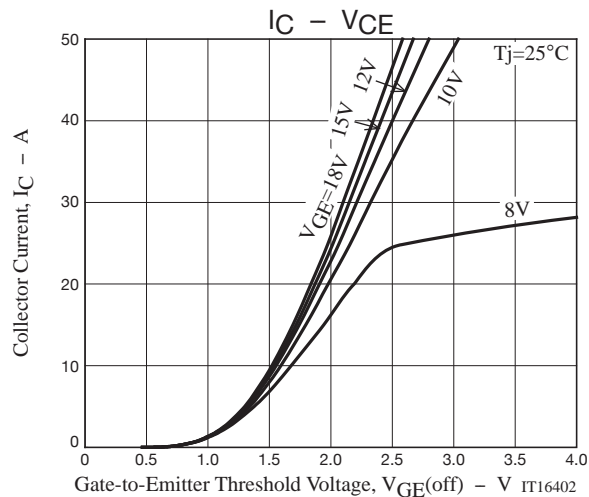
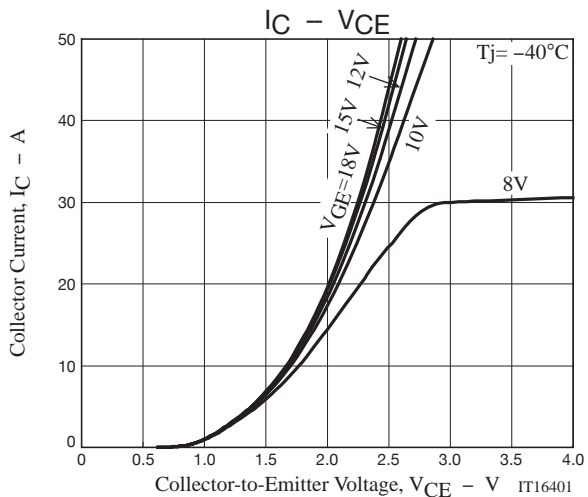


Timing Chart

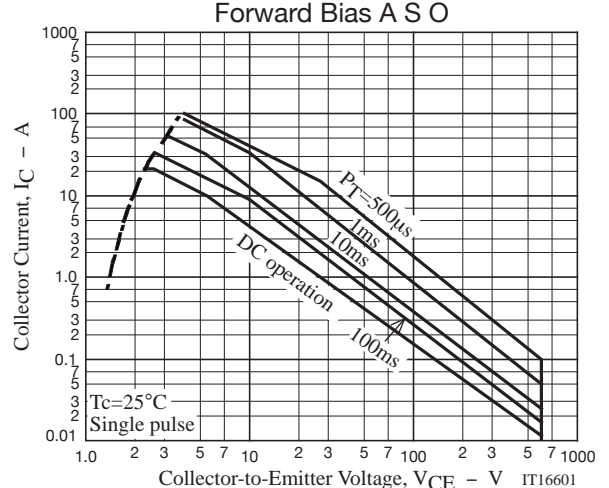
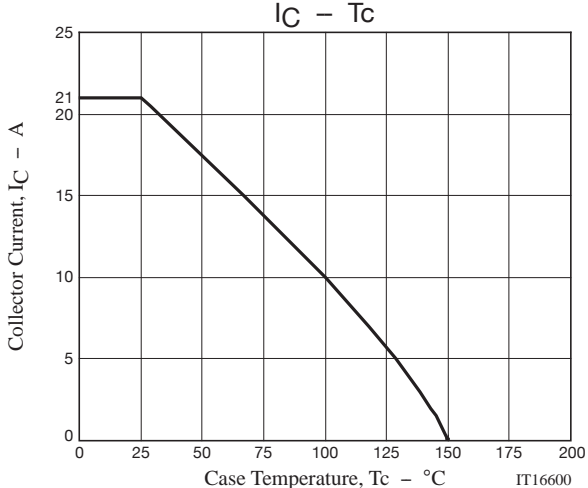
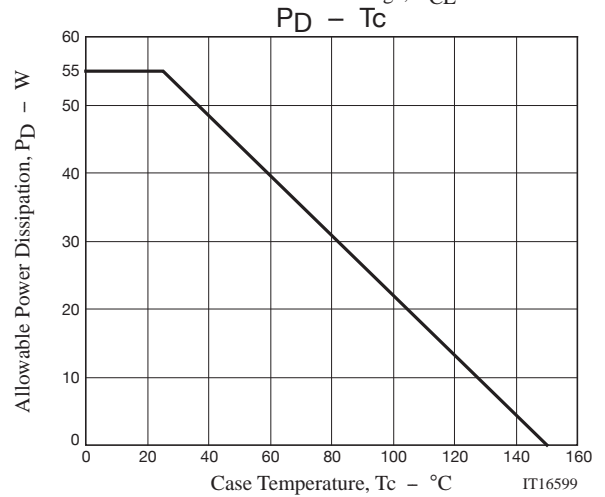
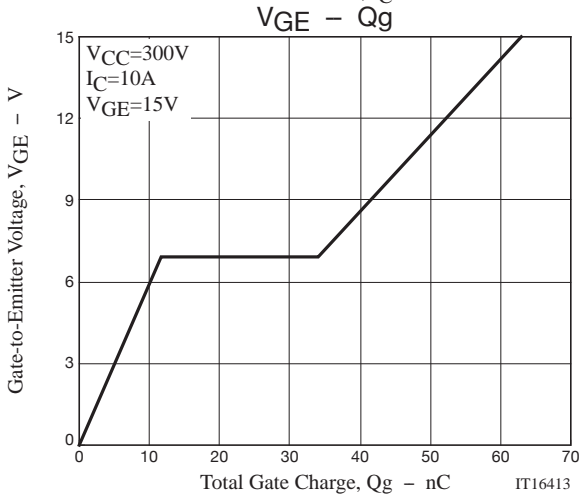
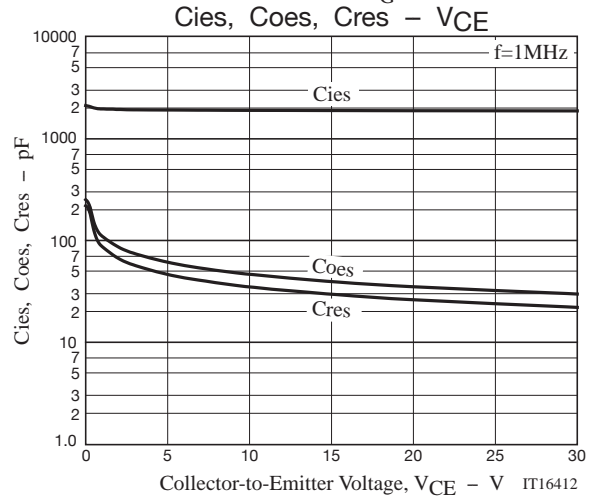
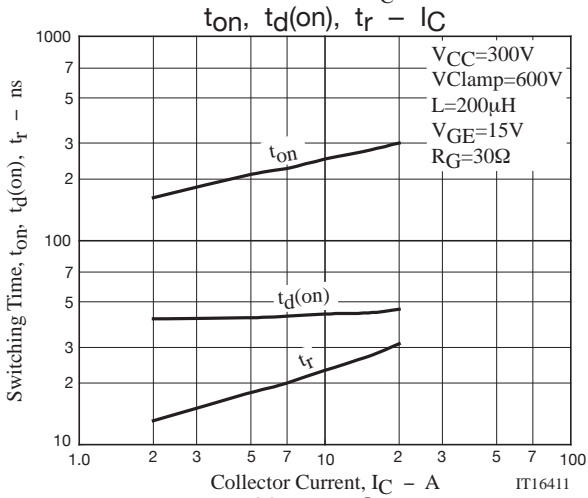
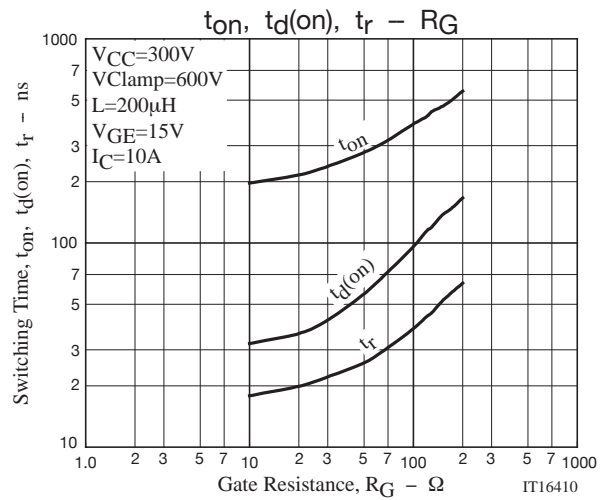
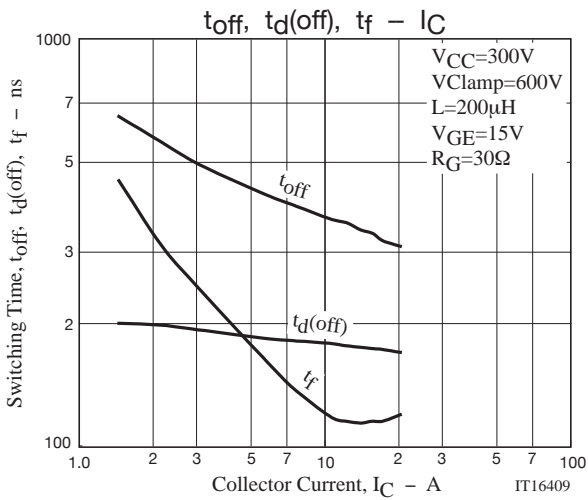


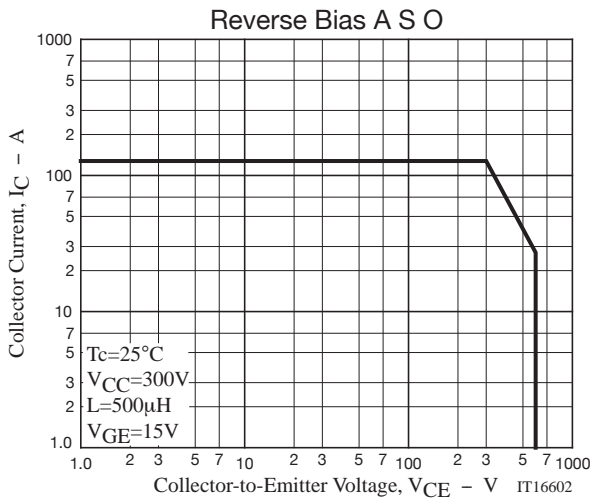
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