Ordering number : EN9018

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

TIG110GMH — N-Channel Non Punch Through IGBT High Power High Speed Switching Applications

Features

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

Specifications

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

Parameter	Symbol	Conditions		Ratings	Unit
Collector-to-Emitter Voltage	V_{CES}			600	V
Gate-to-Emitter Voltage	V_{GES}			±30	V
Collector Current (DC)	I_C*1	Limited by Tjmax		36	A
	I_C*2	Limited by Tjmax	@Tc=25°C*3	23	A
			@Tc=100°C*3	12	A
Collector Current (Pulse)	I_{CP}	Pulse width Limited by Tjmax		144	A
Allowable Power Dissipation	P_D			3	W
		Tc=25°C (SANYO's ideal heat dissipation condition)*3		60	W
Junction Temperature	Tj			150	°C
Storage Temperature	Tstg			-55 to +150	°C

Note :*1 Shows chip capability

*2 Collector current is calculated from the following for mula

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

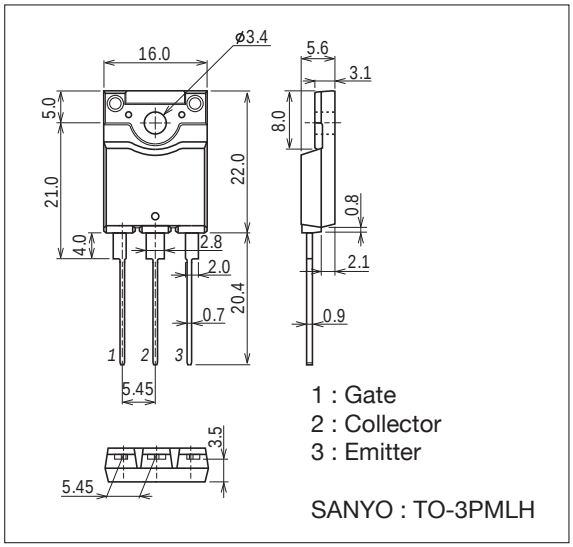
*3 SANYO's condition is radiation from backside.

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)

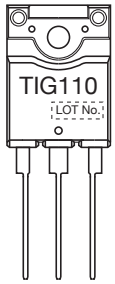
7504-003



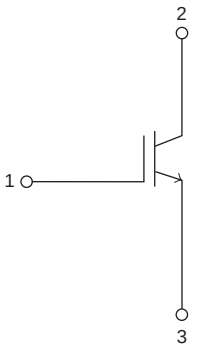
Product & Package Information

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

Marking



Electrical Connection



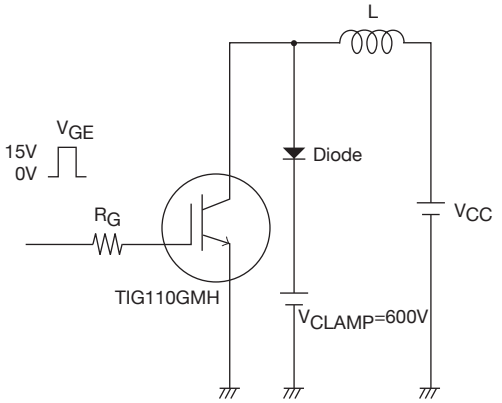
Electrical Characteristics at Tj=25°C, Unless otherwise specified

Parameter	Symbol	Conditions		Ratings min	Ratings typ	Ratings max	Unit
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CES}$	I_C=1mA, V_{GE}=0V		600			V
Collector-to-Emitter Cutoff Current	I_{CES}	V_{CE}=600V, V_{GE}=0V	Tj=25°C			100	μA
			Tj=125°C			1	mA
Gate-to-Emitter Leakage Current	I_{GES}	V_{GE}=±30V, V_{CE}=0V				±100	nA
Gate-to-Emitter Threshold Voltage	$V_{GE(off)}$	V_{CE}=10V, I_C=1mA		4.0	5.0	6.0	V
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)1}$	V_{GE}=15V, I_C=15A	Tj=25°C		1.6	2.0	V
			Tj=125°C		1.75		V
	$V_{CE(sat)2}$	V_{GE}=15V, I_C=40A	Tj=25°C		2.2		V
Input Capacitance	Cies	V_{CE}=30V, f=1MHz			2880		pF
Output Capacitance	Coes				45		pF
Reverse Transfer Capacitance	Cres				38		pF
Turn-ON Delay Time	$t_{d(on)}$	L=200μH, V_{GE}=15V, I_C=15A, V_{CC}=300V, R_G=30Ω, See specified Test Circuit.			65		ns
Rise Time	t_r				30		ns
Turn-ON Time	t_{on}				300		ns
Turn-OFF Delay Time	$t_{d(off)}$				250		ns
Fall Time	t_f				120		ns
Turn-OFF Time	t_{off}				450		ns
Total Gate Charge	Qg	V_{CE}=300V, V_{GE}=15V, I_C=15A			95		nC
Gate-to-Source Charge	Qgs				20		nC
Gate-to-Drain “Miller” Charge	Qgd				30		nC

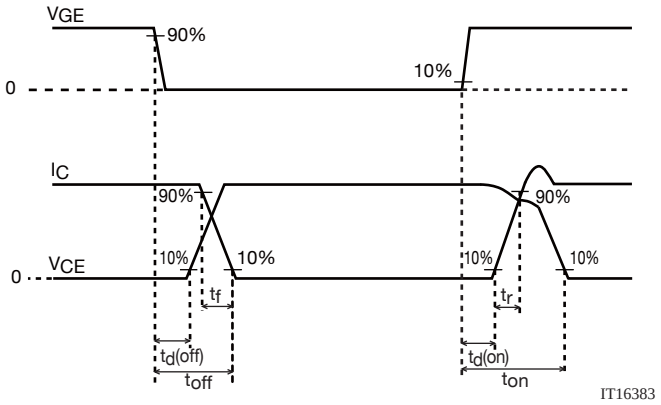
Thermal Characteristics at Ta=25°C, Unless otherwise specified

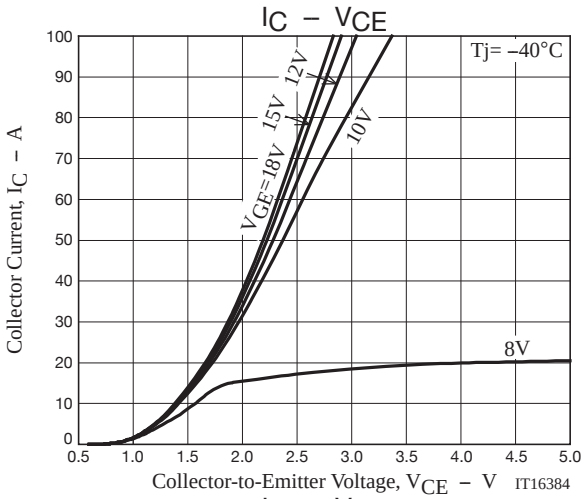
Parameter	Symbol	Conditions	Ratings min	Ratings typ	Ratings max	Unit
Thermal Resistance (Junction- Case)	Rth(j-c)	Tc=25°C (SANYO's ideal heat dissipation condition)*3			2.08	°C / W
Thermal Resistance (Junction- at mosphere)	Rth(j-a)				41.7	°C / W

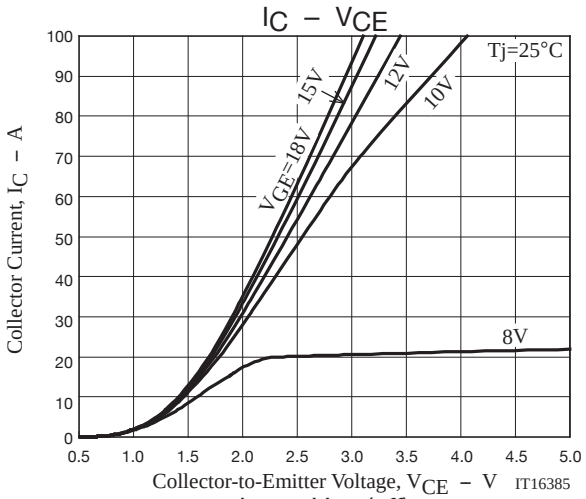
Switching Time Test Circuit

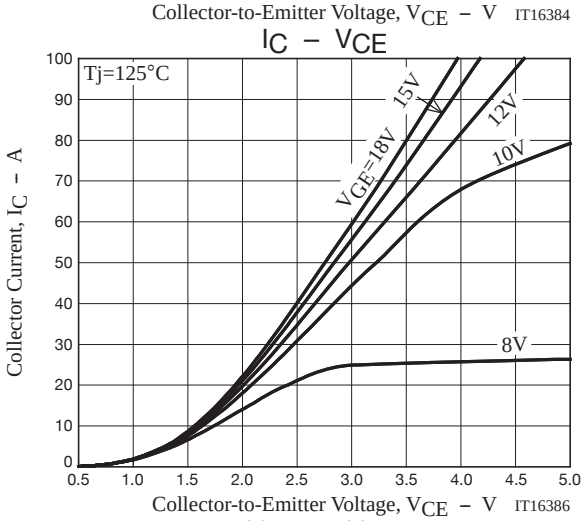


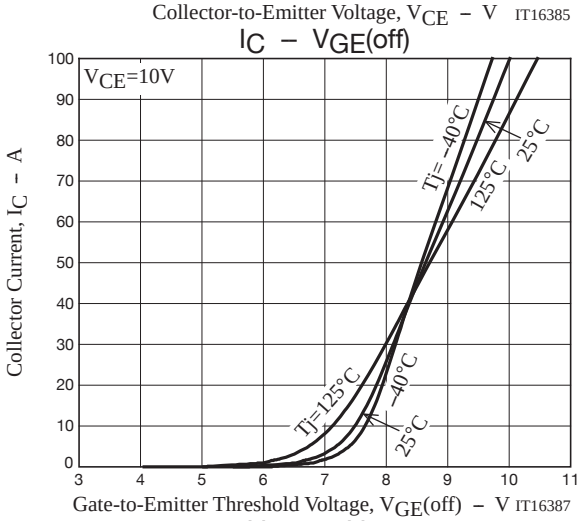
Timing Chart

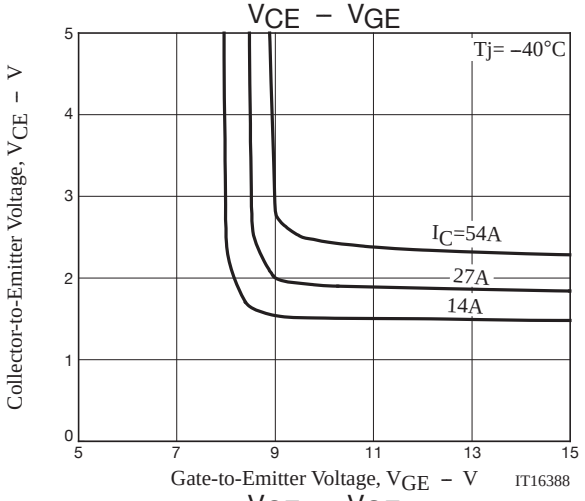


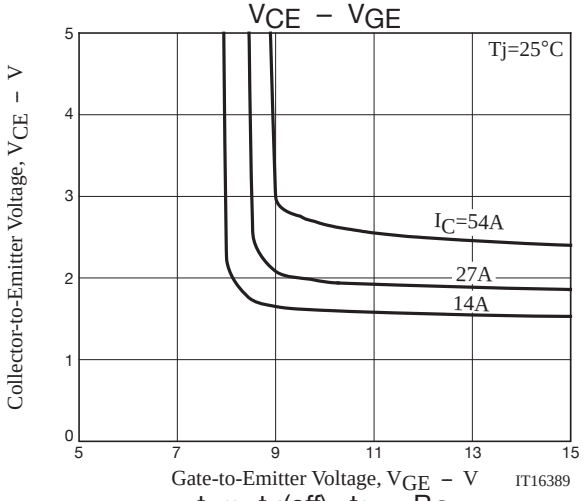

IC – VCE
Tj= –40°C
VGE=18V
15V
12V
10V
8V
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
IT16384

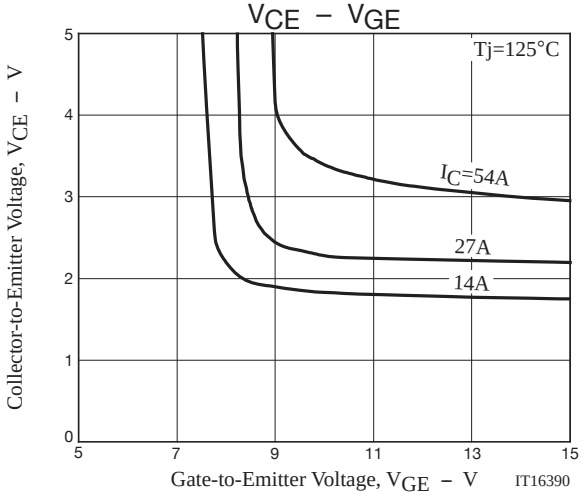

IC – VCE
Tj=25°C
VGE=18V
15V
12V
10V
8V
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
IT16385

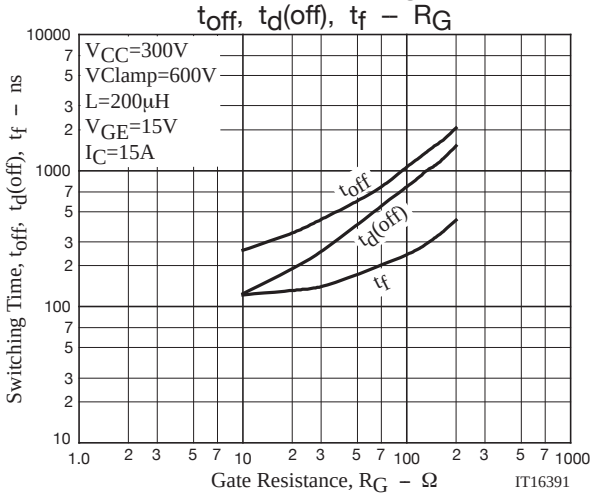

IC – VCE
Tj=125°C
VGE=18V
15V
12V
10V
8V
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
IT16386

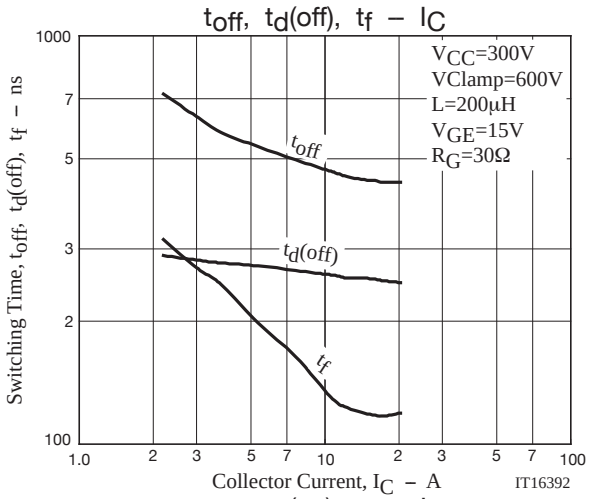

IC – VGE(off)
VCE=10V
Tj= –40°C
25°C
125°C
Tj=125°C
–40°C
25°C
Collector Current, IC – A
Gate-to-Emitter Threshold Voltage, VGE(off) – V
IT16387

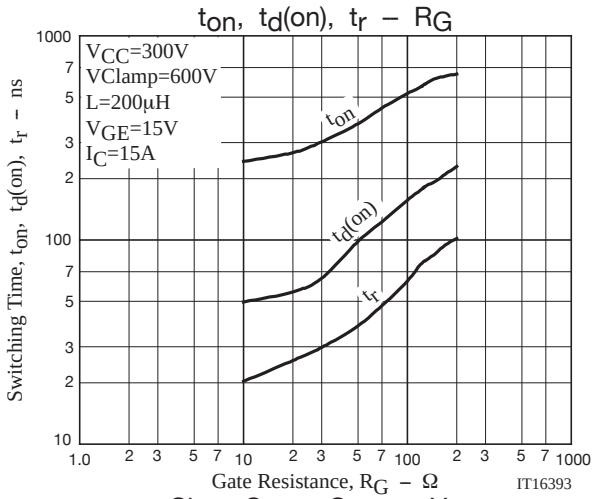

VCE – VGE
Tj= –40°C
IC=54A
27A
14A
Collector-to-Emitter Voltage, VCE – V
Gate-to-Emitter Voltage, VGE – V
IT16388

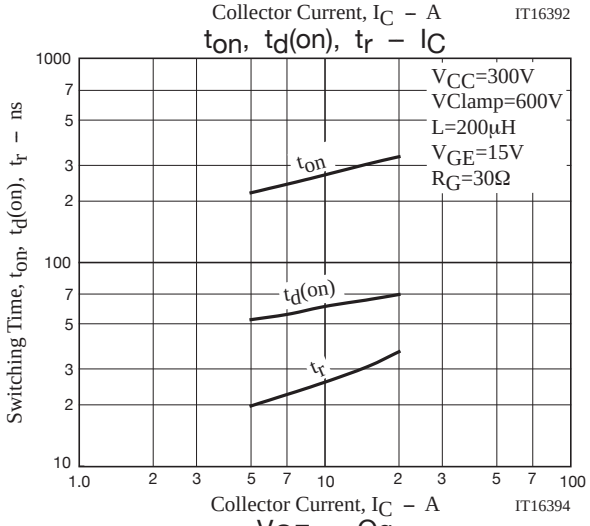

VCE – VGE
Tj=25°C
IC=54A
27A
14A
Collector-to-Emitter Voltage, VCE – V
Gate-to-Emitter Voltage, VGE – V
IT16389

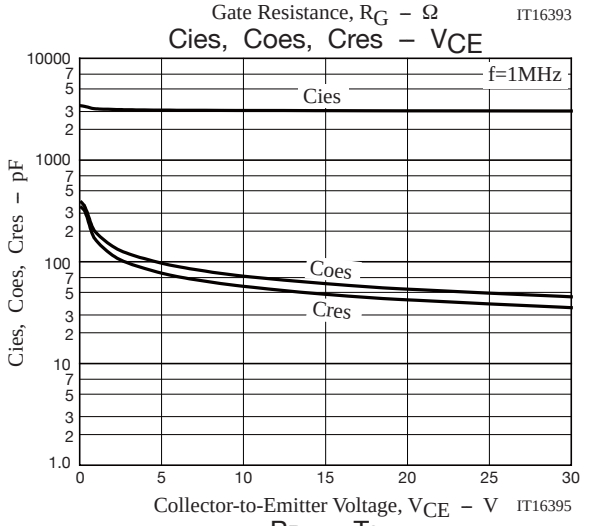

VCE – VGE
Tj=125°C
IC=54A
27A
14A
Collector-to-Emitter Voltage, VCE – V
Gate-to-Emitter Voltage, VGE – V
IT16390

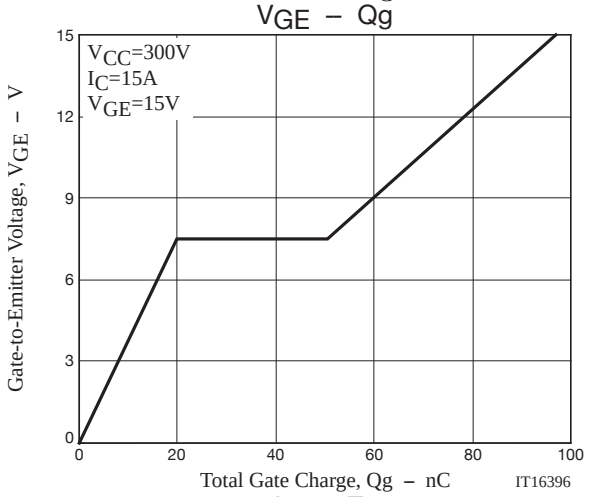

toff, td(off), tf – RG
VCC=300V
VClamp=600V
L=200µH
VGE=15V
IC=15A
toff
td(off)
tf
Switching Time, toff, td(off), tf – ns
Gate Resistance, RG – Ω
IT16391

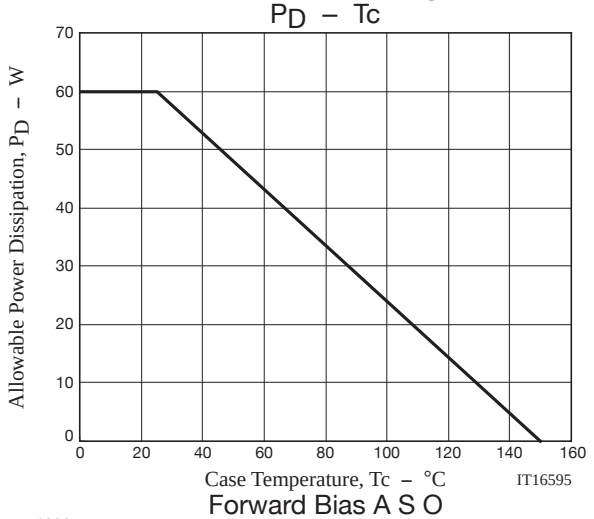

toff, td(off), tf – IC
VCC=300V
VClamp=600V
L=200μH
VGE=15V
RG=30Ω
toff
td(off)
tf
Switching Time, toff, td(off), tf – ns
Collector Current, IC – A
IT16392

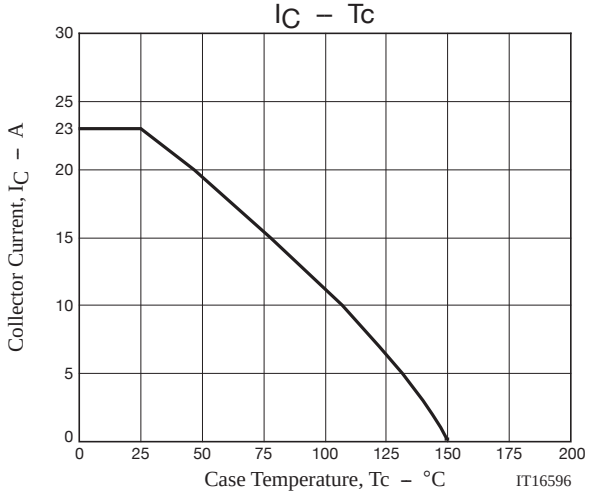

ton, td(on), tr – RG
VCC=300V
VClamp=600V
L=200μH
VGE=15V
IC=15A
ton
td(on)
tr
Switching Time, ton, td(on), tr – ns
Gate Resistance, RG – Ω
IT16393

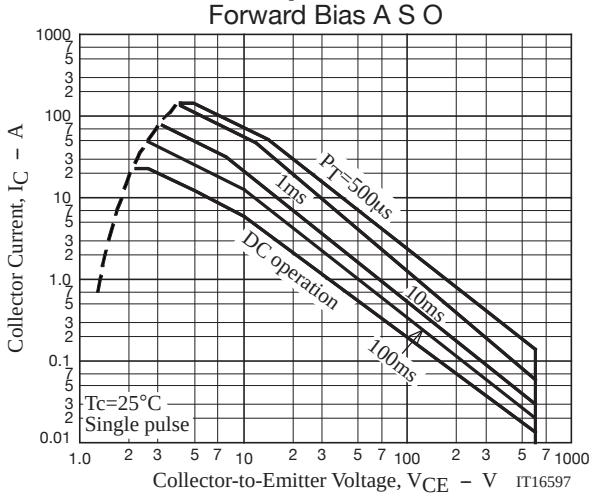

ton, td(on), tr – IC
VCC=300V
VClamp=600V
L=200μH
VGE=15V
RG=30Ω
ton
td(on)
tr
Switching Time, ton, td(on), tr – ns
Collector Current, IC – A
IT16394

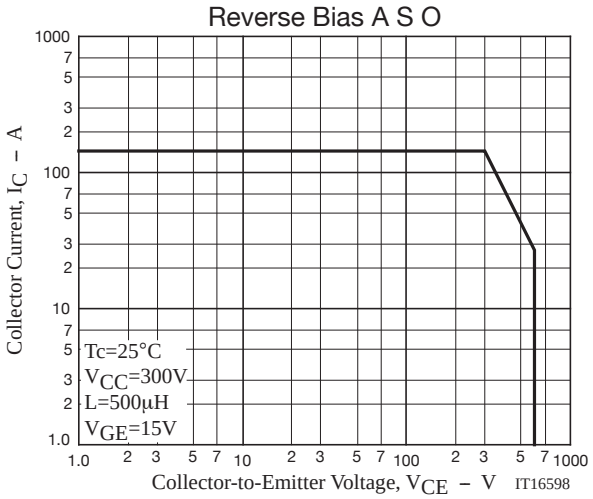

Cies, Coes, Cres – VCE
f=1MHz
Cies
Coes
Cres
Cies, Coes, Cres – pF
Collector-to-Emitter Voltage, VCE – V
IT16395


VGE – Qg
VCC=300V
IC=15A
VGE=15V
Gate-to-Emitter Voltage, VGE – V
Total Gate Charge, Qg – nC
IT16396


PD – Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT16595


IC – Tc
Collector Current, IC – A
Case Temperature, Tc – °C
IT16596


Forward Bias A S O
PT=500μs
1ms
DC operation
10ms
100ms
Tc=25°C
Single pulse
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V
IT16597



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