



IGBT Module 1700V / 100A

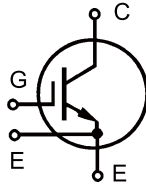
Features

- ◆ Fast Switching Trench / Field Stop IGBT Technology
- ◆ Low Switching Losses
- ◆ High Short Circuit Capability

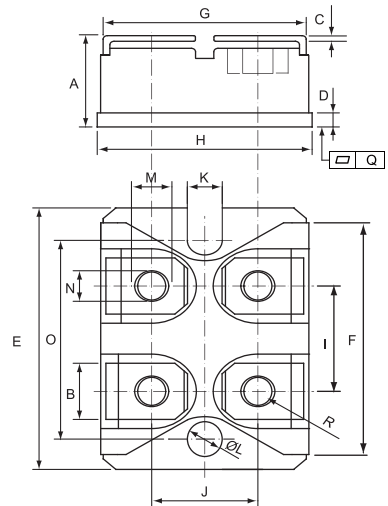
Applications

- ◆ Welder / Power Supply
- ◆ UPS / Inverter
- ◆ Industrial Motor Drive

Preliminary



Dimensions in inches and (millimeters)



Maximum Ratings (T_c = 25°C)

Item	Symbol	Rated Value	Unit
Collector-Emitter Voltage	V _{CEs}	1700	V
Gate-Emitter Voltage	V _{GES}	±20	V
DC-Collector Current	I _{C,nom.}	T _c = 25°C 90 T _c = 80°C 85 T _c = 110°C	A
Repetitive Peak Collector Current	I _{CRM}	600	A
Total Power Dissipation	P _{tot}	735	W
Isolation Voltage (A.C. 1 minute) between All Terminals and Baseplate	V _{iso}	2500	V
Junction Temperature Range	T _J	-40~+150	°C
Storage Temperature Range	T _{stg}	-40~+125	°C
Mounting Torque (M4 screw)	M _d	To heatsink 1.3 To terminals 1.1	N.m

	DIMENSIONS			
	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.460	0.483	11.68	12.28
B	0.307	0.323	7.80	8.20
C	0.030	0.033	0.75	0.85
D	0.071	0.081	1.80	2.05
E	1.488	1.504	37.80	38.20
F	1.248	1.260	31.70	32.00
G	0.917	0.957	23.30	24.30
H	0.996	1.008	25.30	25.60
I	0.579	0.602	14.70	15.30
J	0.492	0.516	12.50	13.10
K	0.161	0.169	4.10	4.30
L	0.161	0.169	4.10	4.30
M	0.181	0.197	4.60	5.00
N	0.165	0.181	4.20	4.60
O	1.181	1.197	30.00	30.40
Q	-0.002	0.004	-0.05	0.10
R	M4*8			



■ Electrical Characteristics ($T_{VJ} = 25^{\circ}\text{C}$)

Characteristic		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Collector-Emitter Cut-Off Current		I_{CES}	$V_{CE} = 1700\text{V}$ $V_{GE} = 0\text{V}$	-	-	50	μA
Gate-Emitter Leakage Current		I_{GES}	$V_{GE} = \pm 20\text{V}$ $V_{CE} = 0\text{V}$	-	-	± 200	nA
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	$I_C = 100\text{A}, V_{GE} = 15\text{V}$		2.5	3.0	V
Gate-Emitter Threshold Voltage		$V_{GE(th)}$	$V_{CE} = V_{GE}, I_C = 8\text{mA}$	3.0	-	5.0	V
Transconductance <small>Note 1</small>		g_{fs}	$I_C = 60\text{A}, V_{DS} = 20\text{V}$	-	37	-	S
Input Capacitance		C_{ies}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$	-	9460	-	pF
Output Capacitance		C_{oes}		-	396	-	
Reverse Transfer Capacitance		C_{res}		-	299	-	
Switching Time	Rise Time	t_r	$V_{CE} = 850\text{V}, I_C = 100\text{A}$ $R_G = 1\Omega, V_{GE} = \pm 15\text{V}$ $T_{VJ} = 25^{\circ}\text{C}$	-	95	-	ns
	Turn-On Time	$t_{d,on}$		-	222	-	
	Fall Time	t_f		-	348	-	
	Turn-Off Time	$t_{d,off}$		-	368	-	
Switching Time	Rise Time	t_r	$V_{CE} = 850\text{V}, I_C = 100\text{A}$ $R_G = 1\Omega, V_{GE} = \pm 15\text{V}$ $T_{VJ} = 125^{\circ}\text{C}$	-	104	-	ns
	Turn-On Time	$t_{d,on}$		-	234	-	
	Fall Time	t_f		-	550	-	
	Turn-Off Time	$t_{d,off}$		-	430	-	
Turn-on Energy Loss Per Pulse		E_{on}	$I_C = 100\text{A}, V_{CE} = 850\text{V}$ $V_{GE} = \pm 15\text{V}, R_G = 1\Omega$ Inductive load, $T_{VJ} = 25^{\circ}\text{C}$	-	36	-	mJ
Turn-off Energy Loss Per Pulse		E_{off}		-	23	-	
Total Gate Charge		Q_g	$V_{CE} = 850\text{V}, I_C = 100\text{A}$ $R_G = 1\Omega, V_{GE} = \pm 15\text{V}$ $T_{VJ} = 25^{\circ}\text{C}$	-	249	-	nC
Gate to Source Charge		Q_{ge}		-	133	-	
Gate to Drain Charge		Q_{gd}		-	96	-	

■ Thermal Characteristics ($T_C = 25^{\circ}\text{C}$)

Characteristic	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Thermal Impedance	$R_{(th j-c)}$	Junction to Case	-	-	0.17	$^{\circ}\text{C/W}$

Note:

1. Pulse Test: $t \leq 300 \mu\text{s}$, Duty Cycle, $d \leq 2\%$.



Typical Characteristics

Preliminary Data

Fig.1 Output Characteristic @T_J = 25 °C

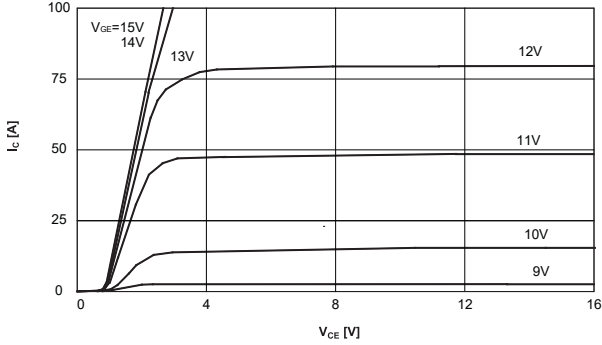


Fig.2 Output Characteristic @T_J = 125 °C

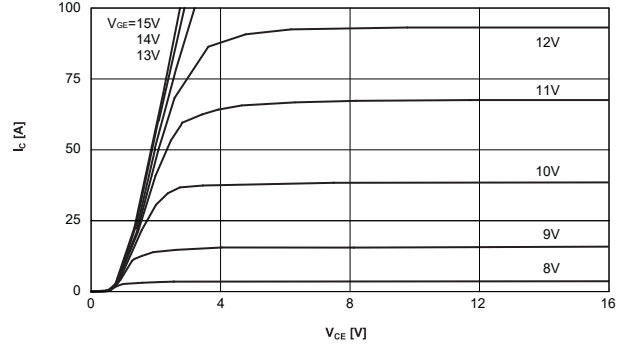


Fig.3 Input Admittance

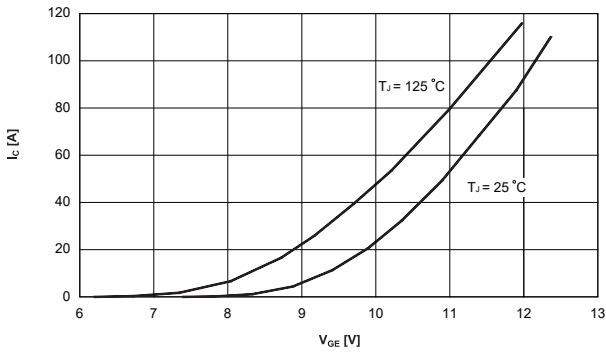


Fig.4 Transconductance

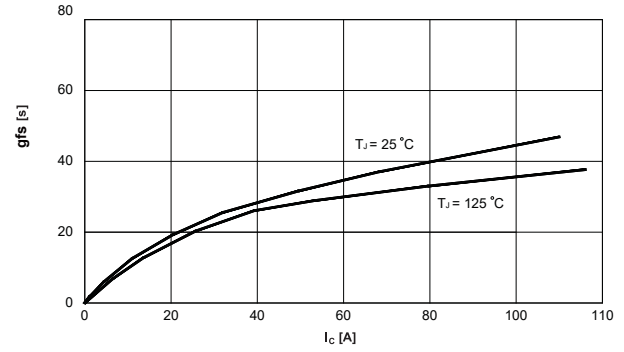


Fig.5 Gate Charge

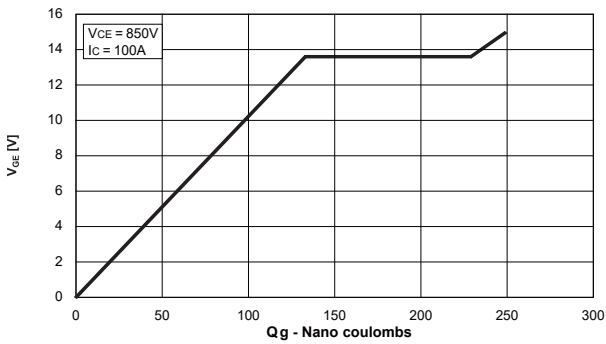


Fig.6 Capacitance

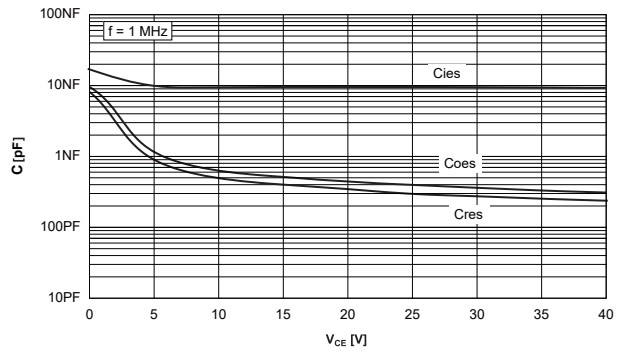


Fig.7 Reverse-Bias Safe Operating Area

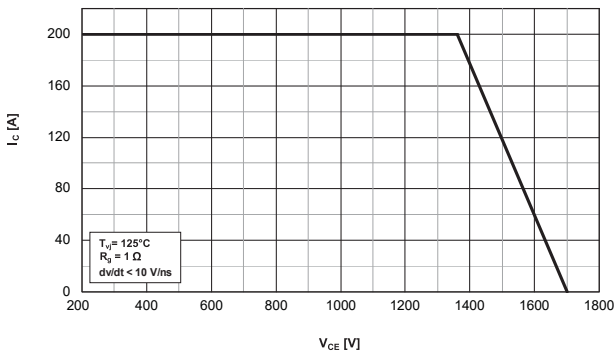
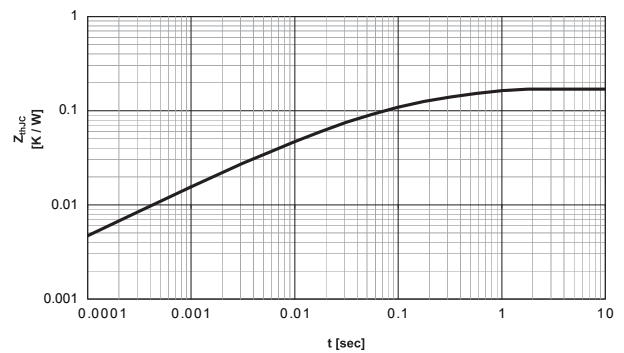


Fig.8 Maximum Transient Thermal Impedance





Typical Characteristics

Preliminary Data

Fig.9 Turn-on Rise Time vs. Junction Temperature

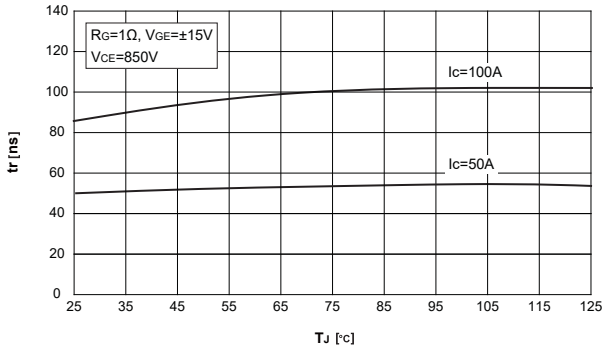


Fig.10 Turn-on Rise Time vs. Collector Current

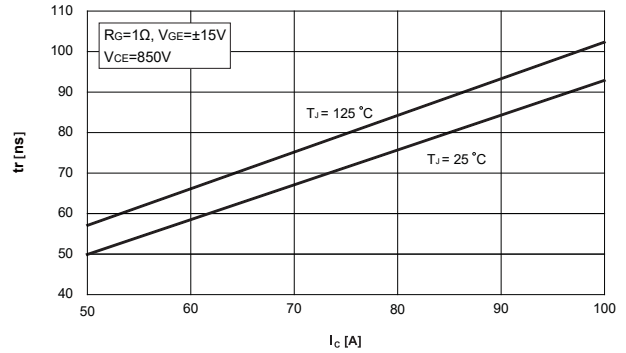


Fig.11 Turn-on Switching Times vs. Gate Resistance

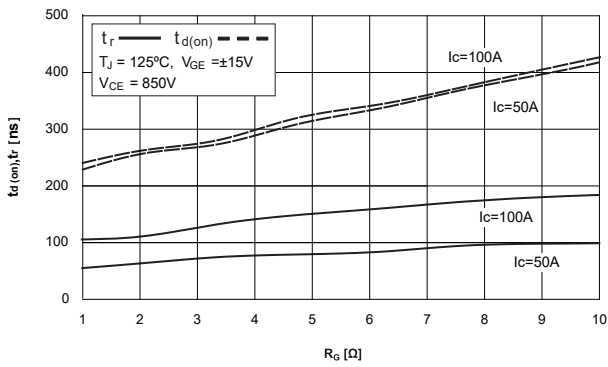


Fig.12 Turn-off Switching Times vs. Junction Temperature

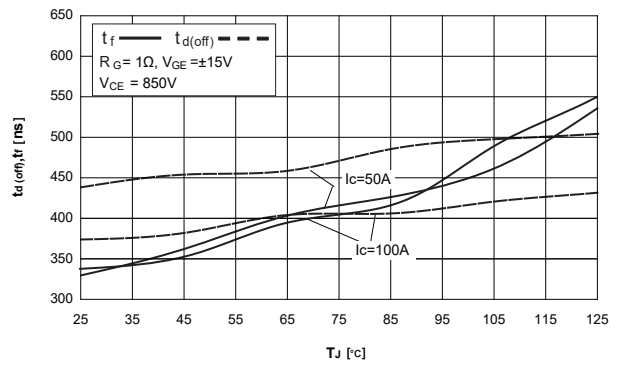


Fig.13 Turn-off Switching Times vs. Collector Current

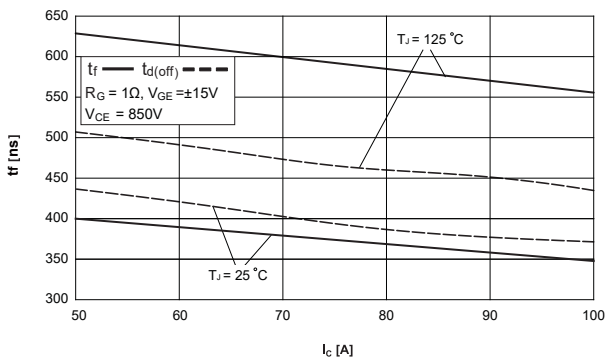
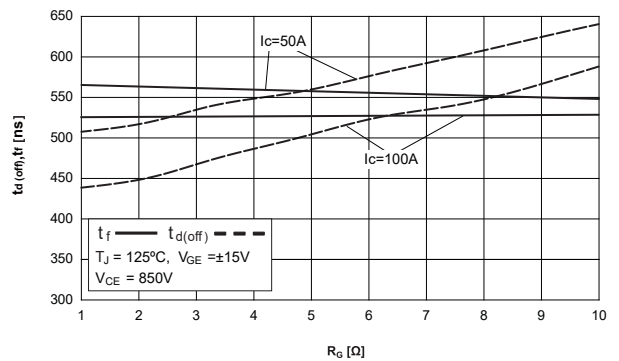


Fig.14 Turn-off Switching Times vs. Gate Resistance





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