Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

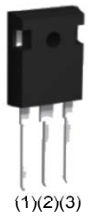
RGTV00TS65D

650V 50A Field Stop Trench IGBT Datasheet

V_{CES}	650V
$I_{C(100°C)}$	50A
$V_{CE(sat)}$ (Typ.)	1.5V
P_D	276W

●Outline

TO-247N



(1)(2)(3)

●Features

1) Low Collector - Emitter Saturation Voltage

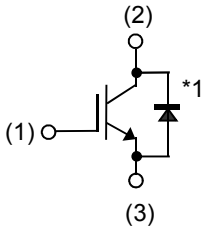
2) High Speed Switching & Low Switching Loss

3) Short Circuit Withstand Time 2μs

4) Built in Very Fast & Soft Recovery FRD

5) Pb - free Lead Plating ; RoHS Compliant

●Inner Circuit



(1) Gate
(2) Collector
(3) Emitter

*1 Built in FRD

●Applications

Solar Inverter

UPS

Welding

IH

PFC

●Packaging Specifications

Type	Packaging	Tube
	Reel Size (mm)	-
	Tape Width (mm)	-
	Basic Ordering Unit (pcs)	450
	Packing Code	C11
	Marking	RGTV00TS65D

●Absolute Maximum Ratings (at T_C = 25°C unless otherwise specified)

Parameter		Symbol	Value	Unit
Collector - Emitter Voltage		V_{CES}	650	V
Gate - Emitter Voltage		V_{GES}	±30	V
Collector Current	T_C = 25°C	I_C	95	A
	T_C = 100°C	I_C	50	A
Pulsed Collector Current		I_{CP} *1	200	A
Diode Forward Current	T_C = 25°C	I_F	84	A
	T_C = 100°C	I_F	50	A
Diode Pulsed Forward Current		I_{FP} *1	200	A
Power Dissipation	T_C = 25°C	P_D	276	W
	T_C = 100°C	P_D	138	W
Operating Junction Temperature		T_j	−40 to +175	°C
Storage Temperature		T_{stg}	−55 to +175	°C

*1 Pulse width limited by $T_{jmax.}$

●Thermal Resistance

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal Resistance IGBT Junction - Case	$R_{\theta(j-c)}$	-	-	0.54	°C/W
Thermal Resistance Diode Junction - Case	$R_{\theta(j-c)}$	-	-	0.80	°C/W

●IGBT Electrical Characteristics (at T_j = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Collector - Emitter Breakdown Voltage	BV_{CES}	I_C = 10μA, V_{GE} = 0V	650	-	-	V
Collector Cut - off Current	I_{CES}	V_{CE} = 650V, V_{GE} = 0V	-	-	10	μA
Gate - Emitter Leakage Current	I_{GES}	V_{GE} = ±30V, V_{CE} = 0V	-	-	±200	nA
Gate - Emitter Threshold Voltage	$V_{GE(th)}$	V_{CE} = 5V, I_C = 34.3mA	5.0	6.0	7.0	V
Collector - Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 50A, V_{GE} = 15V				V
		T_j = 25°C	-	1.5	1.9	
		T_j = 175°C	-	1.85	-	

●**IGBT Electrical Characteristics** (at T_j = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Input Capacitance	C_{ies}	V_{CE} = 30V	-	2890	-	pF
Output Capacitance	C_{oes}	V_{GE} = 0V	-	116	-	
Reverse Transfer Capacitance	C_{res}	f = 1MHz	-	48	-	
Total Gate Charge	Q_g	V_{CE} = 400V	-	104	-	nC
Gate - Emitter Charge	Q_{ge}	I_C = 50A	-	21	-	
Gate - Collector Charge	Q_{gc}	V_{GE} = 15V	-	37	-	
Turn - on Delay Time	$t_{d(on)}$	I_C = 50A, V_{CC} = 400V	-	41	-	ns
Rise Time	t_r	V_{GE} = 15V, R_G = 10Ω	-	20	-	
Turn - off Delay Time	$t_{d(off)}$	T_j = 25°C	-	142	-	
Fall Time	t_f	Inductive Load	-	38	-	
Turn - on Switching Loss	E_{on}	*E_{on} includes diode	-	1.17	-	mJ
Turn - off Switching Loss	E_{off}	reverse recovery	-	0.94	-	
Turn - on Delay Time	$t_{d(on)}$	I_C = 50A, V_{CC} = 400V	-	39	-	ns
Rise Time	t_r	V_{GE} = 15V, R_G = 10Ω	-	23	-	
Turn - off Delay Time	$t_{d(off)}$	T_j = 175°C	-	167	-	
Fall Time	t_f	Inductive Load	-	80	-	
Turn - on Switching Loss	E_{on}	*E_{on} includes diode	-	1.25	-	mJ
Turn - off Switching Loss	E_{off}	reverse recovery	-	1.28	-	
Reverse Bias Safe Operating Area	RBSOA	I_C = 200A, V_{CC} = 520V V_P = 650V, V_{GE} = 15V R_G = 100Ω, T_j = 175°C	FULL SQUARE			-
Short Circuit Withstand Time	t_{sc}	$V_{CC} \leqq$ 360V V_{GE} = 15V T_j = 25°C	2	-	-	µs

●**IGBT Electrical Characteristics** (at T_j = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Diode Forward Voltage	V_F	I_F = 50A T_j = 25°C T_j = 175°C	- -	1.45 1.55	1.9 -	V
Diode Reverse Recovery Time	t_{rr}	I_F = 50A V_{CC} = 400V di_F/dt = 200A/µs T_j = 25°C	-	102	-	ns
Diode Peak Reverse Recovery Current	I_{rr}		-	11.2	-	A
Diode Reverse Recovery Charge	Q_{rr}		-	0.64	-	µC
Diode Reverse Recovery Energy	E_{rr}		-	29.5	-	µJ
Diode Reverse Recovery Time	t_{rr}	I_F = 50A V_{CC} = 400V di_F/dt = 200A/µs T_j = 175°C	-	177	-	ns
Diode Peak Reverse Recovery Current	I_{rr}		-	15.2	-	A
Diode Reverse Recovery Charge	Q_{rr}		-	1.62	-	µC
Diode Reverse Recovery Energy	E_{rr}		-	104.8	-	µJ

●Electrical Characteristic Curves

Fig.1 Power Dissipation vs. Case Temperature

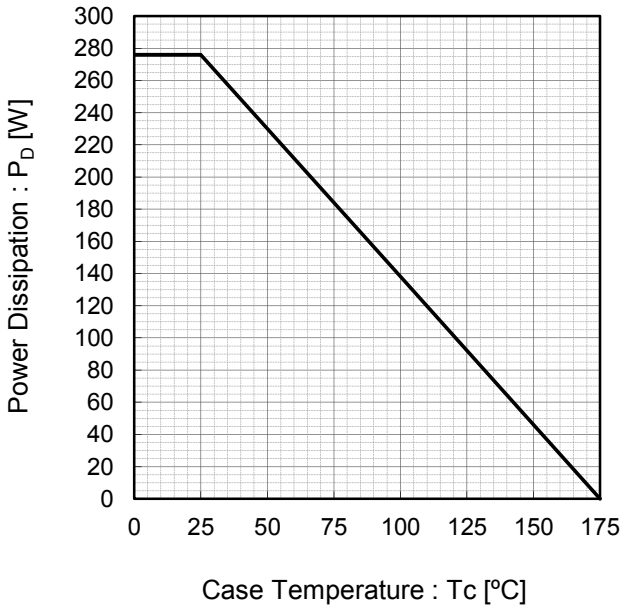


Fig.2 Collector Current vs. Case Temperature

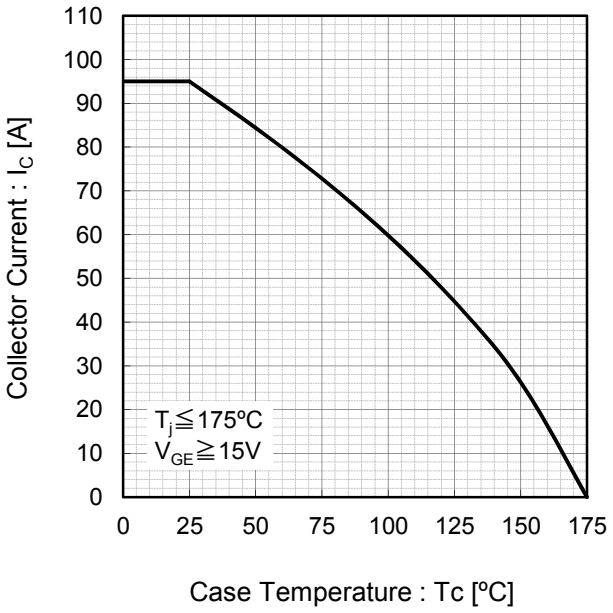


Fig.3 Forward Bias Safe Operating Area

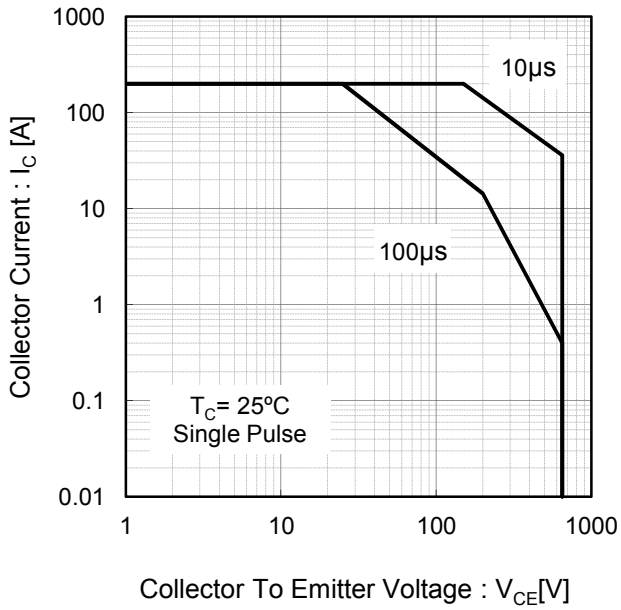
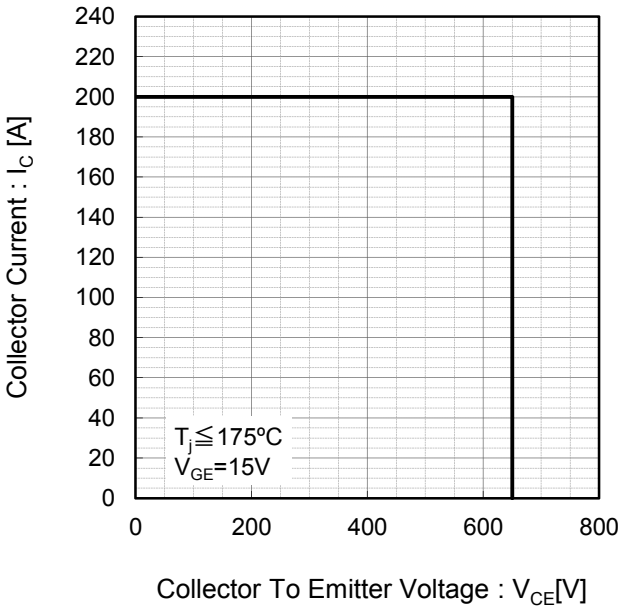


Fig.4 Reverse Bias Safe Operating Area



●Electrical Characteristic Curves

Fig.5 Typical Output Characteristics

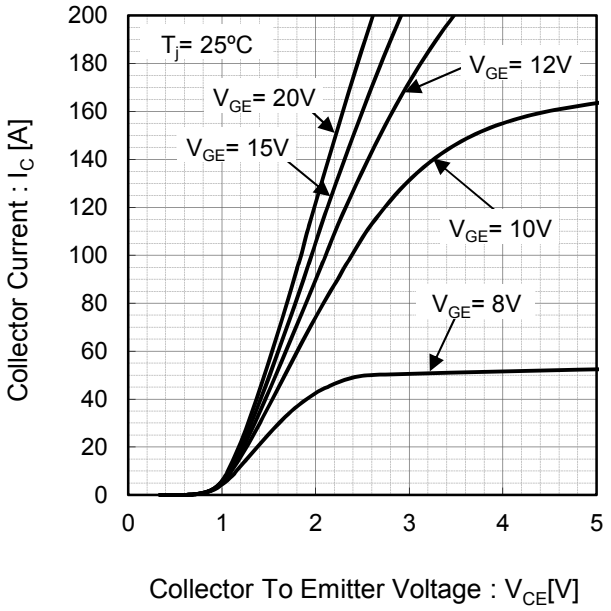


Fig.6 Typical Output Characteristics

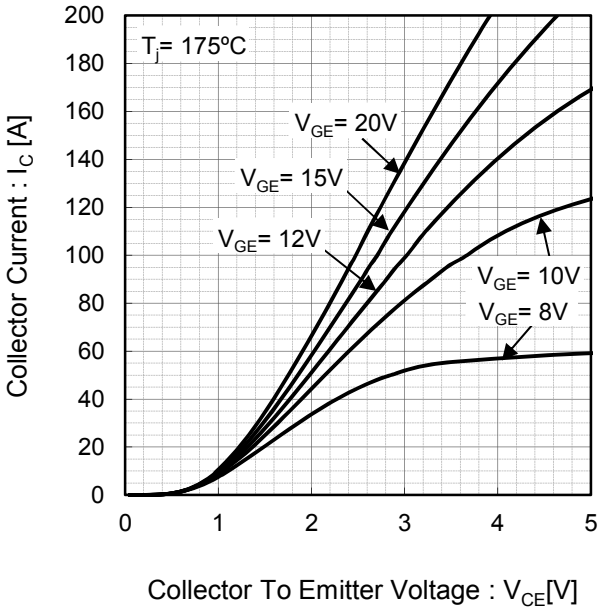


Fig.7 Typical Transfer Characteristics

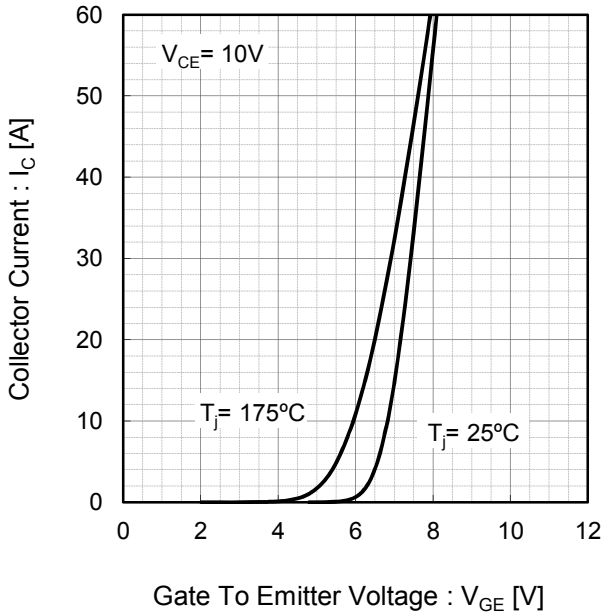
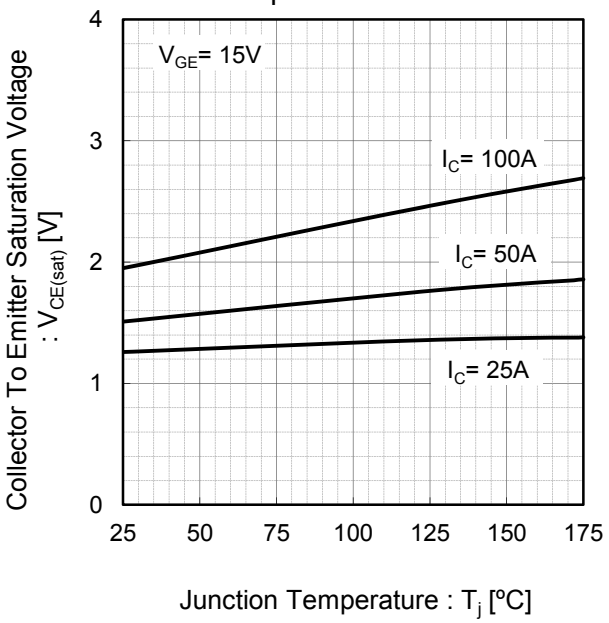


Fig.8 Typical Collector To Emitter Saturation Voltage vs. Junction Temperature



●Electrical Characteristic Curves

Fig.9 Typical Collector To Emitter Saturation Voltage vs. Gate To Emitter Voltage

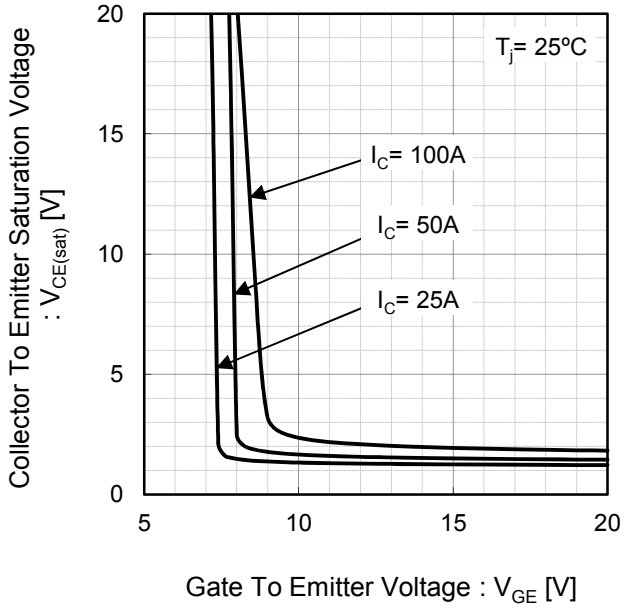


Fig.10 Typical Collector To Emitter Saturation Voltage vs. Gate To Emitter Voltage

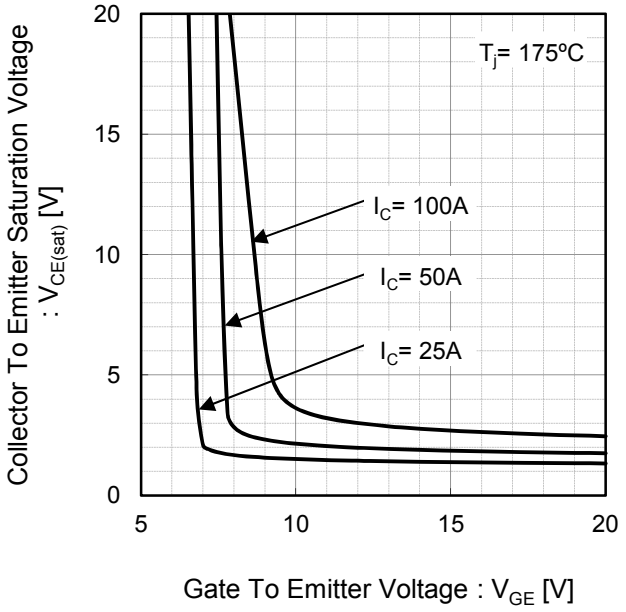


Fig.11 Typical Switching Time vs. Collector Current

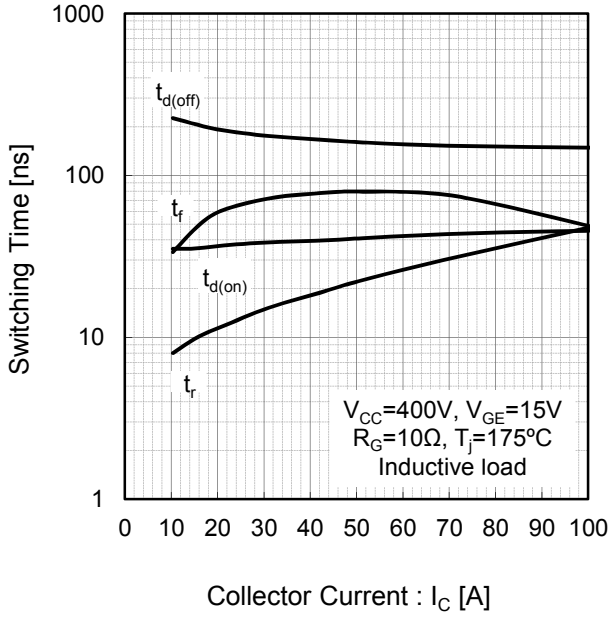
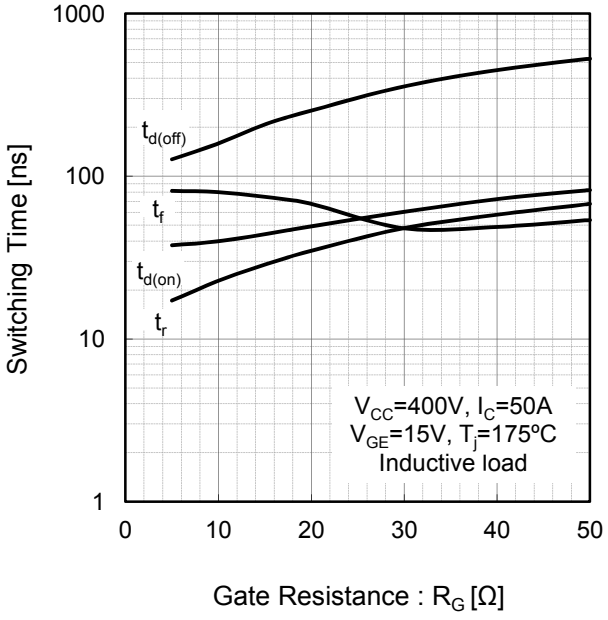


Fig.12 Typical Switching Time vs. Gate Resistance



●Electrical Characteristic Curves

Fig.13 Typical Switching Energy Losses vs. Collector Current

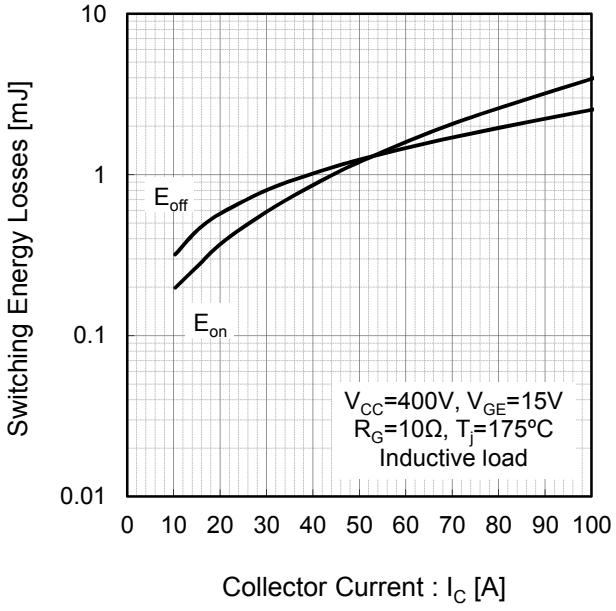


Fig.14 Typical Switching Energy Losses vs. Gate Resistance

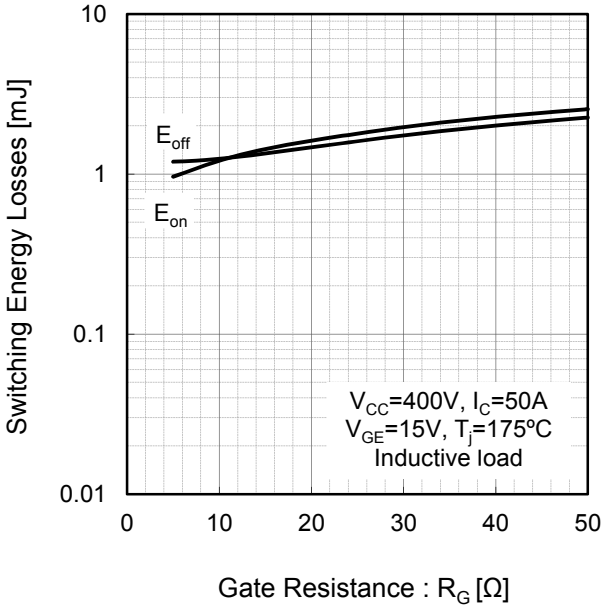


Fig.15 Typical Capacitance vs. Collector To Emitter Voltage

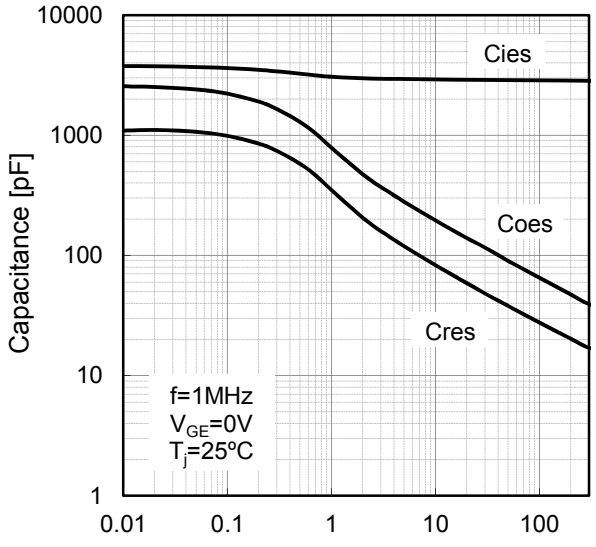
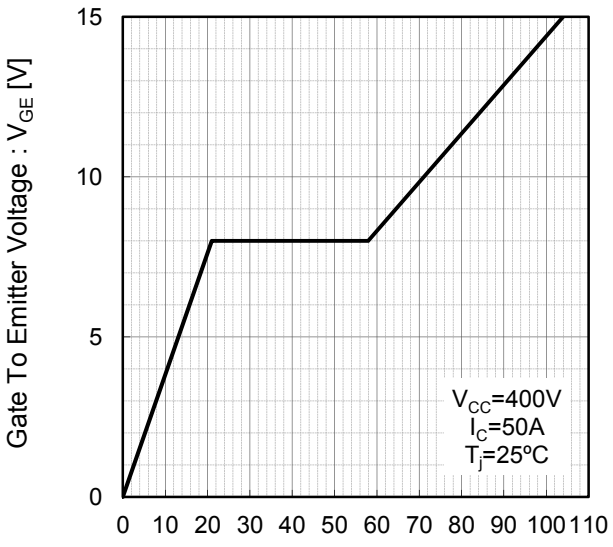


Fig.16 Typical Gate Charge



●Electrical Characteristic Curves

Fig.17 Typical Diode Forward Current vs. Forward Voltage

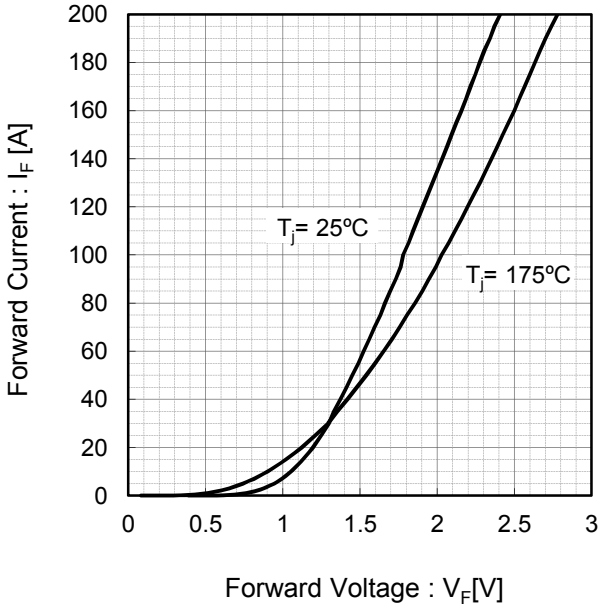


Fig.18 Typical Diode Reverse Recovery Time vs. Forward Current

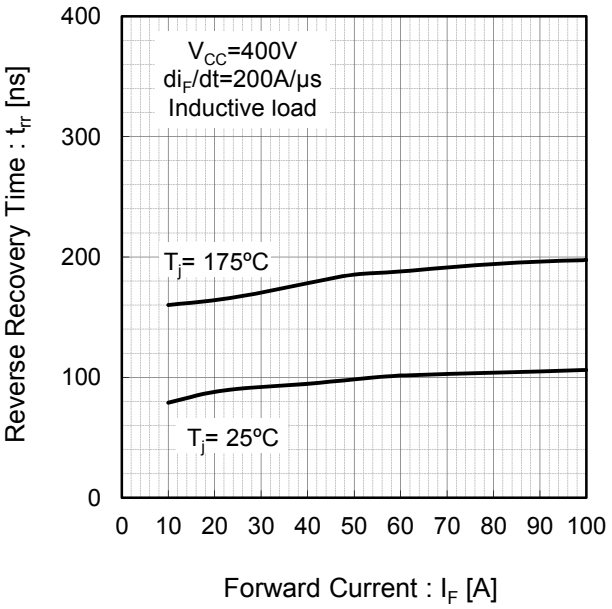


Fig.19 Typical Diode Reverse Recovery Current vs. Forward Current

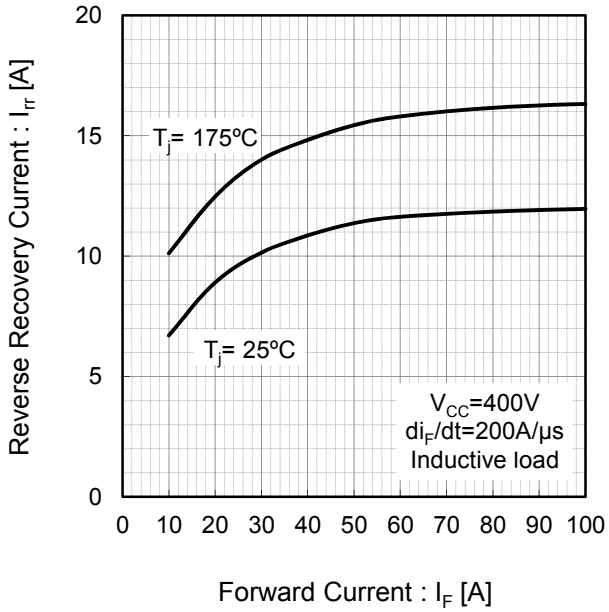
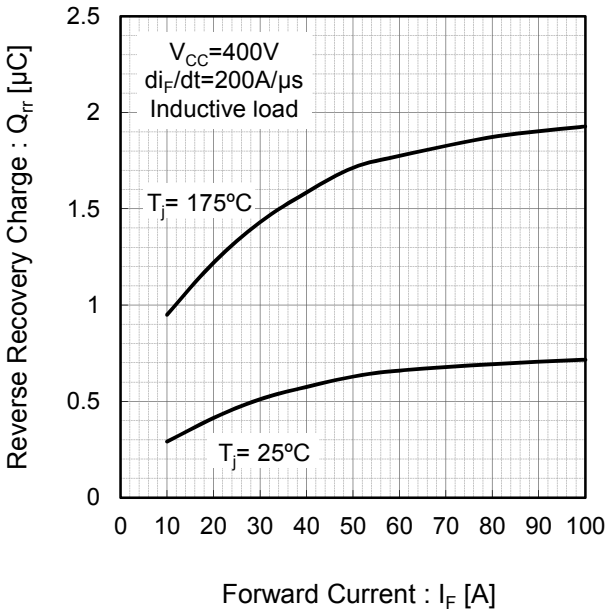
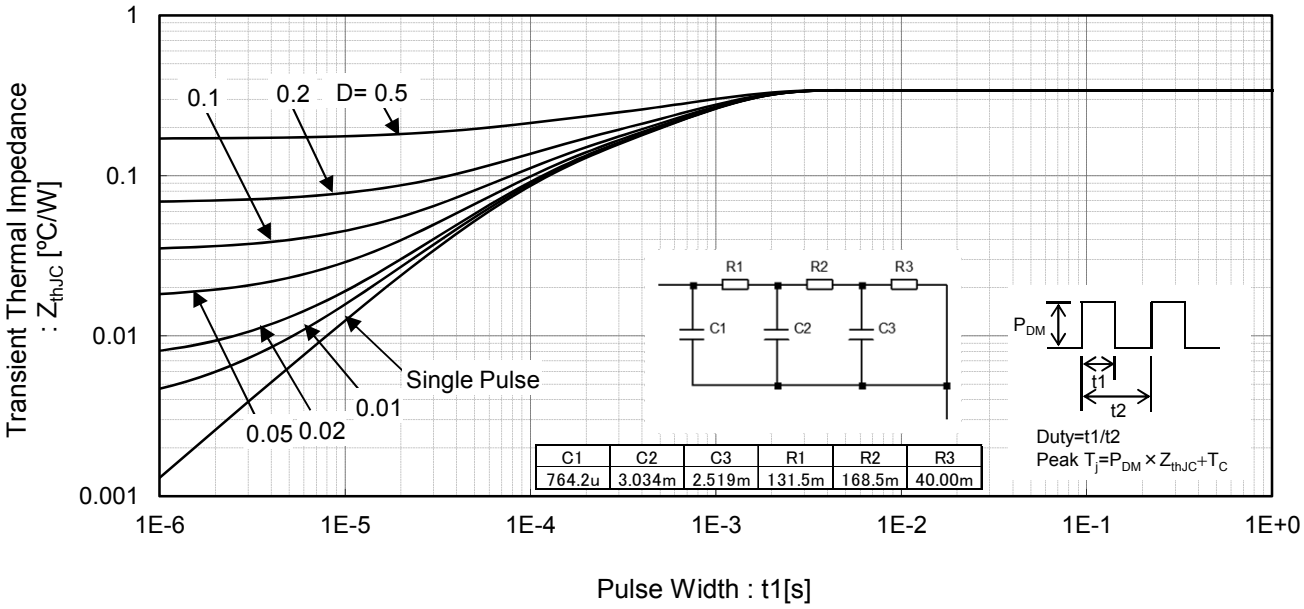


Fig.20 Typical Diode Reverse Recovery Charge vs. Forward Current



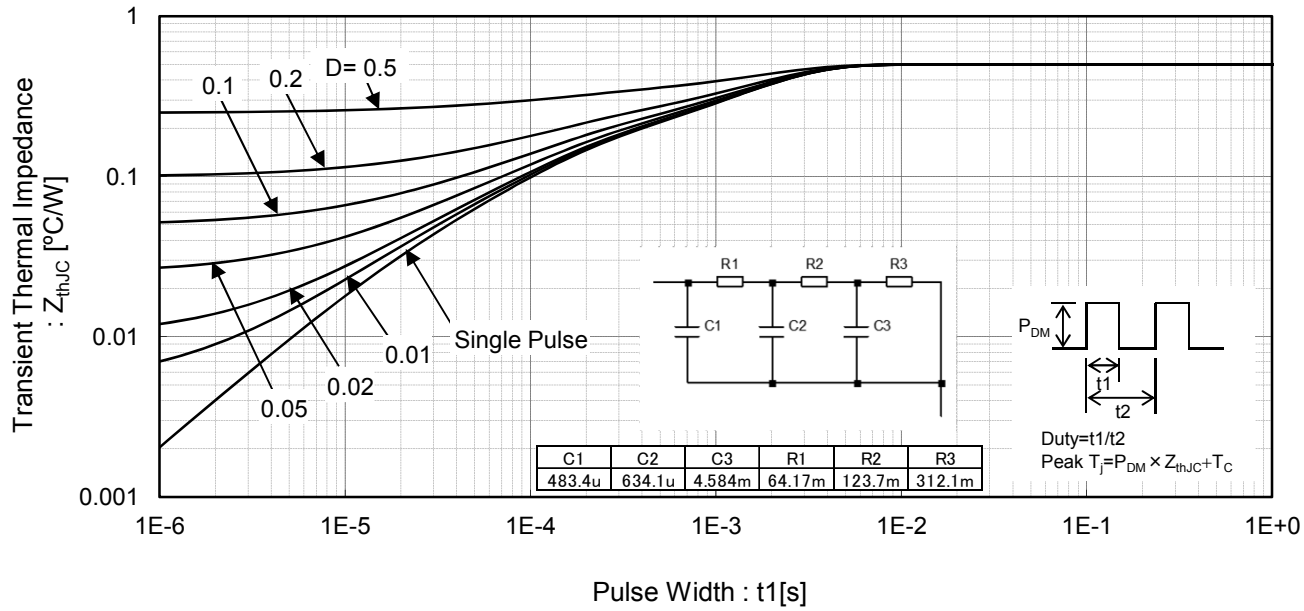
●Electrical Characteristic Curves

Fig.21 Typical IGBT Transient Thermal Impedance



C1	C2	C3	R1	R2	R3
764.2u	3.034m	2.519m	131.5m	168.5m	40.00m

Fig.22 Typical Diode Transient Thermal Impedance



C1	C2	C3	R1	R2	R3
483.4u	634.1u	4.584m	64.17m	123.7m	312.1m

●Inductive Load Switching Circuit and Waveform

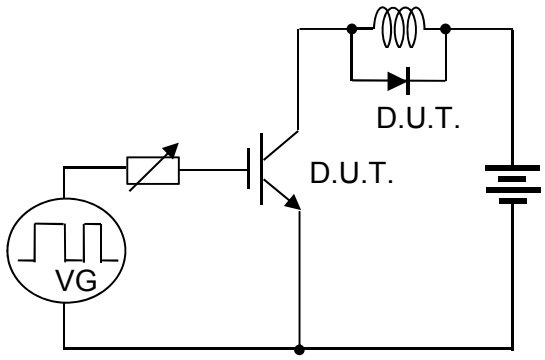


Fig.23 Inductive Load Circuit

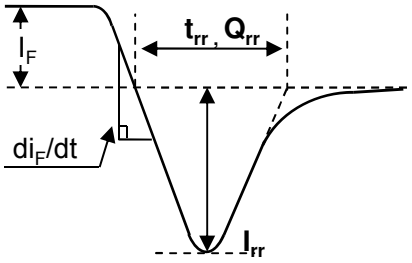


Fig.25 Diode Reverce Recovery Waveform

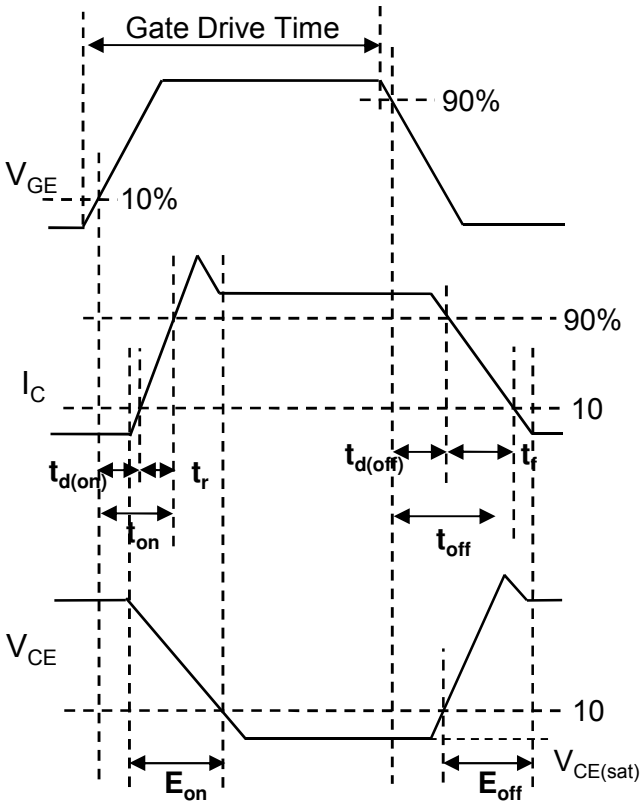


Fig.24 Inductive Load Waveform

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3) Although ROHM is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors.
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5) The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM or any other parties. ROHM shall have no responsibility whatsoever for any dispute arising out of the use of such technical information.

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7) The Products specified in this document are not designed to be radiation tolerant.

8) For use of our Products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a ROHM representative : transportation equipment (i.e. cars, ships, trains), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, servers, solar cells, and power transmission systems.

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ROHM SEMICONDUCTOR

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RGTV00TS65D - Web Page

Distribution Inventory

Part Number	RGTV00TS65D
Package	TO-247N
Unit Quantity	450
Minimum Package Quantity	30
Packing Type	Tube
Constitution Materials List	inquiry
RoHS	Yes