

GBF15T65VN



Silicon FS Trench IGBT

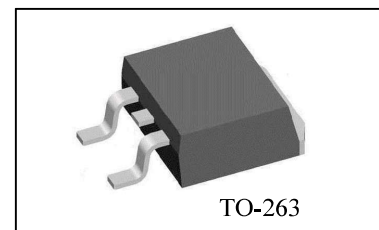
General Description :

Using Greemicro's proprietary trench design and advanced Field Stop (FS) technology, offering superior conduction and switching performances.

V_{CES}	650	V
I_C	15	A
$V_{CE(sat)}$	1.7	V
$P_{tot} (T_C=25^{\circ}C)$	95	W

Features :

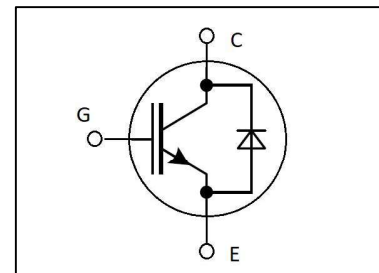
- FS Trench Technology, Positive temperature coefficient
- Low saturation voltage: $V_{CE(sat)}$, typ= 1.7V
@ $I_C = 15A$ and $T_C = 25^{\circ}C$
- RoHS Compliant



TO-263

Applications :

- Motor control and drive
- Solar Inverter
- UPS



Absolute Maximum Ratings ($T_C = 25^{\circ}C$ unless otherwise specified) :

Symbol	Parameter	Rating	Units
V_{CES}	Collector-Emitter Voltage	650	V
V_{GES}	Gate- Emitter Voltage	± 20	V
I_C	Collector Current	30	A
	Collector Current @ $T_C = 100^{\circ}C$	15	A
I_{CM}^{a1}	Pulsed Collector Current	45	A
I_F	Diode Continuous Forward Current @ $T_C = 100^{\circ}C$	10	A
I_{FM}	Diode Maximum Forward Current	40	A
P_D	Power Dissipation @ $T_C = 25^{\circ}C$	95	W
	Power Dissipation @ $T_C = 100^{\circ}C$	30	W
	Power Dissipation @ $T_A = 25^{\circ}C$	1.5	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	-55 to +150	$^{\circ}C$
T_L	Maximum Temperature for Soldering	270	$^{\circ}C$

^{a1}: Repetitive rating; pulse width limited by maximum junction temperature

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Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction to case for IGBT	--	1.3	$^{\circ}\text{C}/\text{W}$
$R_{\theta C}$	Thermal Resistance, Junction to case for Diode	--	2.8	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	--	62.5	$^{\circ}\text{C}/\text{W}$

Electrical Characteristics of the IGBT ($T_C=25^{\circ}\text{C}$ unless otherwise specified) :

OFF Characteristics						
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	$V_{GE}=0\text{V}, I_{CE}=250\mu\text{A}$	650	--	--	V
I_{CES}	Collector-Emitter Leakage Current	$V_{GE}=0\text{V}$ $V_{CE}=650\text{V}$	--	--	1.0	mA
$I_{GES(F)}$	Gate to Emitter Forward Leakage	$V_{GE}=+20\text{V}$	--	--	+250	nA
$I_{GES(R)}$	Gate to Source Reverse Leakage	$V_{GE}=-20\text{V}$	--	--	-250	nA
ON Characteristics						
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=15\text{A}, V_{GE}=15\text{V}$	--	1.7	2.4	V
$V_{GE(th)}$	Gate Threshold Voltage	$I_C=1\text{mA}, V_{CE}=V_{GE}$	4.0	5.7	7.0	V
Pulse width $t_p \leq 300\mu\text{s}, \delta \leq 2\%$						
Dynamic Characteristics						
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}$ $f=1\text{MHz}$	--	1095	--	pF
C_{oes}	Output Capacitance		--	60	--	
C_{res}	Reverse Transfer Capacitance		--	32	--	
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{CE}=400\text{V}, I_C=15\text{A}$ $V_{GE}=15\text{V}, R_g=10\Omega$ Inductive Load, $T_a=25^{\circ}\text{C}$	--	30	--	ns
t_r	Rise Time		--	30	--	
$t_{d(off)}$	Turn-Off Delay Time		--	45	--	
t_f	Fall Time		--	34	--	
E_{on}	Turn-On Switching Loss		--	0.60	--	mJ
E_{off}	Turn-Off Switching Loss		--	0.19	--	
E_{ts}	Total Switching Loss		--	0.79	--	
Q_g	Total Gate Charge	$V_{CE}=480\text{V}, I_C=15\text{A}$ $V_{GE}=15\text{V}$	--	59	--	nC
Q_{ge}	Gate to Emitter Charge		--	10	--	
Q_{gc}	Gate to Collector Charge		--	42	--	

Electrical Characteristics of the DIODE ($T_C=25^{\circ}\text{C}$ unless otherwise specified) :

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	$I_F=10\text{A}$	--	1.4	2.1	V
t_{rr}	Reverse Recovery Time	$I_F=10\text{A}$ $di/dt=100\text{A}/\mu\text{s}$	--	47	--	ns
I_{rm}	Reverse Recovery Current		--	7.5	--	A
Q_{rr}	Reverse Recovery Charge		--	176	--	nC
Pulse width $t_p \leq 300\mu\text{s}, \delta \leq 2\%$						

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Typical Performance Characteristics

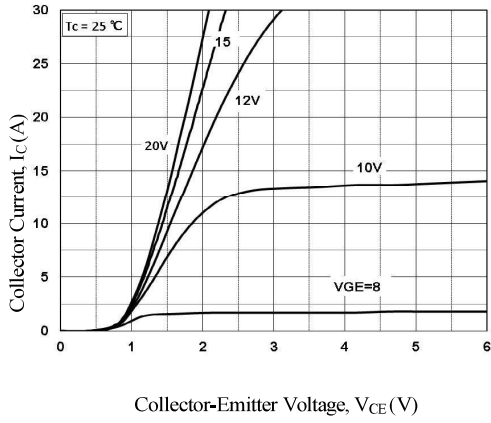


Figure 1. Output Characteristics

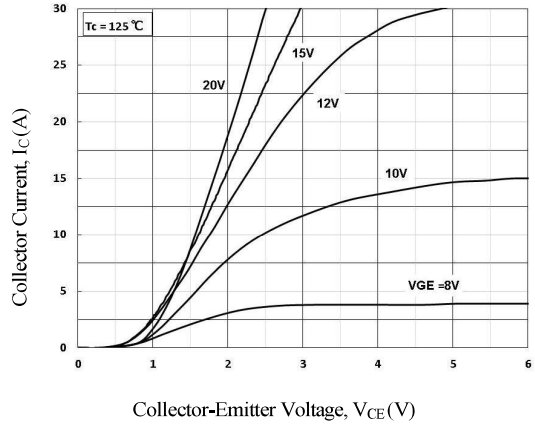


Figure 2. Output Characteristics

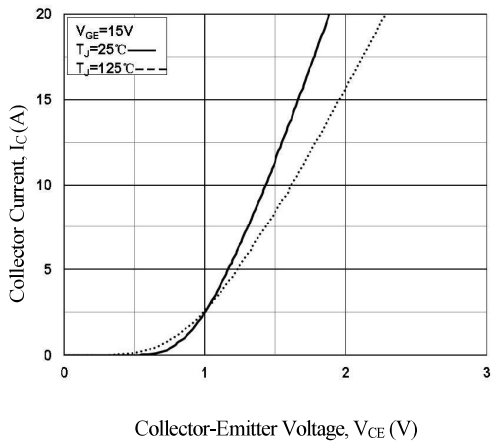


Figure 3. Saturation Voltage Characteristics

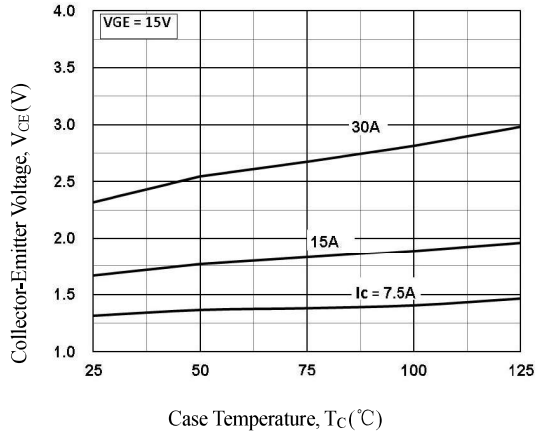


Figure 4. Saturation Voltage - T_c Characteristics

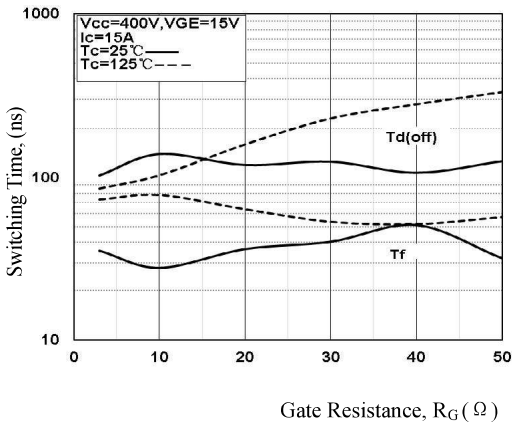


Figure 5. Switching Time - R_G Characteristics

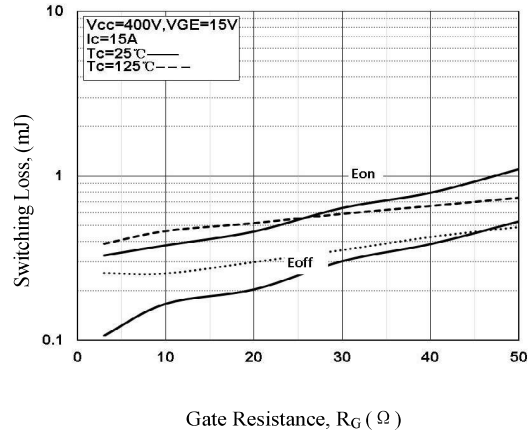


Figure 6. Switching Loss - R_G Characteristics

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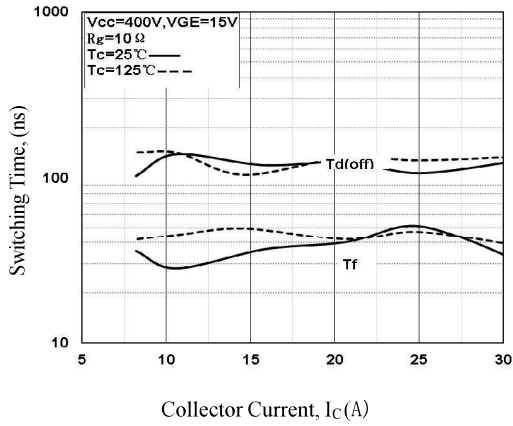


Figure 7. Switching Time- I_C Characteristics

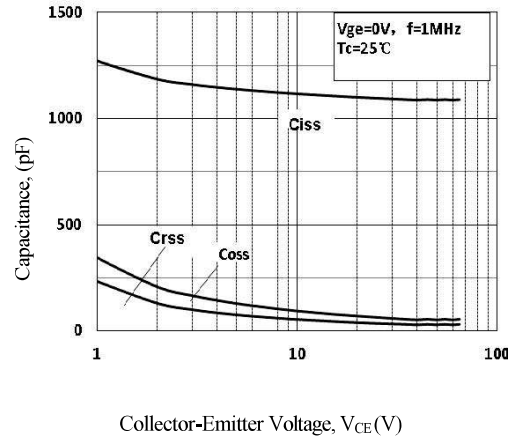


Figure 8. Capacitance Characteristics

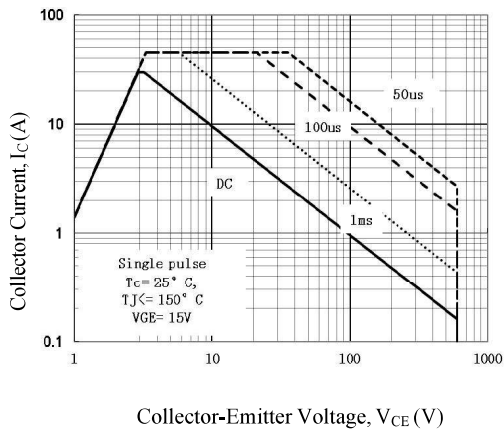


Figure 9. Forward Bias Safe Operating Area

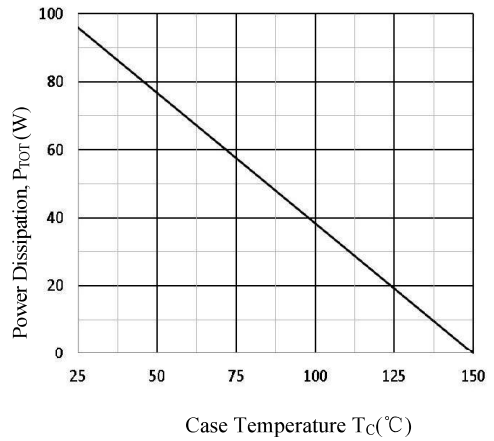


Figure 10. Power Dissipation- T_C Characteristics

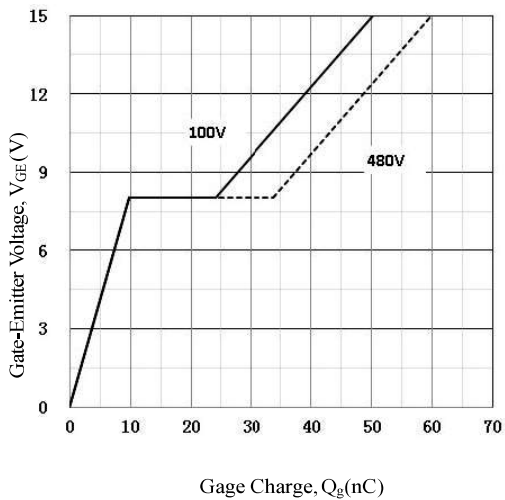


Figure 11. Gage Charge Characteristics

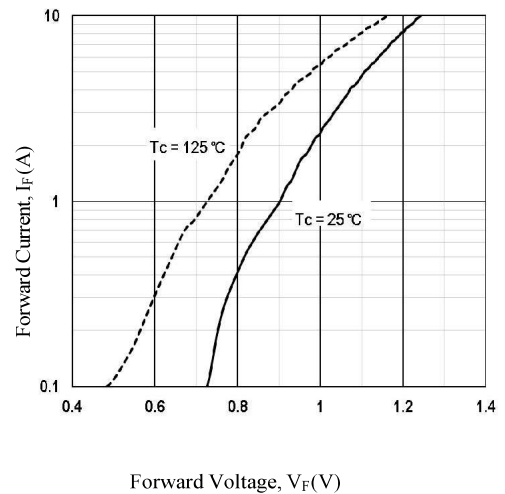


Figure 12. Diode Forward Characteristics

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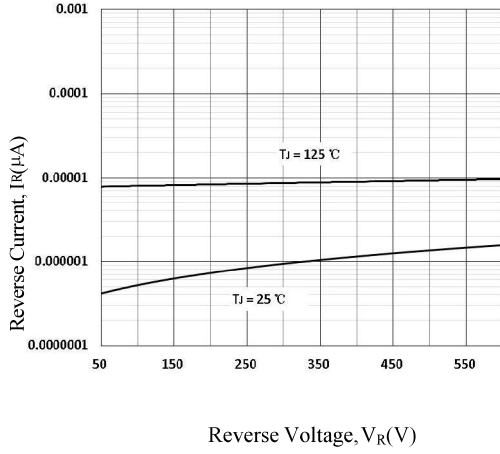


Figure 13. Diode Reverse Characteristics

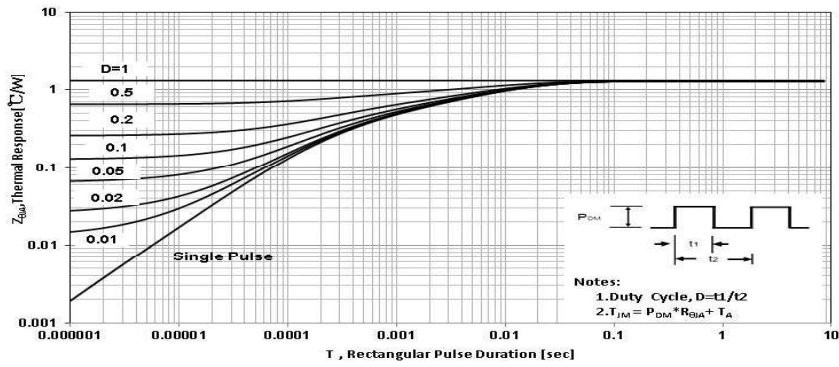
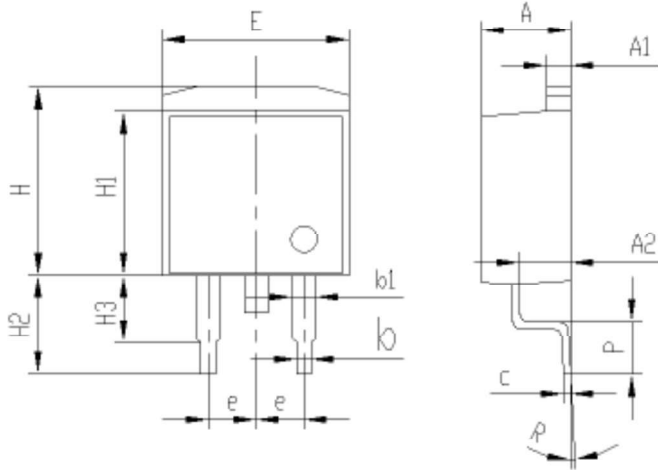


Figure 14. IGBT Transient Thermal Impedance

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Package Information (TO-263 PACKAGE)



Symbol	Dimensions(millimeters)	
	Min.	Max.
A	4.40	4.80
A1	1.17	1.37
A2	2.40	2.80
b	0.60	1.00
b1	1.05	1.45
c	0.26	0.50
e	2.34	2.74
E	9.70	10.1
H	9.90	10.3
H1	8.50	8.90
H2	4.85	5.25
H3	3.60	4.00
R	0°	6°
P	2.55	2.95

The name and content of poisonous and harmful material in products

	Hazardous Substance									
	Pb	Hg	Cd	Cr (VI)	PBB	PBDE	DIBP	DEHP	DBP	BBP
Limit	≤0.1%	≤0.1%	≤0.01%	≤0.1%	≤0.1%	≤0.1%	≤0.1%	≤0.1%	≤0.1%	≤0.1%
Lead Frame	○	○	○	○	○	○	○	○	○	○
Molding	○	○	○	○	○	○	○	○	○	○
Chip	○	○	○	○	○	○	○	○	○	○
Wire Bonding	○	○	○	○	○	○	○	○	○	○
Solder	×	○	○	○	○	○	○	○	○	○
Note	○: Means the hazardous material is under the criterion of 2011/65/EU. ×: Means the hazardous material exceeds the criterion of 2011/65/EU. The plumbum element of solder exist in products presently, but within the allowed range of Eurogroup's RoHS.									