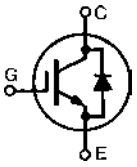
SG40T65DB2

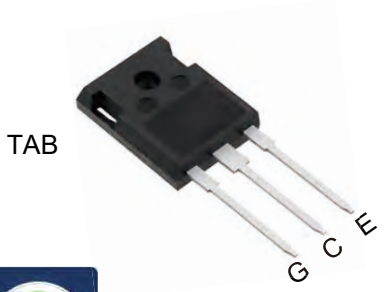
Discrete IGBTs For Welding

V_{CES} = 650V
I_{C100} = 40A
I_F = 20A
$V_{CEsat(typ)}$ =1.65V
$E_{OFF\ (typ)}$ = 0.65mJ



SG40T65DB2
With FWD(Free Wheeling Diode)

TO-247AD



G=Gate, C=Collector, E=Emitter, TAB=Collector

RoHS Compliant

IGBT

Symbol	Test Conditions	Maximum Ratings	Unit
V_{CES} V_{CGR}	T_J=25°C to 150°C T_J=25°C to 150°C; R_{GE}=1 MΩ;	650 650	V
V_{GES} V_{GEM}	Continuous Transient	±20 ±30	V
I_{C25} I_{C100} I_{CM}	T_C=25°C T_C=100°C T_C=25°C, 1 ms	80 40 120	A
SSOA (RBSOA)	V_{GE}=15V; T_{VJ}=125°C; R_G=22Ω Clamped inductive load; L=100uH	I_{CM}=80 @ 0.8 V_{CES}	A
P_C	T_C=25°C	250	W
T_J T_{JM} T_{stg}		-55...+150 150 -55...+150	°C
	Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10s	300	°C
M_d	Mounting torque	1.13/10	Nm/lb.in.
Weight	Typical	6	g

(T_J=25°C, unless otherwise specified)

Symbol	Test Conditions	Characteristic Values			Unit
		min.	typ.	max.	
BV_{CES}	I_C=250uA; V_{GE}=0V	650			V
$V_{GE(th)}$	I_C=250uA; V_{CE}=V_{GE}	4.5	5.5	7.0	V
I_{CES}	V_{CE}=0.8V_{CES}; T_J=25°C V_{GE}=0V; T_J=150°C			250 1	uA mA
I_{GES}	V_{CE}=0V; V_{GE}=±20V			±100	nA
$V_{CE(sat)}$	I_C=40A; V_{GE}=15V		1.65	2.10	V

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SG40T65DB2

Discrete IGBTs For Welding

(T_J=25°C, unless otherwise specified)

Symbol	Test Conditions	Characteristic Values			Unit
		min.	typ.	max.	
g_{ts}	I_C=40A; V_{CE}=10V Pulse test, t ≤ 300us, duty cycle ≤ 2%	20	30		S
C_{ies}			3100	4000	
C_{oes}	V_{CE}=25V; V_{GE}=0V; f=1MHz		220		pF
C_{res}			120		
Q_g			150		
Q_{ge}	I_C=40A; V_{GE}=15V; V_{CE}=0.5V_{CES}		25		nC
Q_{gc}			80		
$t_{d(on)}$	Inductive load, T_J=25°C		50		ns
t_{ri}	IC=40A; V_{GE}=15V; L=100uH		35		ns
$t_{d(off)}$	V_{CE}=0.5V_{CES}; R_G=R_{off}=10Ω		200		ns
t_{fi}	Remarks:Switching times may increase for V_{CE}(Clamp)＞0.8V_{CES}' higher T_J or		35		ns
E_{off}	increased R_G		0.65		mJ
$t_{d(on)}$	Inductive load, T_J=125°C		50		ns
t_{ri}	I_C=40A; V_{GE}=15V; L=100uH		40		ns
E_{on}	V_{CE}=0.5V_{CES}; R_G=R_{off}=10Ω		0.90		mJ
$t_{d(off)}$	Remarks:Switching times may increase		220		ns
t_{fi}	for V_{CE}(Clamp)＞0.8V_{CES}' higher T_J or		50		ns
E_{off}	increased R_G		0.90		mJ
R_{thJC}				0.73	K/W
R_{thCK}			0.25		K/W

Reverse Diode (FRED)

(T_J=25°C, unless otherwise specified)

Symbol	Test Conditions	Characteristic Values			Unit
		min.	typ.	max.	
V_F	I_F=20A; V_{GE}=0V;T_J=125°C Pulse test, t ≤ 300us, duty cycle ≤ 2%; T_J=25°C		1.85 1.80	 2.3	V
I_{RM}	I_F=20A; V_{GE}=0V; -di$_F$/dt=100A/us		10		A
	V_R=100V; T_J=125°C		120		ns
t_{rr}	I_F=20A; -di/dt=100A/us; V_R=30V; T_J=25°C		70		ns
R_{thJC}				1.2	K/W

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SG40T65DB2

Discrete IGBTs For Welding

Features

•Trench Field Stop IGBT technology
• Low switching losses
• Switching frequency up to 30 kHz
• Square RBSOA, no latch up
• High short circuit capability
• Positive temperature coefficient for easy parallelling
• MOS input, voltage controlled
• Ultra fast free wheeling diodes

Application

• Welding inverters

Advantages

• space and weight savings
• reduced protection circuits

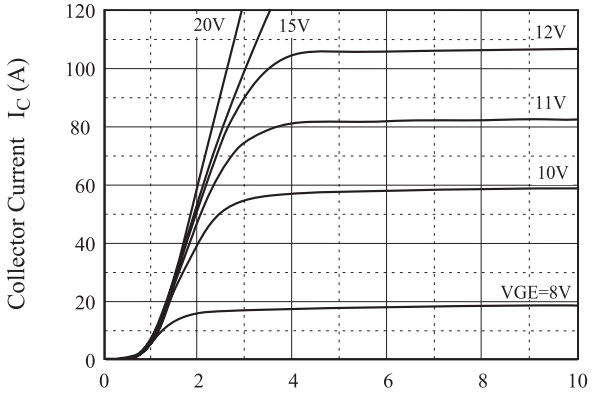

Fig 1. Saturation Voltage Characteristics

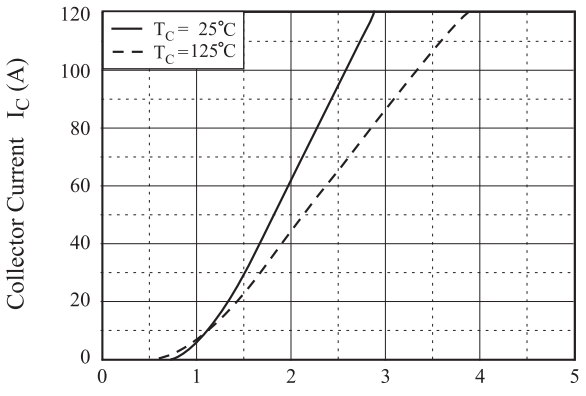

Fig 2. Saturation Voltage Characteristics

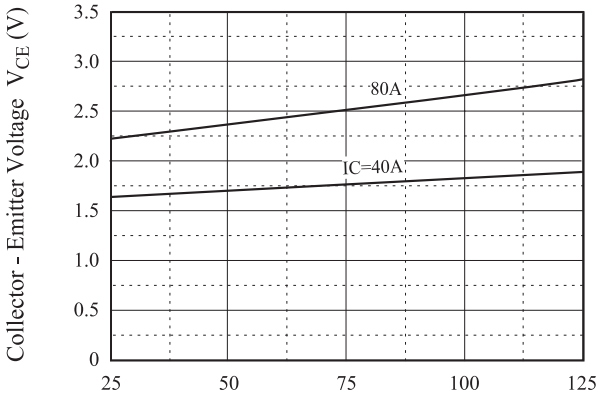

Fig 3. Saturation Voltage vs. Case Temperature

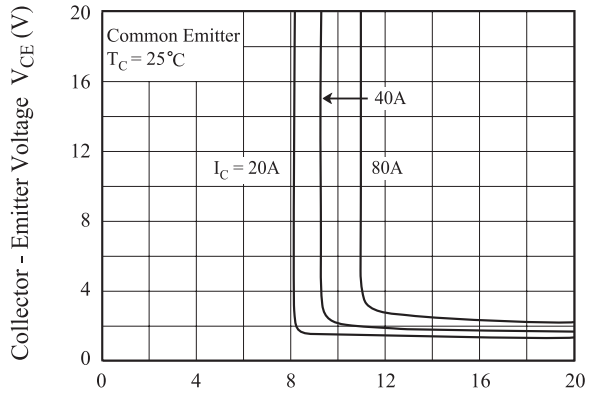

Fig 4. Saturation Voltage vs. V_{GE}

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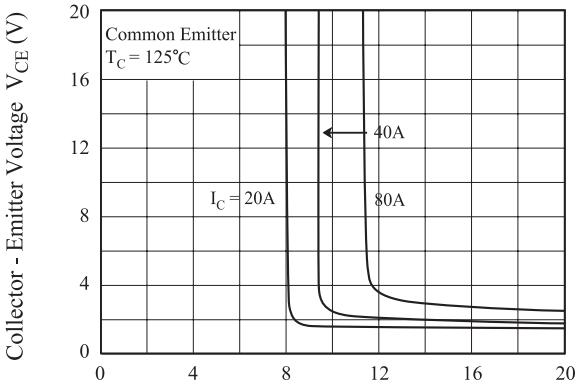

Fig 5. Saturation Voltage vs. V_{GE}

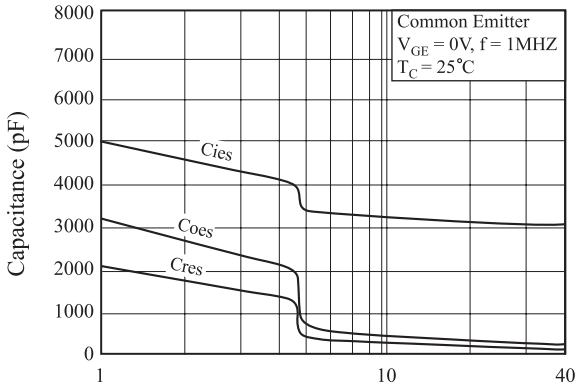

Fig 6. Capacitance Characteristics

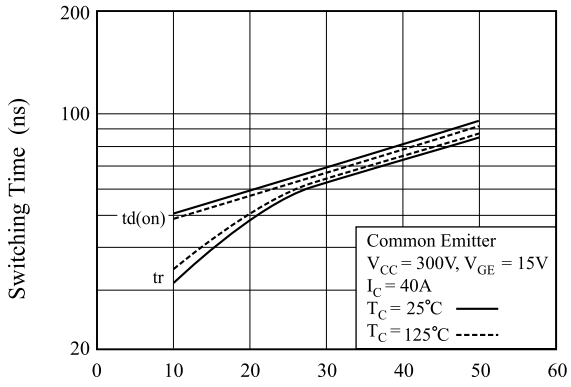

Fig 7. Turn-On Characteristics vs. Gate Resistance

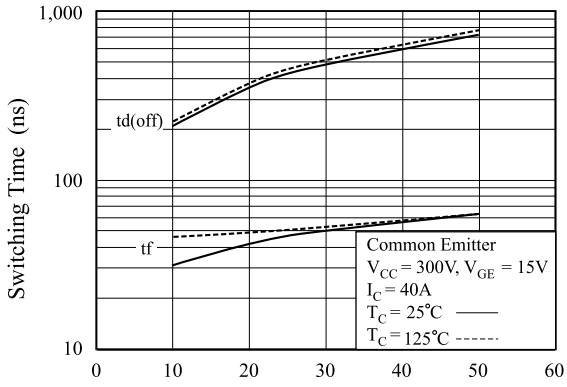

Fig 8. Turn-Off Characteristics vs. Gate Resistance

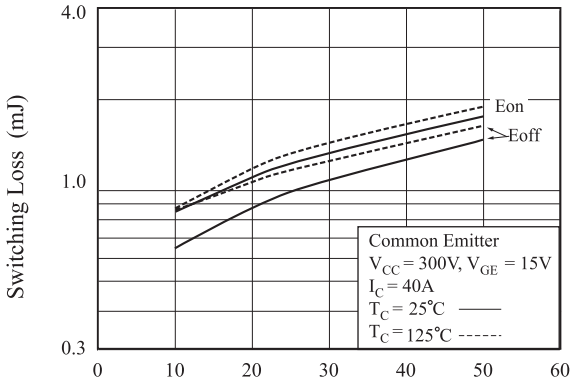

Fig 9. Switching Loss vs. Gate Resistance

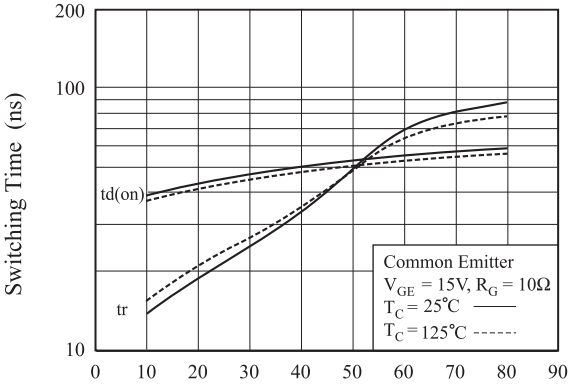

Fig 10. Turn-On Characteristics vs. Collector Current

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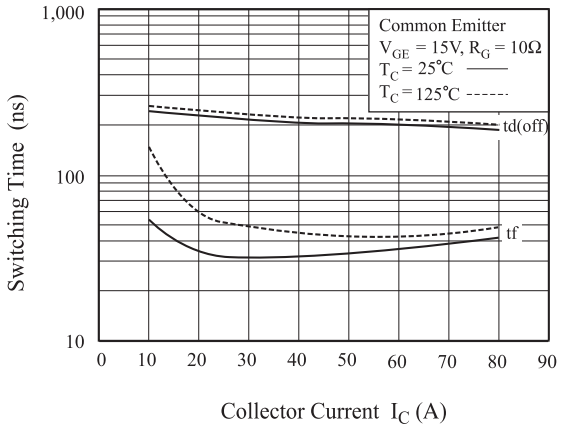

Fig 11. Turn-Off Characteristics vs. Collector Current

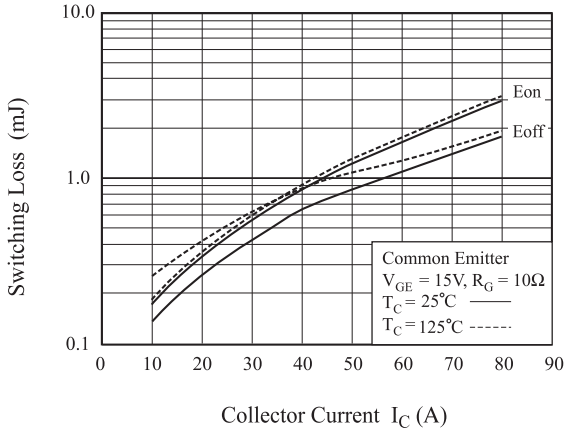

Fig 12. Switching Loss vs. Collector Current

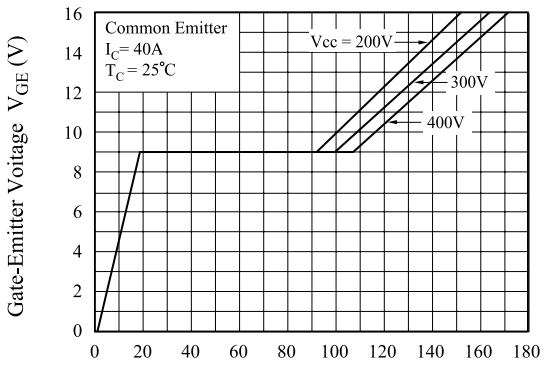

Fig 13. Gate Charge Characteristics

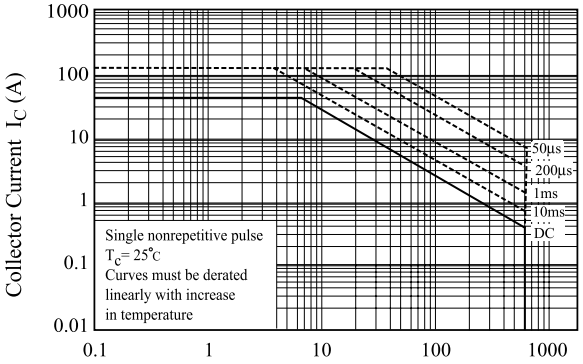

Fig 14. SOA Characteristics

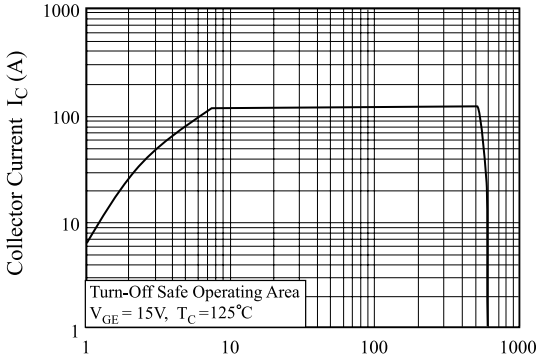

Fig 15. Turn-Off SOA

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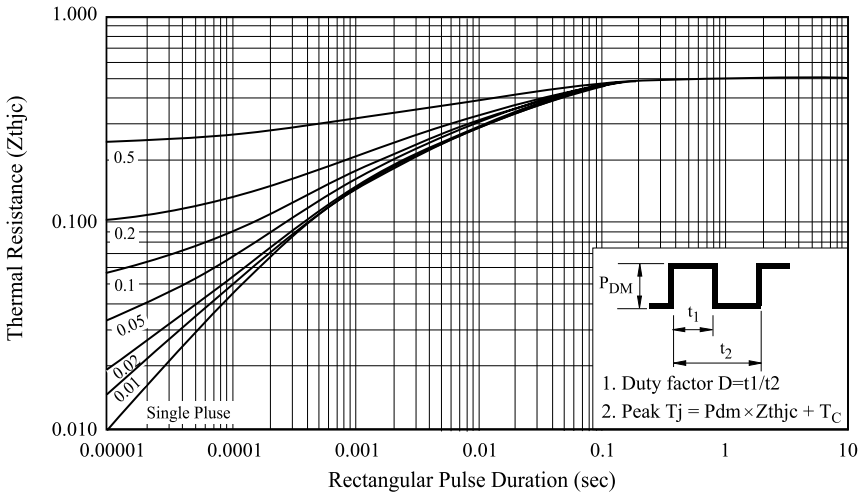

Fig 16. Transient Thermal Impedance of IGBT

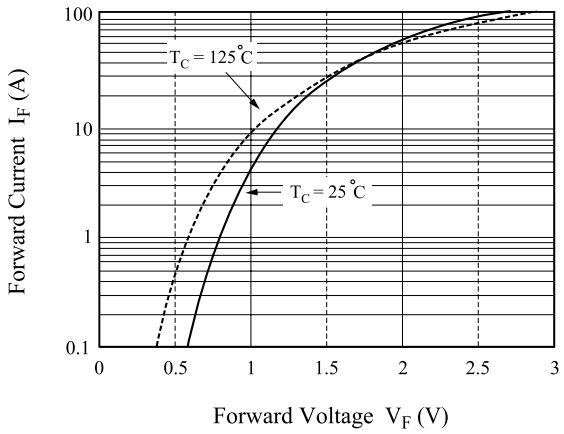

Fig 17. Forward Characteristics

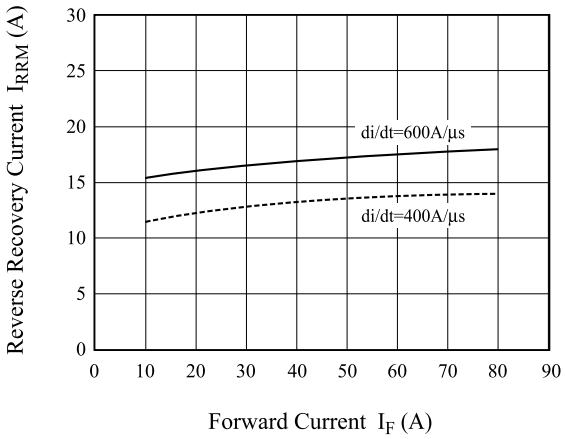

Fig 18. Reverse Recovery Current

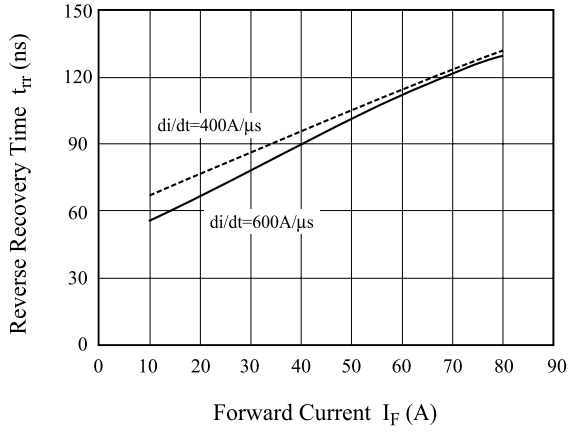

Fig 19. Reverse Recovery Time

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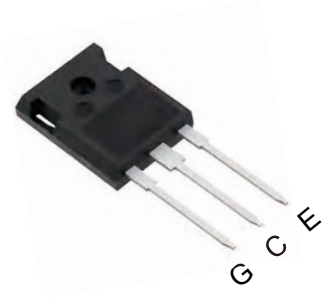
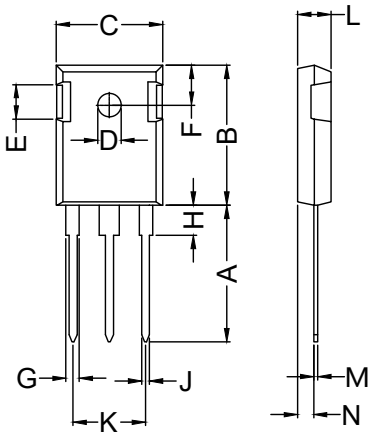
SG40T65DB2

Discrete IGBTs For Welding

Dimensions TO-247AD



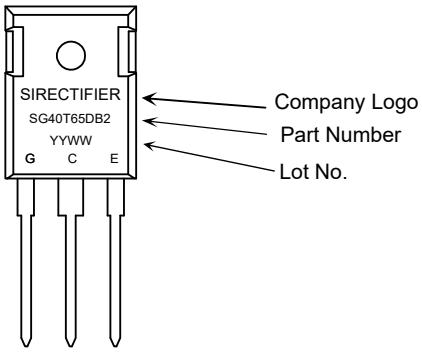


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	19.81	20.32	0.780	0.800
B	20.80	21.46	0.819	0.845
C	15.75	16.26	0.620	0.640
ØD	3.15	3.65	0.124	0.144
E	4.32	5.49	0.170	0.216
F	5.40	6.30	0.213	0.248
G	1.65	2.18	0.065	0.086
H	3.80	4.50	0.150	0.177
J	1.00	1.40	0.039	0.055
K	10.80	11.10	0.425	0.437
L	4.70	5.30	0.185	0.209
M	0.40	0.80	0.016	0.031
N	1.50	2.49	0.059	0.098

Marking

SG40T65DB2

(TO-247AD)



Ordering Information

Part Number	Package	Shipping	Marking Code
SG40T65DB2	TO-247AD	30pcs / Tube	SG40T65DB2

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