

SG40T65DB2

Discrete IGBTs For Welding

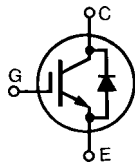
$$V_{CES} = 650V$$

$$I_{C100} = 40A$$

$$I_F = 20A$$

$$V_{CESat(typ)} = 1.65V$$

$$E_{off(typ)} = 0.65mJ$$

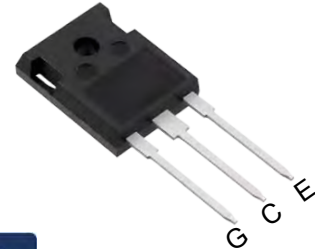


SG40T65DB2

With FWD(Free
Wheeling Diode)

TO-247AD

TAB



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



IGBT

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

($T_J=25^{\circ}C$, unless otherwise specified)

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

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(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} C _{oes} C _{res}	V _{CE} =25V; V _{GE} =0V; f=1MHz		3100 220 120	4000	pF
Q _g Q _{ge} Q _{gc}	I _C =40A; V _{GE} =15V; V _{CE} =0.5V _{CES}		150 25 80		nC
t _{d(on)} t _{ri} t _{d(off)} t _{fi} E _{off}	Inductive load, T _J =25°C I _C =40A; V _{GE} =15V; L=100uH V _{CE} =0.5V _{CES} ; R _G =R _{off} =10 Ω Remarks: Switching times may increase for V _{CE} (Clamp) > 0.8V _{CES} higher T _J or increased R _G		50 35 200 35 0.65		ns ns ns ns mJ
t _{d(on)} t _{ri} E _{on} t _{d(off)} t _{fi} E _{off}	Inductive load, T _J =125°C I _C =40A; V _{GE} =15V; L=100uH V _{CE} =0.5V _{CES} ; R _G =R _{off} =10 Ω Remarks: Switching times may increase for V _{CE} (Clamp) > 0.8V _{CES} higher T _J or increased R _G		50 40 0.90 220 50 0.90		ns ns mJ ns ns 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} t _{rr}	I _F =20A; V _{GE} =0V; -di _F /dt=100A/us V _R =100V; T _J =125°C I _F =20A; -di _F /dt=100A/us; V _R =30V; T _J =25°C		10 120 70		A ns ns
R _{thJC}				1.2	K/W

Sirectifier®

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

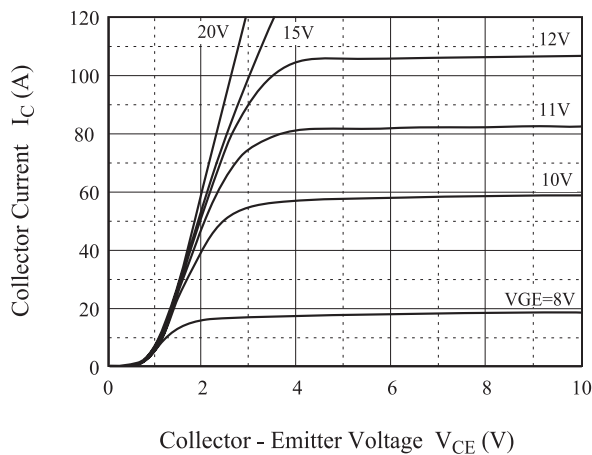


Fig 1. Saturation Voltage Characteristics

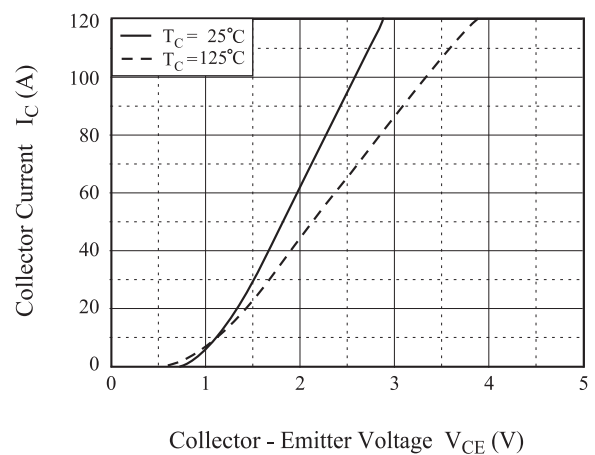


Fig 2. Saturation Voltage Characteristics

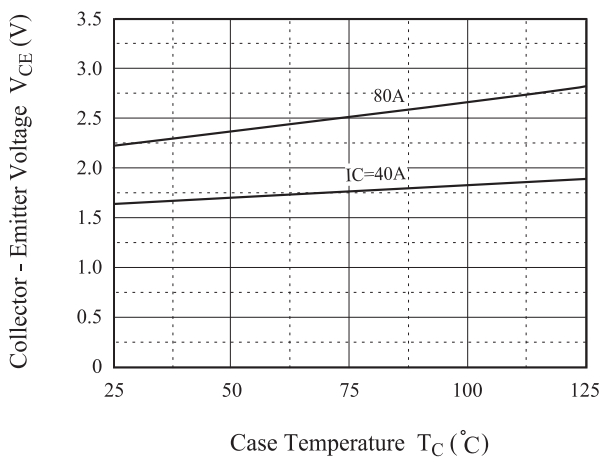


Fig 3. Saturation Voltage vs. Case Temperature

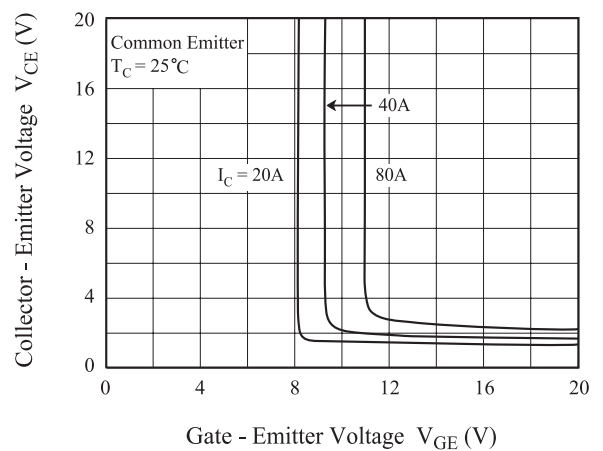


Fig 4. Saturation Voltage vs. V_{GE}

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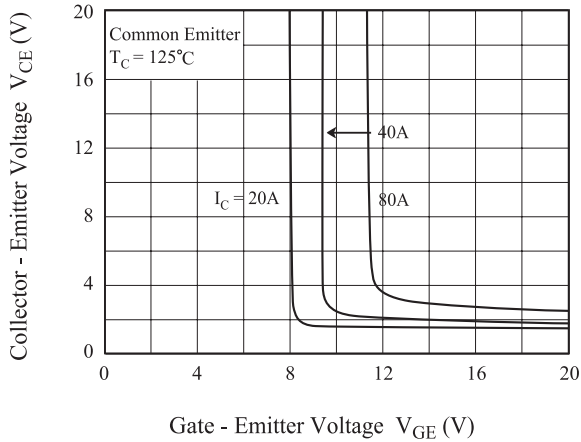


Fig 5. Saturation Voltage vs. V_{GE}

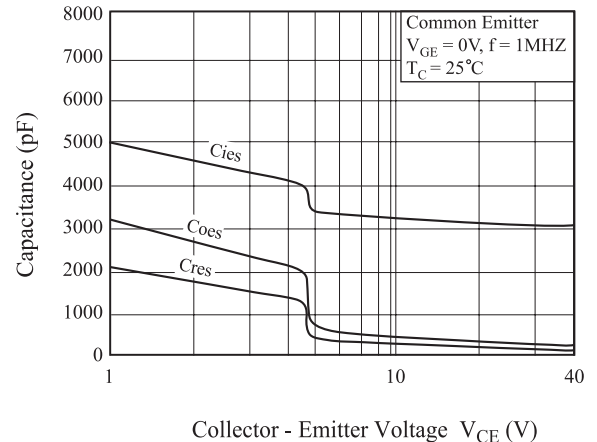


Fig 6. Capacitance Characteristics

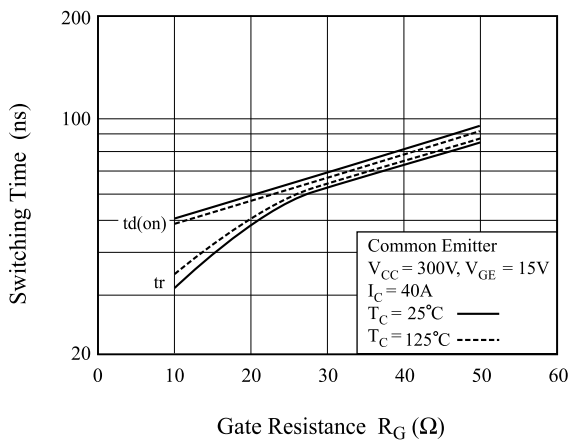


Fig 7. Turn-On Characteristics vs. Gate Resistance

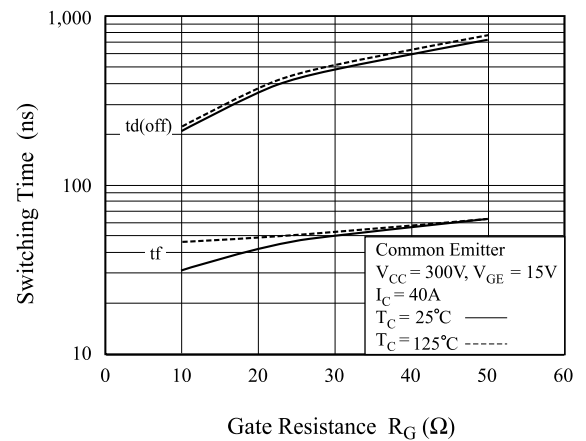


Fig 8. Turn-Off Characteristics vs. Gate Resistance

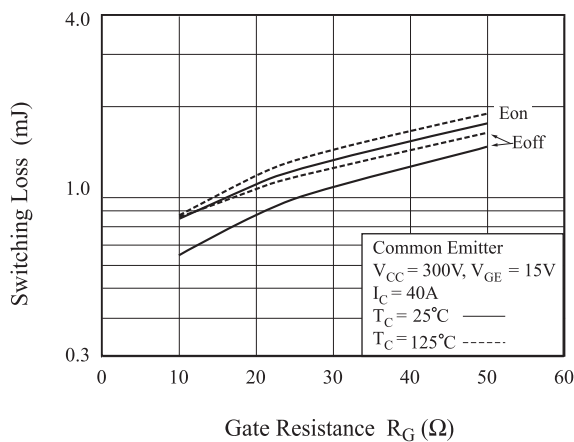


Fig 9. Switching Loss vs. Gate Resistance

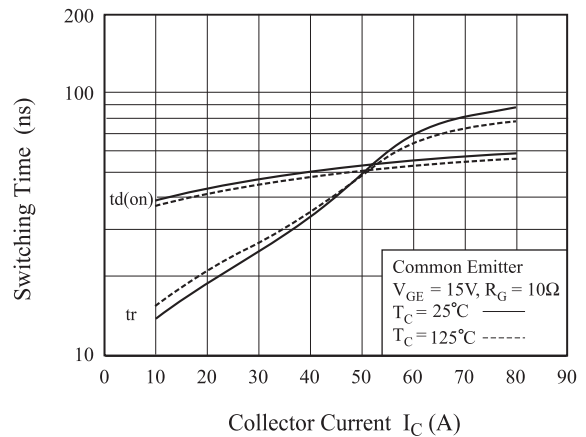


Fig 10. Turn-On Characteristics vs. Collector Current

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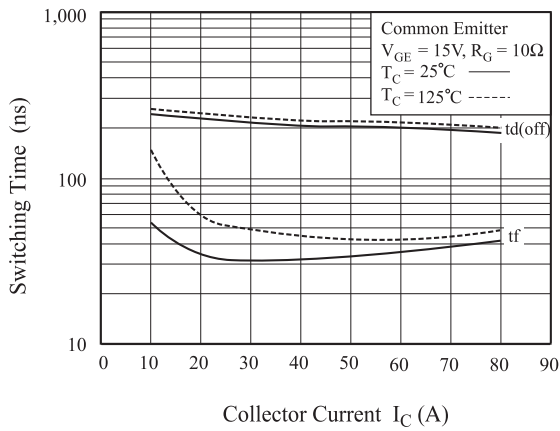


Fig 11. Turn-Off Characteristics vs. Collector Current

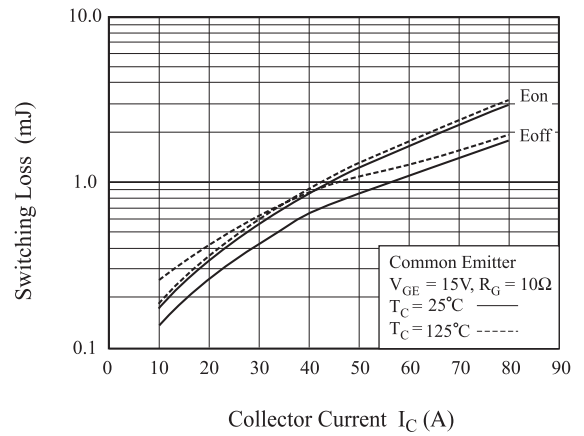


Fig 12. Switching Loss vs. Collector Current

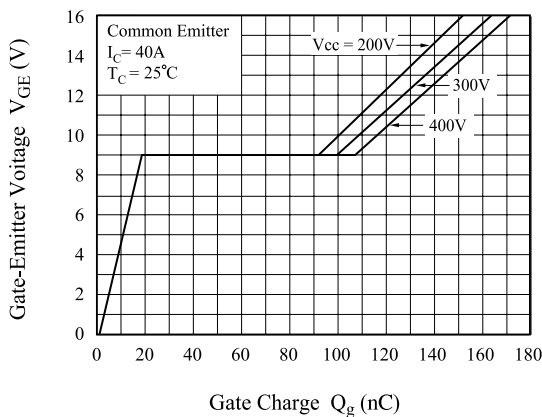


Fig 13. Gate Charge Characteristics

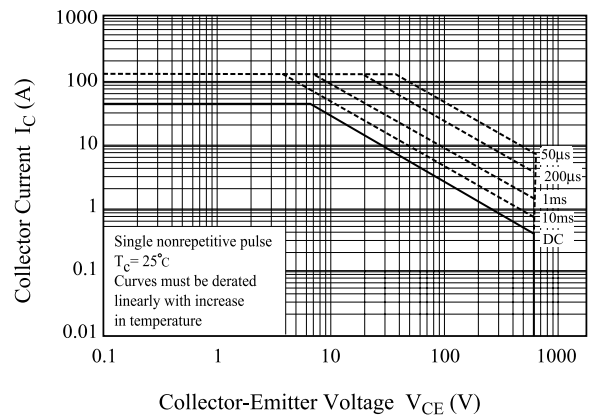


Fig 14. SOA Characteristics

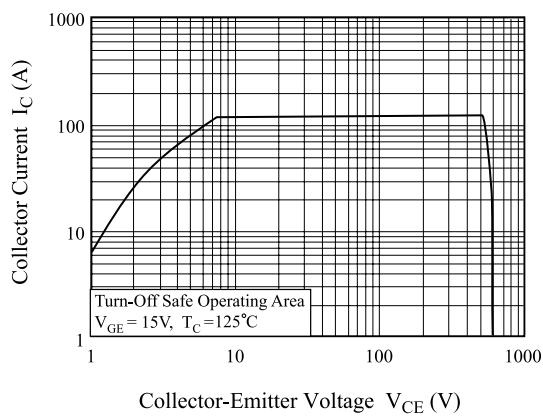


Fig 15. Turn-Off SOA

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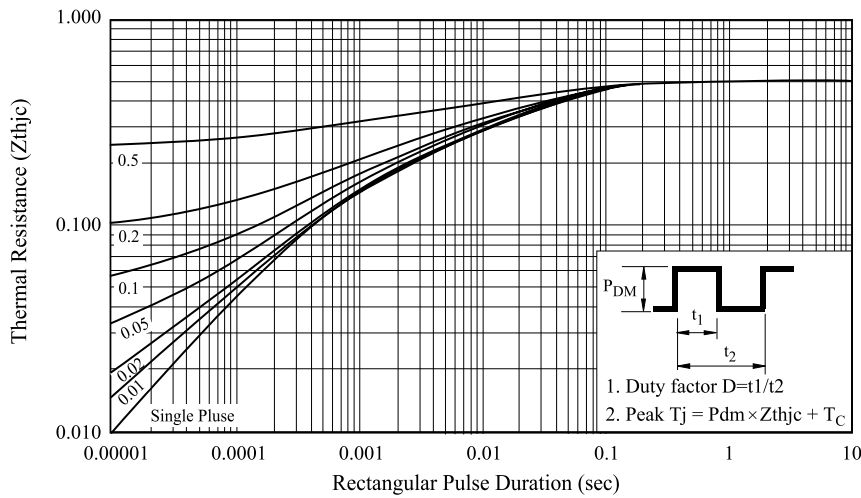


Fig 16. Transient Thermal Impedance of IGBT

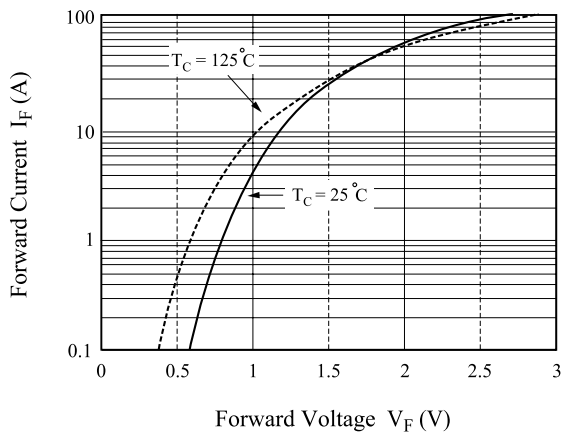


Fig 17. Forward Characteristics

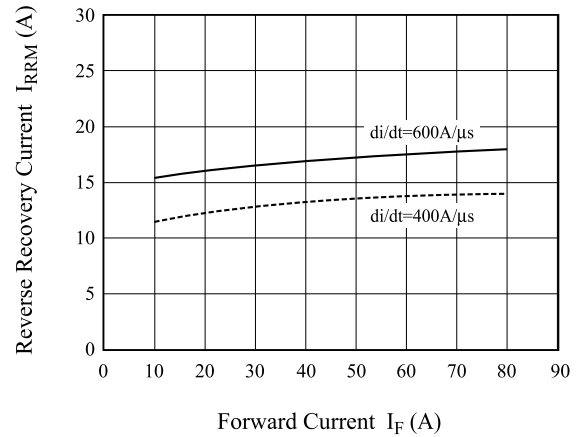


Fig 18. Reverse Recovery Current

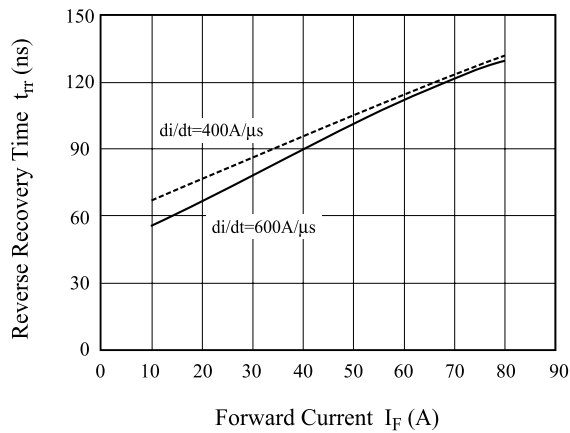
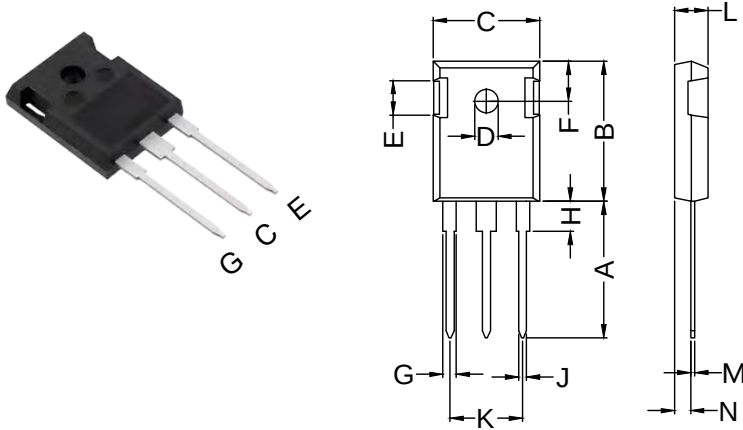


Fig 19. Reverse Recovery Time

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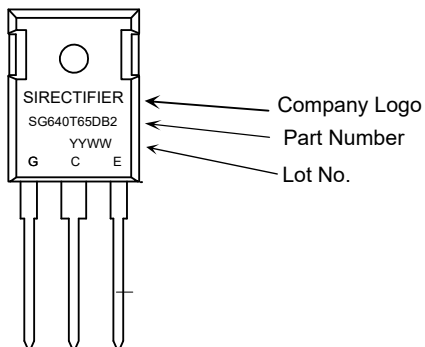
Dimensions TO-247AD



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