ON Semiconductor

Is Now

To learn more about onsemi™, please visit our website at
www.onsemi.com

ON Semiconductor®

FGB3040G2-F085 / FGD3040G2-F085
FGP3040G2-F085 / FGI3040G2-F085

EcoSPARK®2 300mJ, 400V, N-Channel Ignition IGBT

Features

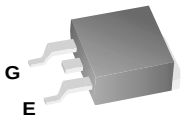
- SCIS Energy = 300mJ at T_J = 25°C
- Logic Level Gate Drive
- Qualified to AEC Q101
- RoHS Compliant

Applications

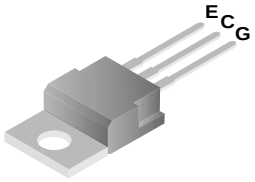
- Automotive Ignition Coil Driver Circuits
- Coil On Plug Applications

Package

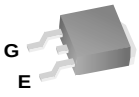
JEDEC TO-263AB
D²-Pak



JEDEC TO-220AB

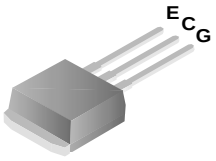


JEDEC TO-252AA
D-Pak

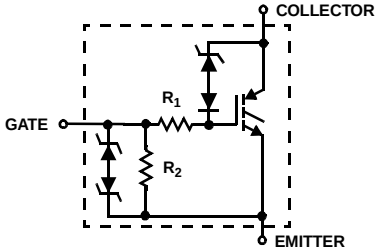


COLLECTOR
(FLANGE)

JEDEC TO-262AA



Symbol



Device Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
BV_{CER}	Collector to Emitter Breakdown Voltage (I_C = 1mA)	400	V
BV_{ECS}	Emitter to Collector Voltage - Reverse Battery Condition (I_C = 10mA)	28	V
E_{SCIS25}	Self Clamping Inductive Switching Energy (Note 1)	300	mJ
$E_{SCIS150}$	Self Clamping Inductive Switching Energy (Note 2)	170	mJ
I_{C25}	Collector Current Continuous, at V_{GE} = 5.0V, T_C = 25°C	41	A
I_{C110}	Collector Current Continuous, at V_{GE} = 5.0V, T_C = 110°C	25.6	A
V_{GEM}	Gate to Emitter Voltage Continuous	±10	V
P_D	Power Dissipation Total, at T_C = 25°C	150	W
	Power Dissipation Derating, for T_C > 25°C	1	W/°C
T_J	Operating Junction Temperature Range	-55 to +175	°C
T_{STG}	Storage Junction Temperature Range	-55 to +175	°C
T_L	Max. Lead Temp. for Soldering (Leads at 1.6mm from case for 10s)	300	°C
T_{PKG}	Reflow soldering according to JESD020C	260	°C
ESD	HBM-Electrostatic Discharge Voltage at100pF, 1500Ω	4	kV
	CDM-Electrostatic Discharge Voltage at 1Ω	2	kV

August-2017, Rev. 3

Publication Order Number:
FGB3040G2-F085/D

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FGB3040G2	FGB3040G2-F085	TO-263AB	330mm	24mm	800
FGD3040G2	FGD3040G2-F085	TO-252AA	330mm	16mm	2500
FGP3040G2	FGP3040G2-F085	TO-220AB	Tube	N/A	50
FGI3040G2	FGI3040G2-F085	TO-262AA	Tube	N/A	50

Electrical Characteristics T_A = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions		Min	Typ	Max	Units
Off State Characteristics							
BV_{CER}	Collector to Emitter Breakdown Voltage	I_{CE} = 2mA, V_{GE} = 0, R_{GE} = 1KΩ, T_J = -40 to 150°C		370	400	430	V
BV_{CES}	Collector to Emitter Breakdown Voltage	I_{CE} = 10mA, V_{GE} = 0V, R_{GE} = 0, T_J = -40 to 150°C		390	420	450	V
BV_{ECS}	Emitter to Collector Breakdown Voltage	I_{CE} = -20mA, V_{GE} = 0V, T_J = 25°C		28	-	-	V
BV_{GES}	Gate to Emitter Breakdown Voltage	I_{GES} = ±2mA		±12	±14	-	V
I_{CER}	Collector to Emitter Leakage Current	V_{CE} = 250V, R_{GE} = 1KΩ	T_J = 25°C	-	-	25	μA
			T_J = 150°C	-	-	1	mA
I_{ECS}	Emitter to Collector Leakage Current	V_{EC} = 24V,	T_J = 25°C	-	-	1	mA
			T_J = 150°C	-	-	40	
R_1	Series Gate Resistance			-	120	-	Ω
R_2	Gate to Emitter Resistance			10K	-	30K	Ω
On State Characteristics							
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	I_{CE} = 6A, V_{GE} = 4V,	T_J = 25°C	-	1.15	1.25	V
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	I_{CE} = 10A, V_{GE} = 4.5V,	T_J = 150°C	-	1.35	1.50	V
$V_{CE(SAT)}$	Collector to Emitter Saturation Voltage	I_{CE} = 15A, V_{GE} = 4.5V,	T_J = 150°C	-	1.68	1.85	V
E_{SCIS}	Self Clamped Inductive Switching	L = 3.0 mHy, R_G = 1KΩ, V_{GE} = 5V, (Note 1)	T_J = 25°C	-	-	300	mJ
Thermal Characteristics							
$R_{\theta JC}$	Thermal Resistance Junction to Case			-	-	1	°C/W

Notes:

1: Self Clamping Inductive Switching Energy (E_{SCIS25}) of 300 mJ is based on the test conditions that starting Tj=25°C; L=3mHy, I_{SCIS}=14.2A,V_{CC}=100V during inductor charging and V_{CC}=0V during the time in clamp.

2: Self Clamping Inductive Switching Energy ($E_{SCIS150}$) of 170 mJ is based on the test conditions that starting Tj=150°C; L=3mHy, I_{SCIS}=10.8A,V_{CC}=100V during inductor charging and V_{CC}=0V during the time in clamp.

Electrical Characteristics T_A = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions		Min	Typ	Max	Units
Dynamic Characteristics							
$Q_{G(ON)}$	Gate Charge	I_{CE} = 10A, V_{CE} = 12V, V_{GE} = 5V		-	21	-	nC
$V_{GE(TH)}$	Gate to Emitter Threshold Voltage	I_{CE} = 1mA, V_{CE} = V_{GE},	T_J = 25°C	1.3	1.7	2.2	V
			T_J = 150°C	0.75	1.2	1.8	
V_{GEP}	Gate to Emitter Plateau Voltage	V_{CE} = 12V, I_{CE} = 10A		-	2.8	-	V
Switching Characteristics							
$t_{d(ON)R}$	Current Turn-On Delay Time-Resistive	V_{CE} = 14V, R_L = 1Ω		-	0.9	4	μs
t_{rR}	Current Rise Time-Resistive	V_{GE} = 5V, R_G = 1KΩ T_J = 25°C,		-	1.9	7	μs
$t_{d(OFF)L}$	Current Turn-Off Delay Time-Inductive	V_{CE} = 300V, L = 1mH,		-	4.8	15	μs
t_{fL}	Current Fall Time-Inductive	V_{GE} = 5V, R_G = 1KΩ I_{CE} = 6.5A, T_J = 25°C,		-	2.0	15	μs

Typical Performance Curves

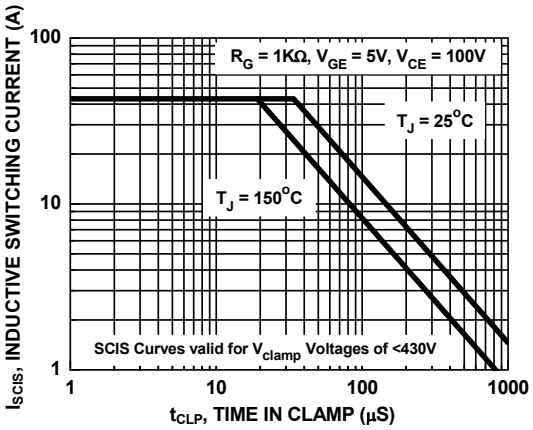


Figure 1. Self Clamped Inductive Switching Current vs. Time in Clamp

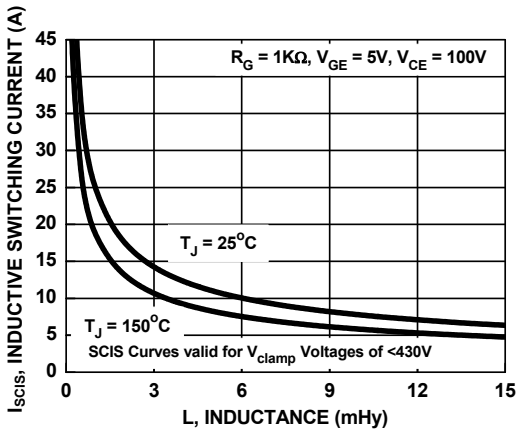


Figure 2. Self Clamped Inductive Switching Current vs. Inductance

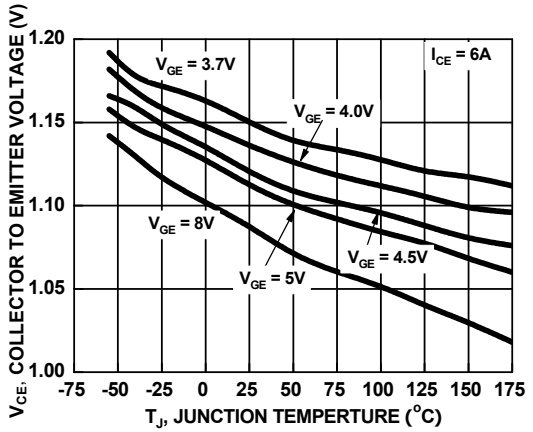


Figure 3. Collector to Emitter On-State Voltage vs. Junction Temperature

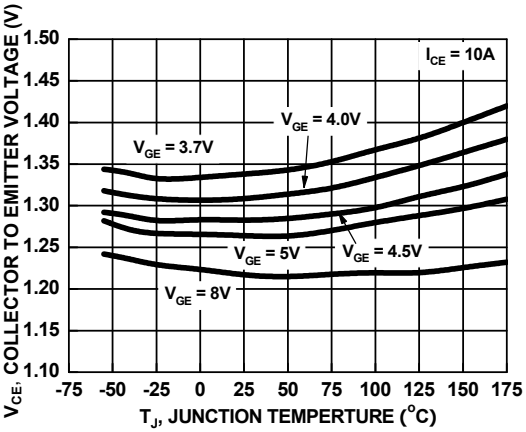


Figure 4. Collector to Emitter On-State Voltage vs. Junction Temperature

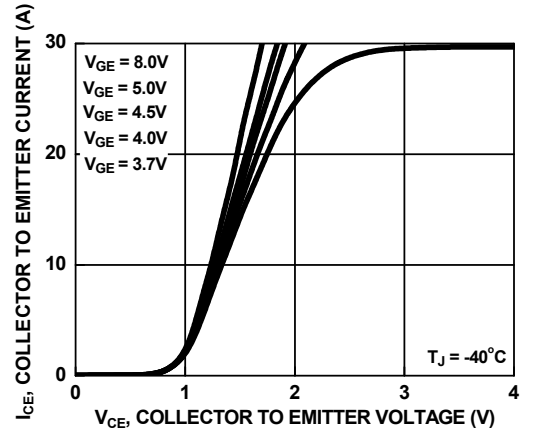


Figure 5. Collector to Emitter On-State Voltage vs. Collector Current

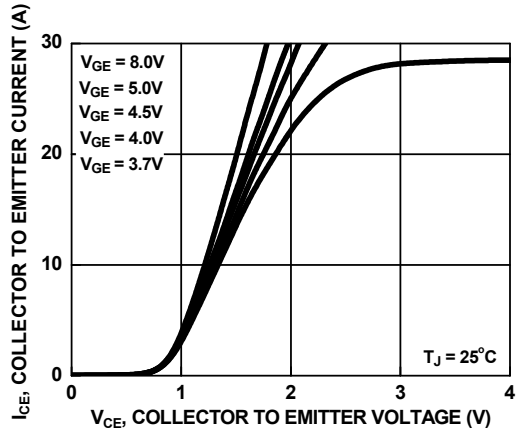


Figure 6. Collector to Emitter On-State Voltage vs. Collector Current

Typical Performance Curves (Continued)

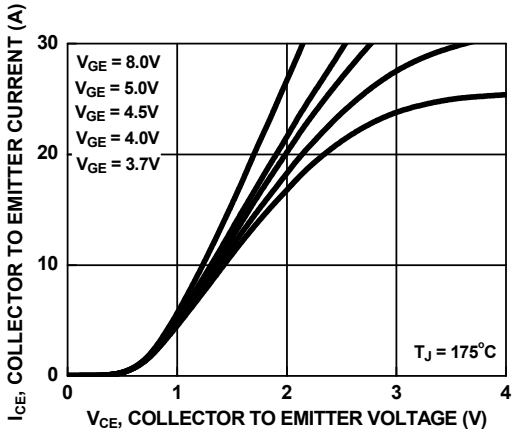


Figure 7. Collector to Emitter On-State Voltage vs. Collector Current

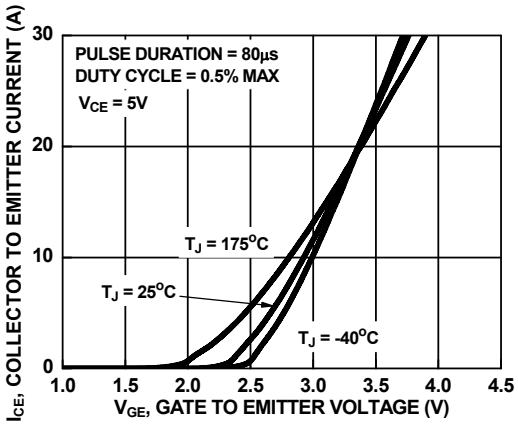


Figure 8. Transfer Characteristics

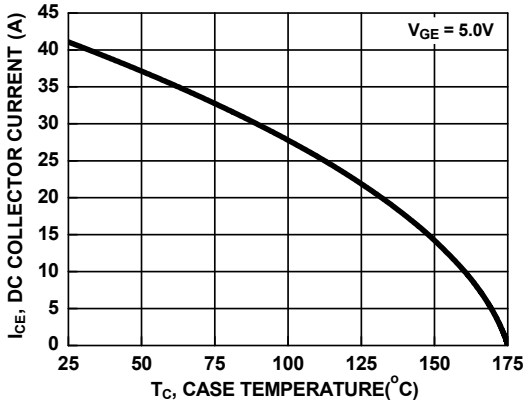


Figure 9. DC Collector Current vs. Case Temperature

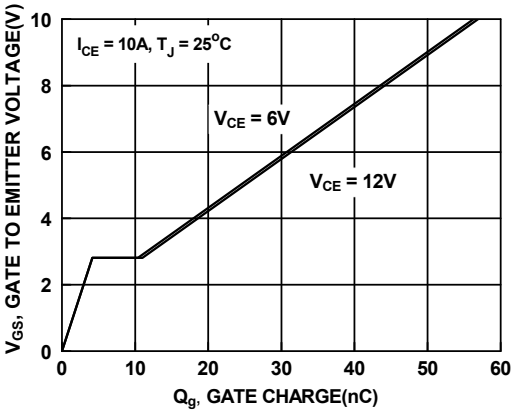


Figure 10. Gate Charge

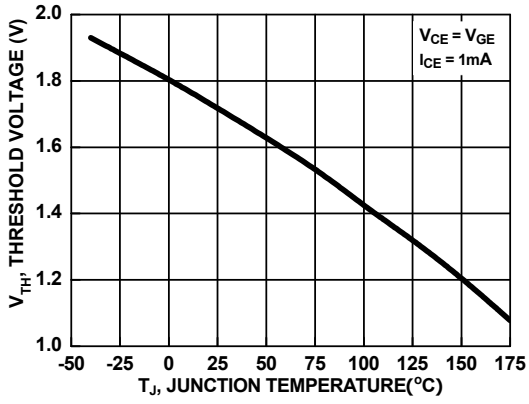


Figure 11. Threshold Voltage vs. Junction Temperature

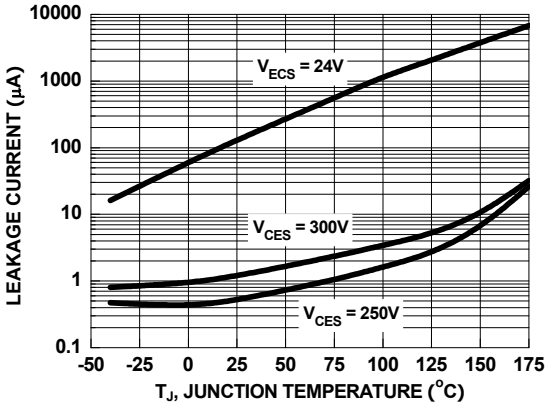


Figure 12. Leakage Current vs. Junction Temperature

Typical Performance Curves (Continued)

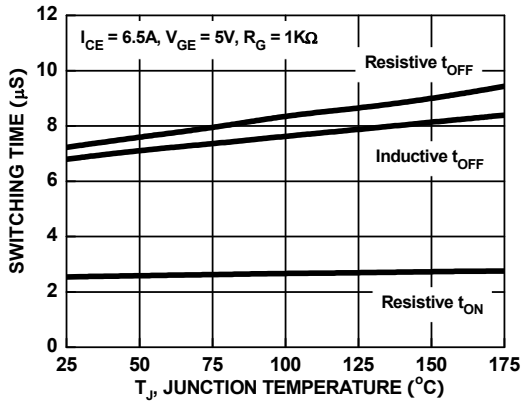


Figure 13. Switching Time vs. Junction Temperature

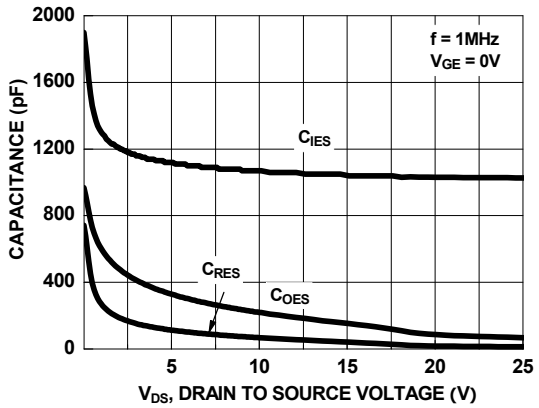


Figure 14. Capacitance vs. Collector to Emitter Voltage

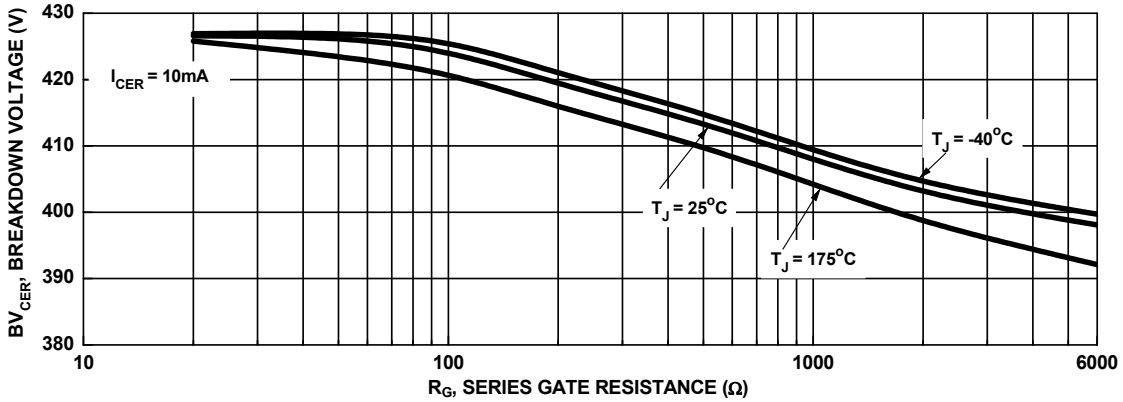


Figure 15. Break down Voltage vs. Series Gate Resistance

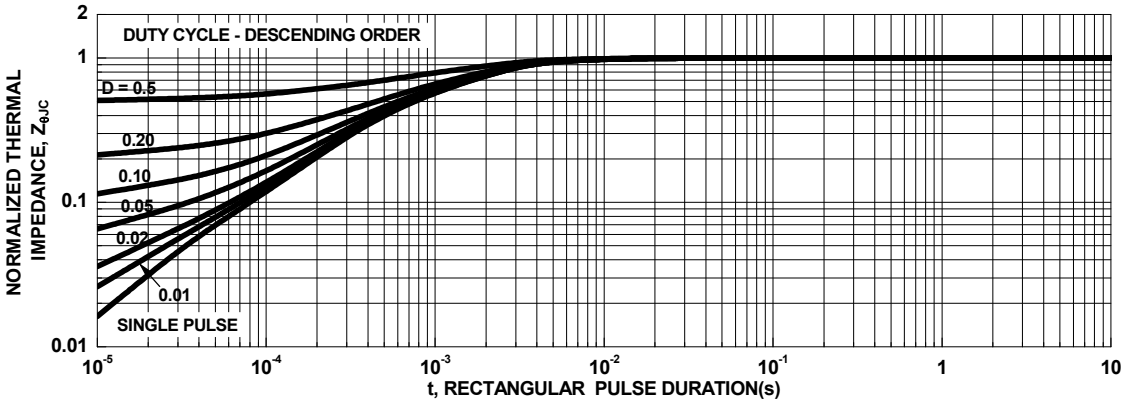


Figure 16. IGBT Normalized Transient Thermal Impedance, Junction to Case

Typical Performance Curves

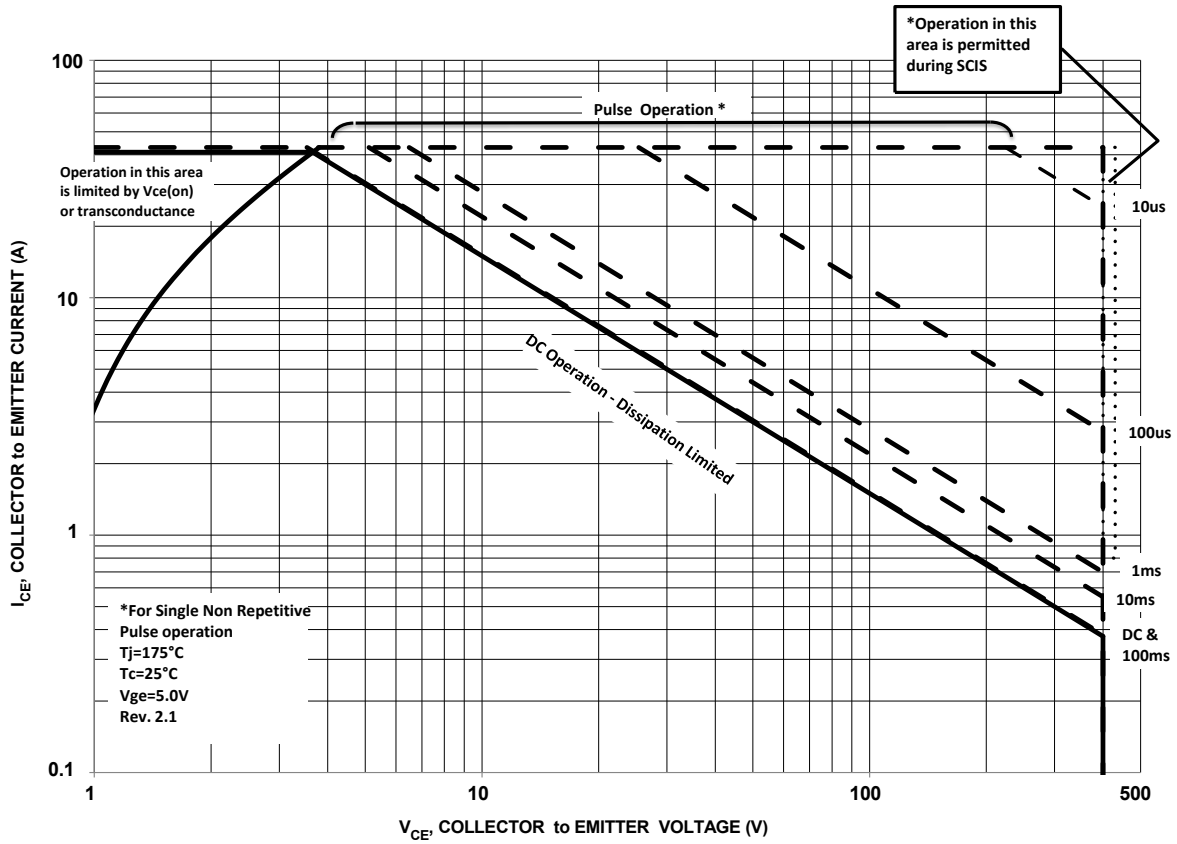


Figure 17. Forward Safe Operating Area

Test Circuit and Waveforms

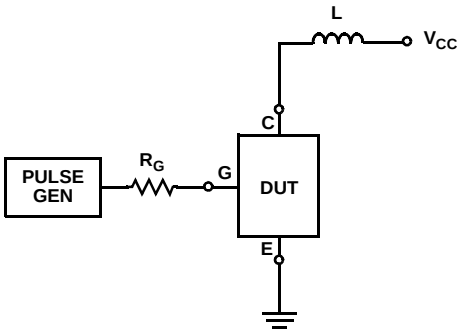


Figure 18. Inductive Switching Test Circuit

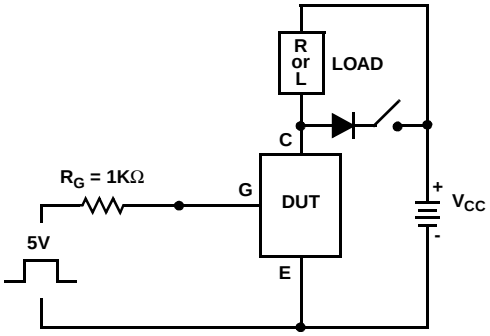


Figure 19. t_{ON} and t_{OFF} Switching Test Circuit

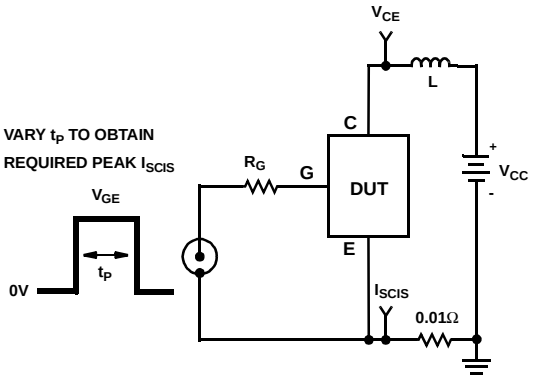


Figure 20. Energy Test Circuit

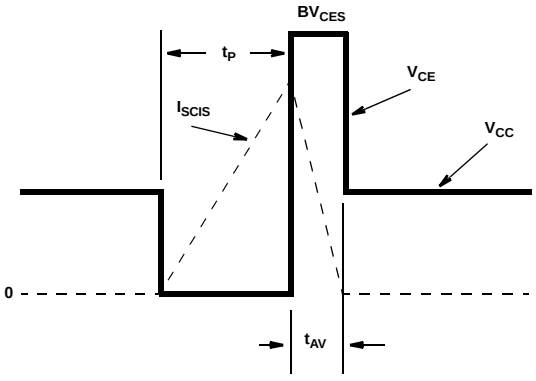


Figure 21. Energy Waveforms

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81−3−5817−1050

ON Semiconductor Website: **www.onsemi.com**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for IGBT Transistors ***category:***

Click to view products by ON Semiconductor ***manufacturer:***

Other Similar products are found below :

748152A APT20GT60BRDQ1G APT50GT60BRG NGTB10N60FG STGFW20V60DF APT30GP60BG APT45GR65B2DU30 GT50JR22(STA1ES) TIG058E8-TL-H VS-CPV364M4KPBF NGTB25N120FL2WAG NGTG40N120FL2WG RJH60F3DPQ-A0#T0 APT40GR120B2SCD10 APT15GT120BRG APT20GT60BRG NGTB75N65FL2WAG NGTG15N120FL2WG IXA30RG1200DHGLB IXA40RG1200DHGLB APT70GR65B2DU40 NTE3320 IHFW40N65R5SXKSA1 APT70GR120J APT35GP120JDQ2 IKZA40N65RH5XKSA1 IKFW75N65ES5XKSA1 IKFW50N65ES5XKSA1 IKFW50N65EH5XKSA1 IKFW40N65ES5XKSA1 IKFW60N65ES5XKSA1 IMBG120R090M1HXTMA1 IMBG120R220M1HXTMA1 XD15H120CX1 XD25H120CX0 XP15PJS120CL1B1 IGW30N60H3FKSA1 STGWA8M120DF3 IGW08T120FKSA1 IGW75N60H3FKSA1 HGTG40N60B3 FGH60N60SMD_F085 FGH75T65UPD STGWA15H120F2 IKA10N60TXKSA1 IHW20N120R5XKSA1 RJH60D2DPP-M0#T2 IKP20N60TXKSA1 IHW20N65R5XKSA1 IDW40E65D2FKSA1