ALPHA & OMEGA SEMICONDUCTOR

AOK50B65M2

650V, 50A Alpha IGBT™

With soft and fast recovery anti-parallel diode

General Description

- Latest AlphaIGBT (α IGBT) technology
- 650V breakdown voltage
- Very fast and soft recovery freewheeling diode
- High efficient turn-on di/dt controllability
- Low VCE(SAT) enables high efficiencies
- Low turn-off switching loss and softness
- Very good EMI behavior
- High short-circuit ruggedness

Applications

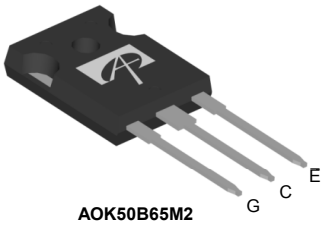
- Motor Drives
- Servo and General Purpose Inverters
- Other Hard Switching Applications

Product Summary

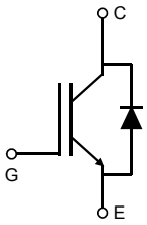
V_{CE}	650V
I_C (T_C=100°C)	50A
$V_{CE(sat)}$ (T_J=25°C)	1.72V

RoHS Compliant

TO-247



AOK50B65M2



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AOK50B65M2	TO247	Tube	240

Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	AOK50B65M2	Units
Collector-Emitter Voltage		V_{CE}	650	V
Gate-Emitter Voltage		V_{GE}	±30	V
Continuous Collector Current	T_C=25°C	I_C	100	A
	T_C=100°C		50	
Pulsed Collector Current, Limited by T_{Jmax}		I_{CM}	150	A
Turn off SOA, V_{CE}≤650V, Limited by T_{Jmax}		I_{LM}	150	A
Continuous Diode Forward Current	T_C=25°C	I_F	100	A
	T_C=100°C		50	
Diode Pulsed Current, Limited by T_{Jmax}		I_{FM}	150	A
Short circuit withstanding time [1] V_{GE}=15V, V_{CC}≤400V, T_J≤175°C		t_{SC}	5	µs
Power Dissipation	T_C=25°C	P_D	500	W
	T_C=100°C		250	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	°C
Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds		T_L	300	°C

Thermal Characteristics

Parameter	Symbol	AOK50B65M2	Units
Maximum Junction-to-Ambient	$R_{\theta JA}$	40	°C/W
Maximum IGBT Junction-to-Case	$R_{\theta JC}$	0.3	°C/W
Maximum Diode Junction-to-Case	$R_{\theta JC}$	0.7	°C/W

1) Allowed number of short circuits: <1000; time between short circuits: >1s.

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions		Min	Typ	Max	Units
STATIC PARAMETERS							
BV_{CES}	Collector-Emitter Breakdown Voltage	I_C=1mA, V_{GE}=0V, T_J=25°C		650	-	-	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C=50A	T_J=25°C	-	1.72	2.2	V
			T_J=125°C	-	2.08	-	
			T_J=175°C	-	2.26	-	
V_F	Diode Forward Voltage	V_{GE}=0V, I_C=50A	T_J=25°C	-	1.55	1.95	V
			T_J=125°C	-	1.63	-	
			T_J=175°C	-	1.59	-	
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	V_{CE}=5V, I_C=1mA		-	4.8	-	V
I_{CES}	Zero Gate Voltage Collector Current	V_{CE}=650V, V_{GE}=0V	T_J=25°C	-	-	10	µA
			T_J=125°C	-	-	1000	
			T_J=175°C	-	-	15000	
I_{GES}	Gate-Emitter leakage current	V_{CE}=0V, V_{GE}=±30V		-	-	±100	nA
g_{FS}	Forward Transconductance	V_{CE}=20V, I_C=50A		-	35	-	S
DYNAMIC PARAMETERS							
C_{ies}	Input Capacitance	V_{GE}=0V, V_{CC}=25V, f=1MHz		-	2848	-	pF
C_{oes}	Output Capacitance			-	368	-	pF
C_{res}	Reverse Transfer Capacitance			-	118	-	pF
Q_g	Total Gate Charge	V_{GE}=15V, V_{CC}=520V, I_C=50A		-	102	-	nC
Q_{ge}	Gate to Emitter Charge			-	28	-	nC
Q_{gc}	Gate to Collector Charge			-	42	-	nC
$I_{C(SC)}$	Short circuit collector current	V_{GE}=15V, V_{CC}=400V, $t_{sc}\leqslant$5us, $T_J\leqslant$175°C		-	222	-	A
R_g	Gate resistance	V_{GE}=0V, V_{CC}=0V, f=1MHz		-	14	-	Ω
SWITCHING PARAMETERS, (Load Inductive, T_J=25°C)							
$t_{D(on)}$	Turn-On DelayTime	T_J=25°C, V_{GE}=15V, V_{CC}=400V, I_C=50A, R_G=6Ω		-	46	-	ns
t_r	Turn-On Rise Time			-	68	-	ns
$t_{D(off)}$	Turn-Off Delay Time			-	182	-	ns
t_f	Turn-Off Fall Time			-	49	-	ns
E_{on}	Turn-On Energy			-	2.09	-	mJ
E_{off}	Turn-Off Energy			-	1.03	-	mJ
E_{total}	Total Switching Energy			-	3.12	-	mJ
t_{rr}	Diode Reverse Recovery Time	T_J=25°C, I_F=50A, di/dt=200A/µs, V_{CC}=400V		-	327	-	ns
Q_{rr}	Diode Reverse Recovery Charge			-	1.3	-	µC
I_{rm}	Diode Peak Reverse Recovery Current			-	8	-	A
SWITCHING PARAMETERS, (Load Inductive, T_J=175°C)							
$t_{D(on)}$	Turn-On DelayTime	T_J=175°C, V_{GE}=15V, V_{CC}=400V, I_C=50A, R_G=6Ω		-	44	-	ns
t_r	Turn-On Rise Time			-	70	-	ns
$t_{D(off)}$	Turn-Off Delay Time			-	224	-	ns
t_f	Turn-Off Fall Time			-	44	-	ns
E_{on}	Turn-On Energy			-	2.54	-	mJ
E_{off}	Turn-Off Energy			-	1.56	-	mJ
E_{total}	Total Switching Energy			-	4.1	-	mJ
t_{rr}	Diode Reverse Recovery Time	T_J=175°C, I_F=50A, di/dt=200A/µs, V_{CC}=400V		-	508	-	ns
Q_{rr}	Diode Reverse Recovery Charge			-	3.4	-	µC
I_{rm}	Diode Peak Reverse Recovery Current			-	12	-	A

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

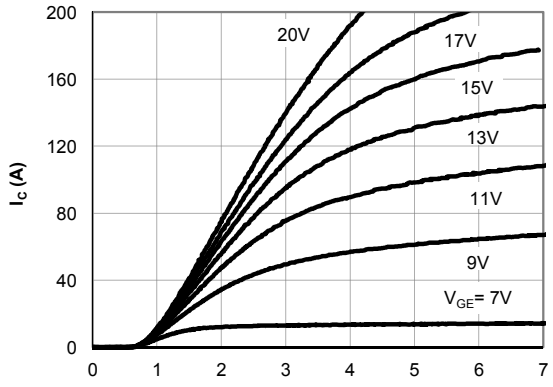


Figure 1: Output Characteristic (T_j=25°C)

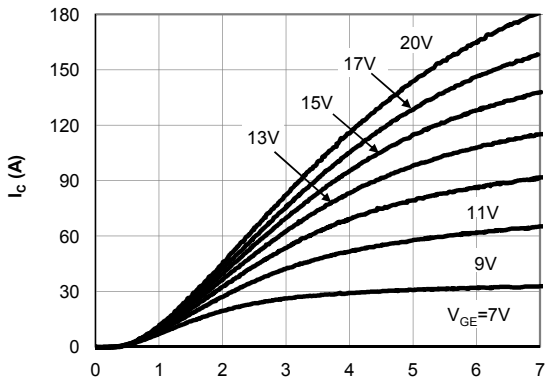


Figure 2: Output Characteristic (T_j=175°C)

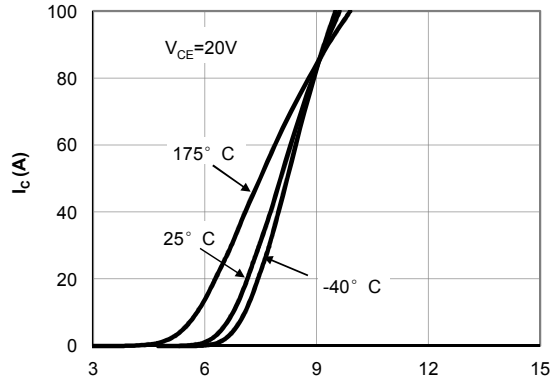


Figure 3: Transfer Characteristic

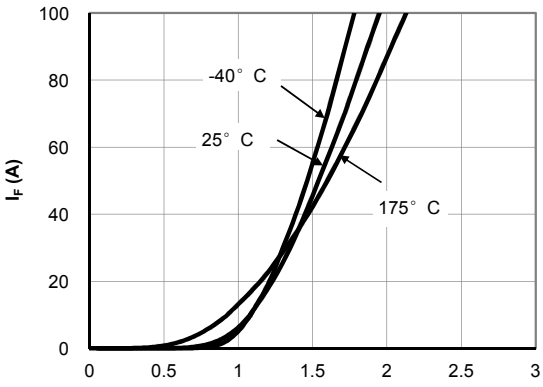


Figure 4: Diode Characteristic

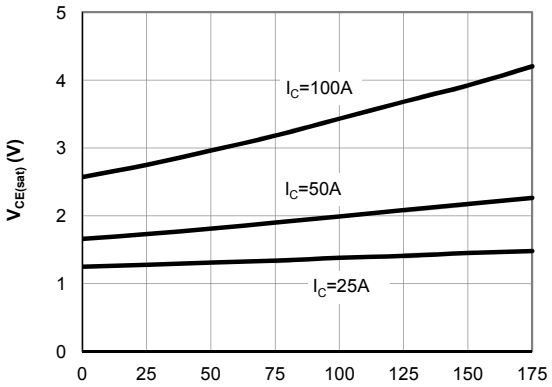


Figure 5: Collector-Emitter Saturation Voltage vs. Junction Temperature

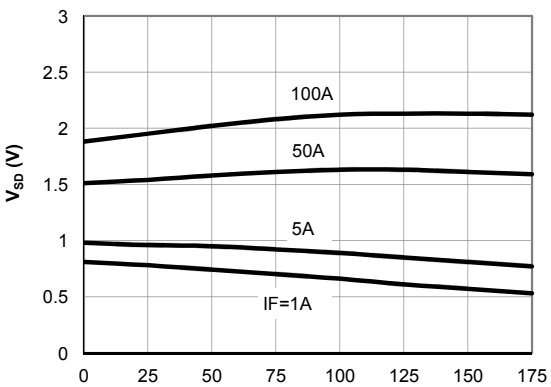


Figure 6: Diode Forward voltage vs. Junction Temperature

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

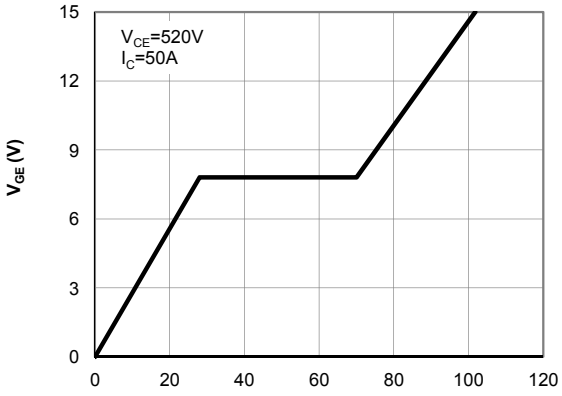


Figure 7: Gate-Charge Characteristics

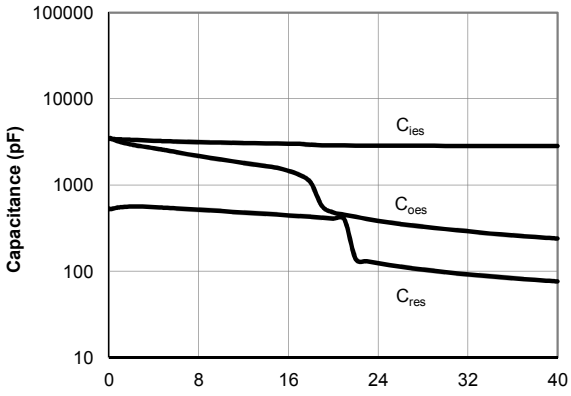


Figure 8: Capacitance Characteristic

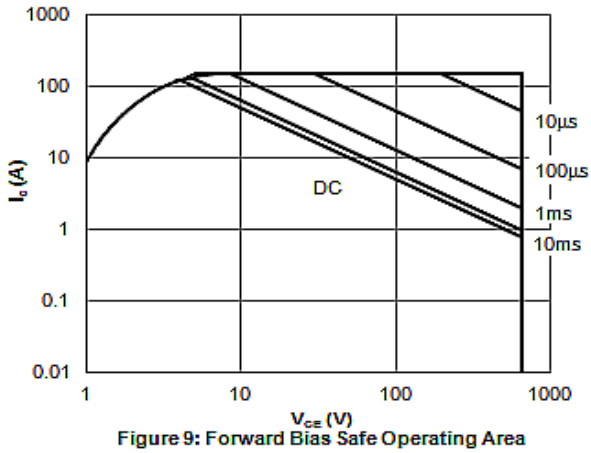


Figure 9: Forward Bias Safe Operating Area
(T_C=25°C, V_{GE}=15V)

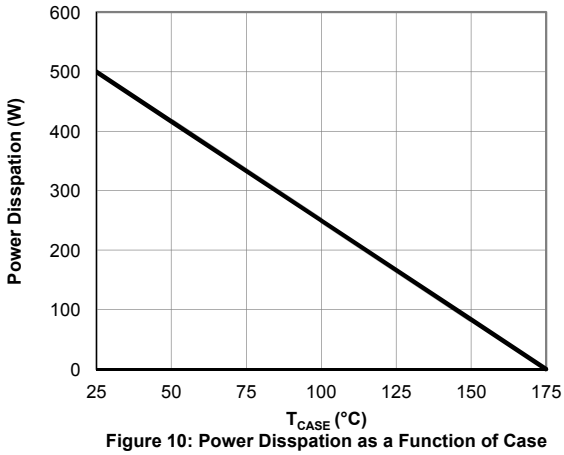


Figure 10: Power Disspation as a Function of Case

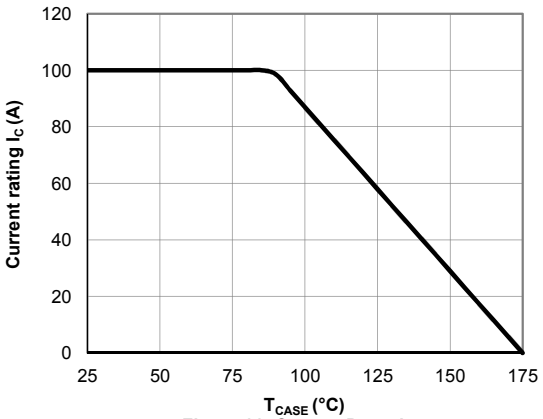


Figure 11: Current De-rating

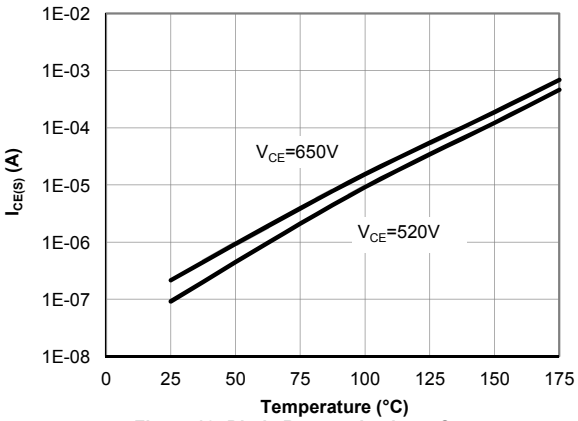


Figure 12: Diode Reverse Leakage Current vs. Junction Temperature

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

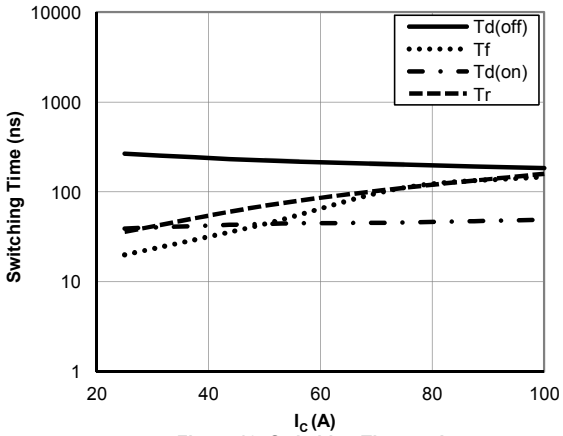


Figure 13: Switching Time vs. I_C
(T_j=175°C, V_{GE}=15V, V_{CE}=400V, R_g=6Ω)

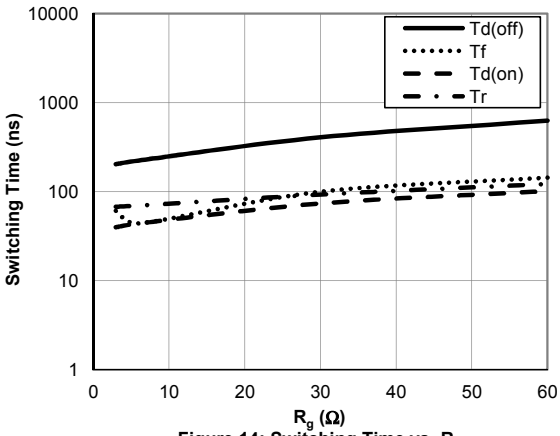


Figure 14: Switching Time vs. R_g
(T_j=175°C, V_{GE}=15V, V_{CE}=400V, I_C=50A)

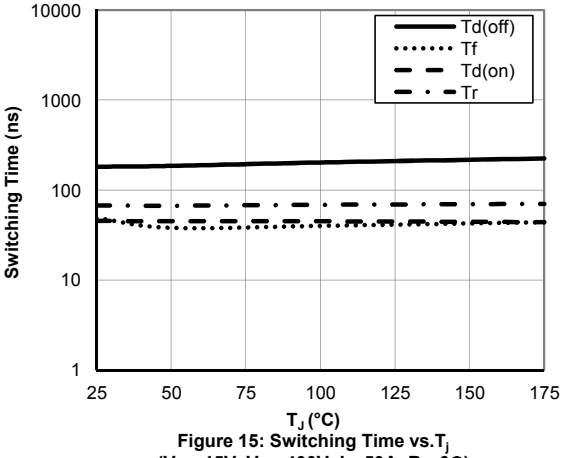


Figure 15: Switching Time vs.T_j
(V_{GE}=15V, V_{CE}=400V, I_C=50A, R_g=6Ω)

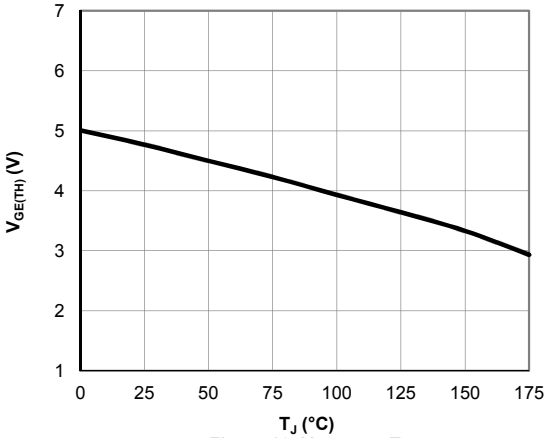


Figure 16: $V_{GE(TH)}$ vs. T_j

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

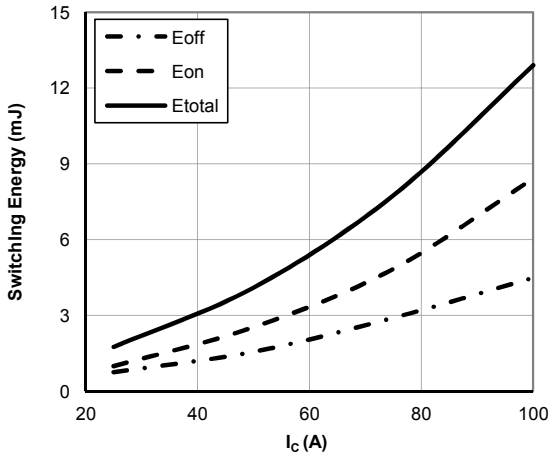


Figure 17: Switching Loss vs. I_C
(T_j=175°C, V_{GE}=15V, V_{CE}=400V, R_g=6Ω)

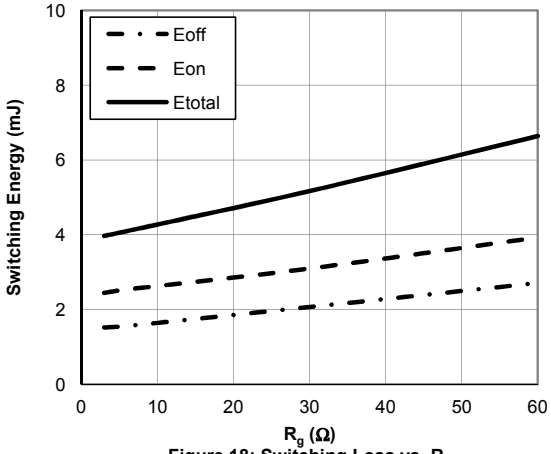


Figure 18: Switching Loss vs. R_g
(T_j=175°C, V_{GE}=15V, V_{CE}=400V, I_C=50A)

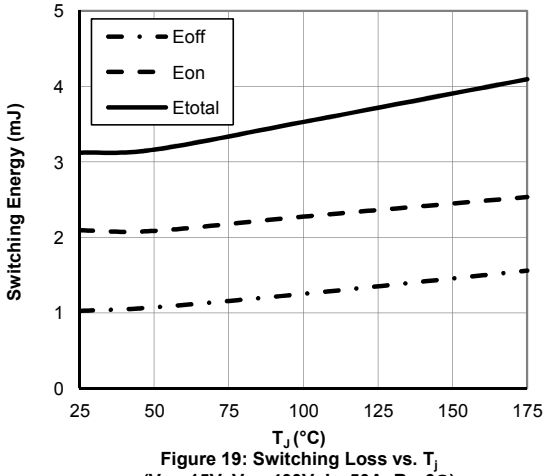


Figure 19: Switching Loss vs. T_j
(V_{GE}=15V, V_{CE}=400V, I_C=50A, R_g=6Ω)

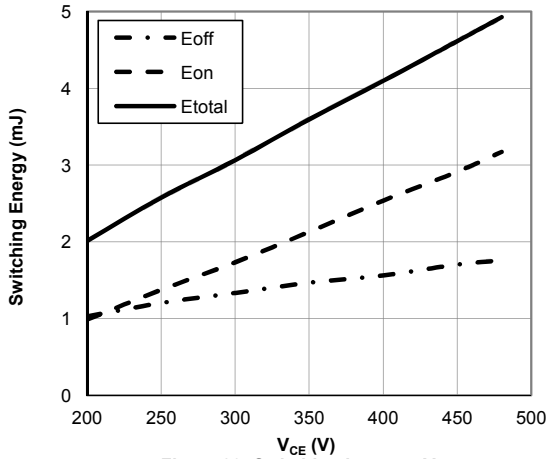


Figure 20: Switching Loss vs. V_{CE}
(T_j=175°C, V_{GE}=15V, I_C=50A, R_g=6Ω)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

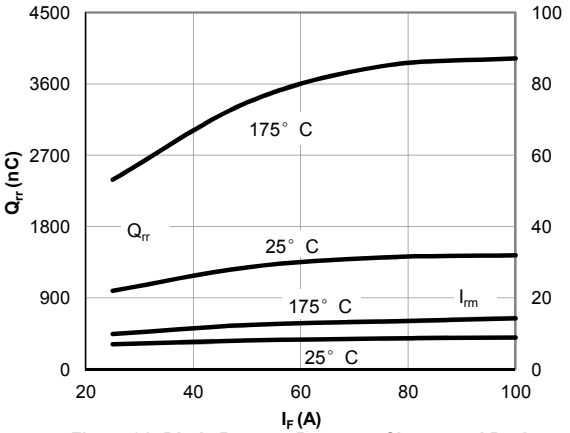


Figure 21: Diode Reverse Recovery Charge and Peak Current vs. Conduction Current (V_{GE}=15V, V_{CE}=400V, di/dt=200A/µs)

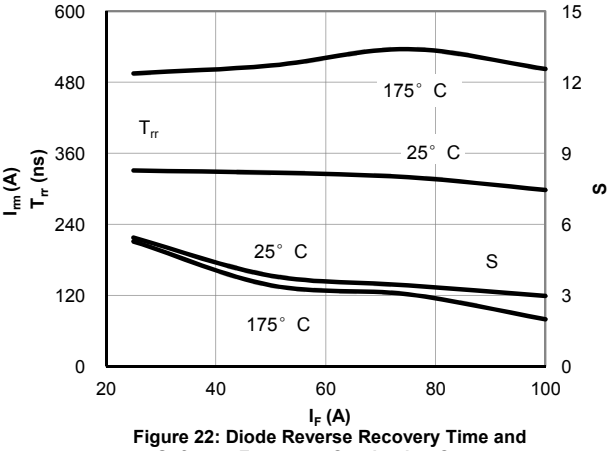


Figure 22: Diode Reverse Recovery Time and Softness Factor vs. Conduction Current (V_{GE}=15V, V_{CE}=400V, di/dt=200A/µs)

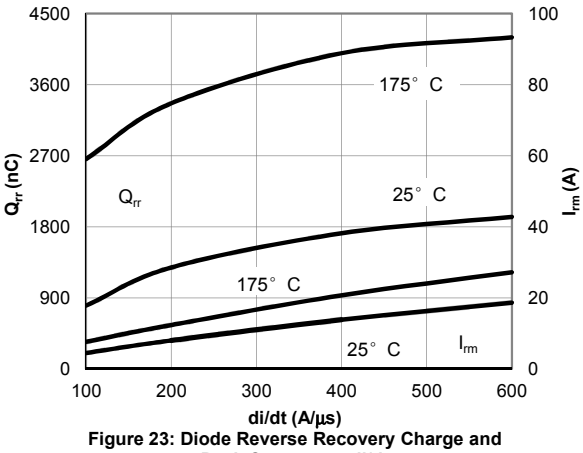


Figure 23: Diode Reverse Recovery Charge and Peak Current vs. di/dt (V_{GE}=15V, V_{CE}=400V, I_F=50A)

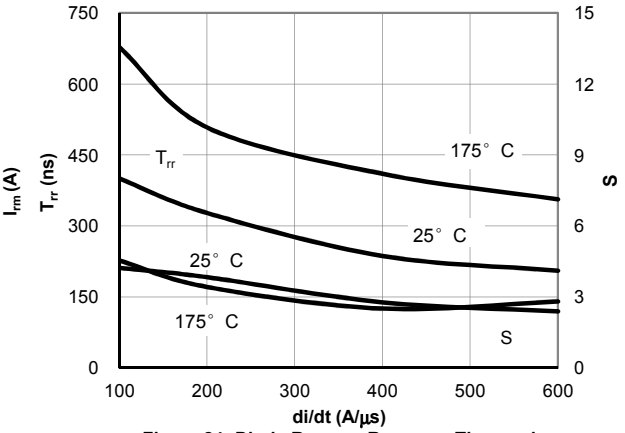


Figure 24: Diode Reverse Recovery Time and Softness Factor vs. di/dt (V_{GE}=15V, V_{CE}=400V, I_F=50A)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

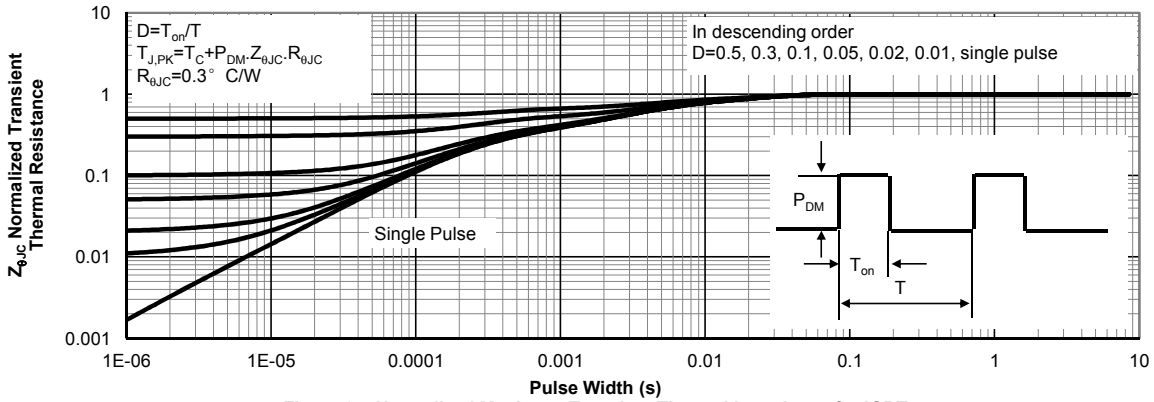


Figure 25: Normalized Maximum Transient Thermal Impedance for IGBT

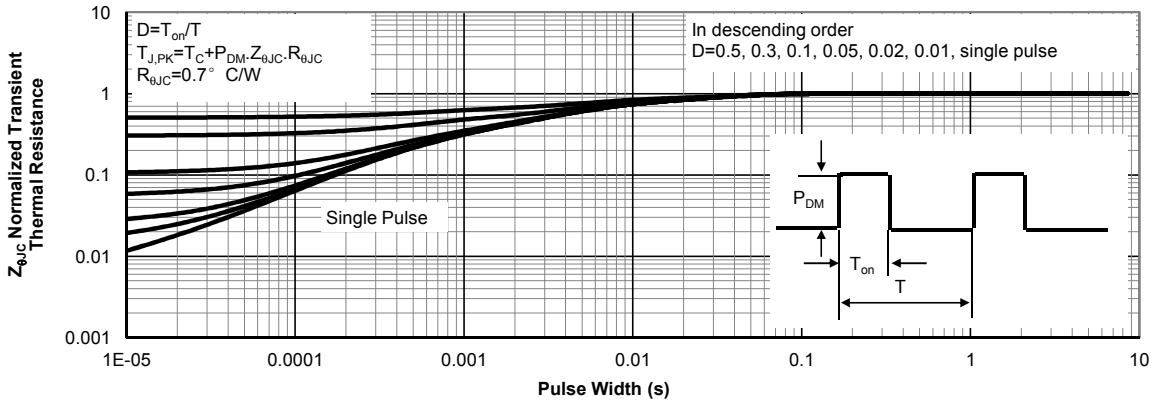


Figure 26: Normalized Maximum Transient Thermal Impedance for Diode

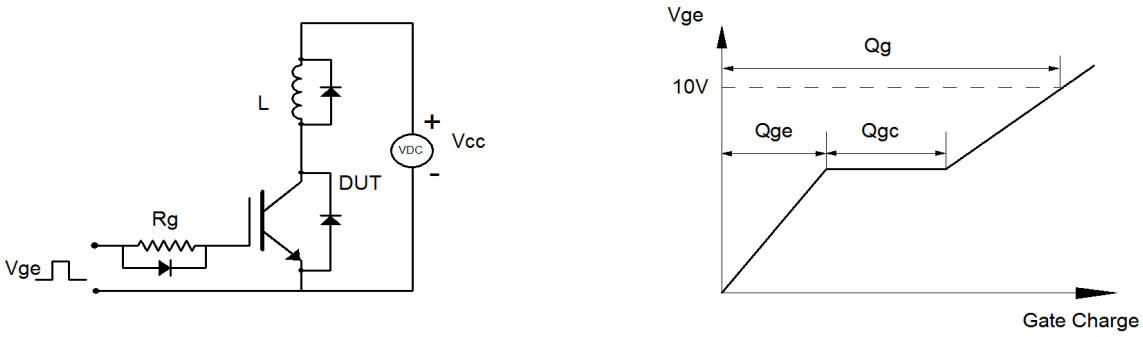


Figure A: Gate Charge Test Circuit & Waveforms

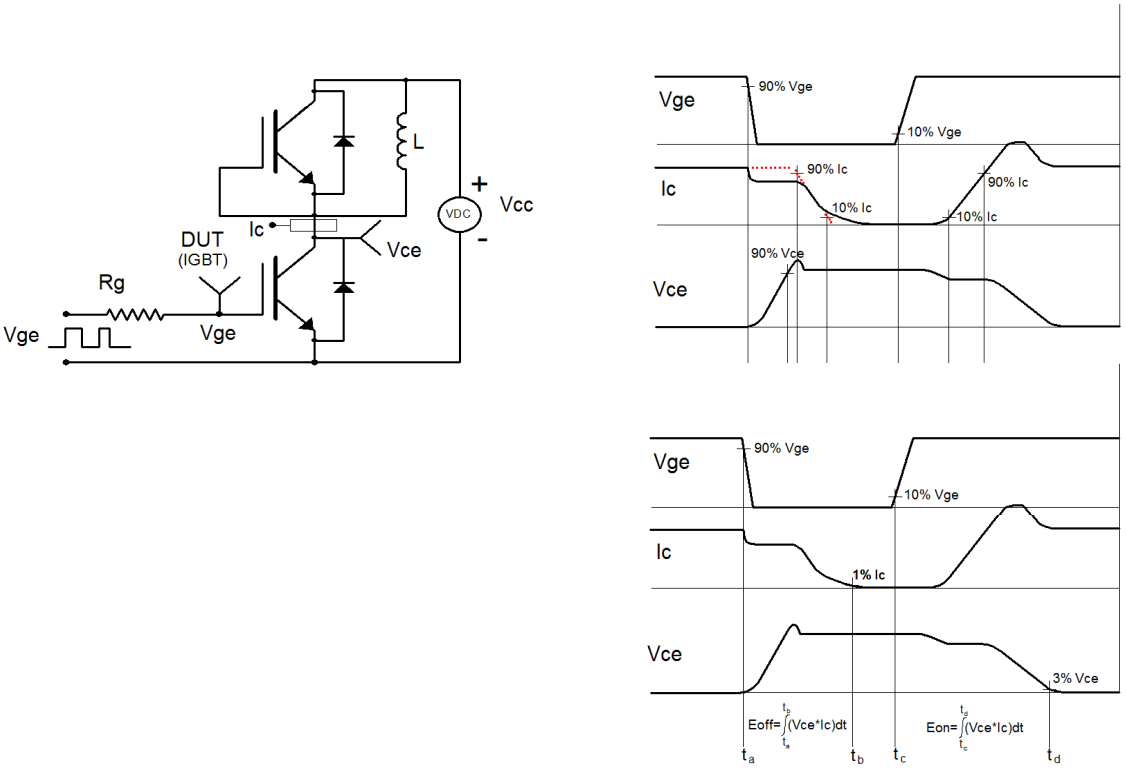


Figure B: Inductive Switching Test Circuit & Waveforms

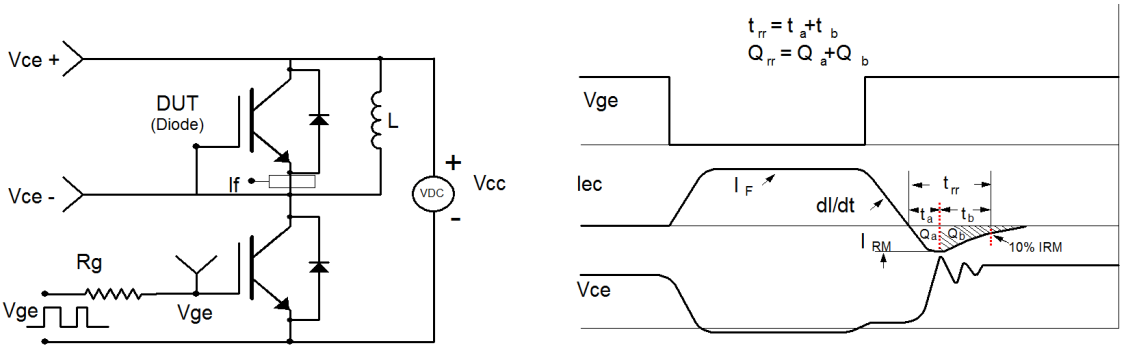


Figure C: Diode Recovery Test Circuit & Waveforms

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

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

Click to view products by Alpha & Omega ***manufacturer:***

Other Similar products are found below :

748152A APT20GT60BRDQ1G NGTB10N60FG IGP30N60H3XKSA1 STGFW20V60DF APT30GP60BG APT45GR65B2DU30 GT50JR22(STA1ES) TIG058E8-TL-H VS-CPV364M4KPBF NGTB25N120FL2WAG NGTG40N120FL2WG RJH60F3DPQ-A0#T0 APT40GR120B2SCD10 APT15GT120BRG APT20GT60BRG NGTB75N65FL2WAG NGTG15N120FL2WG APT70GR65B2DU40 NTE3320 FGD3440G2-F085 APT70GR120J APT35GP120JDQ2 IKFW40N65ES5XKSA1 IMBG120R220M1HXTMA1 IGW30N60H3FKSA1 STGWA8M120DF3 IGB30N60H3ATMA1 IGW100N60H3FKSA1 IGW75N60H3FKSA1 HGTG40N60B3 IRGS4715DPBF FGH60N60SMD_F085 FGH75T65UPD STGWA15H120F2 IKA10N60TXKSA1 IHW20N120R5XKSA1 IKW25N120T2FKSA1 IHW20N65R5XKSA1 IDW40E65D2FKSA1 STGWT60H65FB STGWT60H65DFB STGWT40V60DF STGWT20V60DF STGB10NB37LZT4 FGH40T70SHD-F155 FGD3245G2_F085 NGTB40N65IHL2WG HGTG30N60C3D HGTG30N60A4D