

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units	
STATIC PARAMETERS							
BV_{CES}	Collector-Emitter Breakdown Voltage	$I_C=1mA, V_{GE}=0V, T_J=25^\circ C$	650	-	-	V	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE}=15V, I_C=10A$	$T_J=25^\circ C$	-	1.6	2	V
			$T_J=125^\circ C$	-	1.86	-	
			$T_J=175^\circ C$	-	2.02	-	
V_F	Diode Forward Voltage	$V_{GE}=0V, I_C=10A$	$T_J=25^\circ C$	-	1.9	2.4	V
			$T_J=125^\circ C$	-	1.96	-	
			$T_J=175^\circ C$	-	1.91	-	
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$V_{CE}=5V, I_C=1mA$	4.5	5.1	5.7	V	
I_{CES}	Zero Gate Voltage Collector Current	$V_{CE}=650V, V_{GE}=0V$	$T_J=25^\circ C$	-	-	10	μA
			$T_J=125^\circ C$	-	-	100	
			$T_J=175^\circ C$	-	-	1000	
I_{GES}	Gate-Emitter leakage current	$V_{CE}=0V, V_{GE}=\pm 30V$	-	-	±100	nA	
g_{FS}	Forward Transconductance	$V_{CE}=20V, I_C=10A$	-	9	-	S	
DYNAMIC PARAMETERS							
C_{ies}	Input Capacitance	$V_{GE}=0V, V_{CC}=25V, f=1MHz$	-	655	-	pF	
C_{oes}	Output Capacitance		-	68	-	pF	
C_{res}	Reverse Transfer Capacitance		-	25	-	pF	
Q_g	Total Gate Charge	$V_{GE}=15V, V_{CC}=520V, I_C=10A$	-	24	-	nC	
Q_{ge}	Gate to Emitter Charge		-	5.5	-	nC	
Q_{gc}	Gate to Collector Charge		-	12	-	nC	
$I_{C(SC)}$	Short circuit collector current	$V_{GE}=15V, V_{CC}=400V,$ $t_{sc} \leq 5\mu s, T_J \leq 175^\circ C$	-	70	-	A	
R_g	Gate resistance	$V_{GE}=0V, V_{CC}=0V, f=1MHz$	-	5.8	-	Ω	
SWITCHING PARAMETERS, (Load Inductive, T_J=25°C)							
$t_{D(on)}$	Turn-On DelayTime	$T_J=25^\circ C$ $V_{GE}=15V, V_{CC}=400V, I_C=10A,$ $R_G=30\Omega$	-	12	-	ns	
t_r	Turn-On Rise Time		-	16	-	ns	
$t_{D(off)}$	Turn-Off Delay Time		-	91	-	ns	
t_f	Turn-Off Fall Time		-	14	-	ns	
E_{on}	Turn-On Energy		-	0.18	-	mJ	
E_{off}	Turn-Off Energy		-	0.13	-	mJ	
E_{total}	Total Switching Energy		-	0.31	-	mJ	
t_{rr}	Diode Reverse Recovery Time		$T_J=25^\circ C$	-	263	-	ns
Q_{rr}	Diode Reverse Recovery Charge		$I_F=10A, di/dt=200A/\mu s, V_{CC}=400V$	-	0.4	-	μC
I_{rm}	Diode Peak Reverse Recovery Current			-	3.8	-	A
SWITCHING PARAMETERS, (Load Inductive, T_J=175°C)							
$t_{D(on)}$	Turn-On DelayTime	$T_J=175^\circ C$ $V_{GE}=15V, V_{CC}=400V, I_C=10A,$ $R_G=30\Omega$	-	10	-	ns	
t_r	Turn-On Rise Time		-	17	-	ns	
$t_{D(off)}$	Turn-Off Delay Time		-	111	-	ns	
t_f	Turn-Off Fall Time		-	26	-	ns	
E_{on}	Turn-On Energy		-	0.2	-	mJ	
E_{off}	Turn-Off Energy		-	0.23	-	mJ	
E_{total}	Total Switching Energy		-	0.43	-	mJ	
t_{rr}	Diode Reverse Recovery Time		$T_J=175^\circ C$	-	262	-	ns
Q_{rr}	Diode Reverse Recovery Charge		$I_F=10A, di/dt=200A/\mu s, V_{CC}=400V$	-	0.7	-	μC
I_{rm}	Diode Peak Reverse Recovery Current			-	5	-	A

APPLICATIONS OR USES AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS ARE NOT AUTHORIZED. AOS DOES NOT ASSUME ANY LIABILITY ARISING OUT OF SUCH APPLICATIONS OR USES OF ITS PRODUCTS. AOS RESERVES THE RIGHT TO MAKE CHANGES TO PRODUCT SPECIFICATIONS WITHOUT NOTICE. IT IS THE RESPONSIBILITY OF THE CUSTOMER TO EVALUATE SUITABILITY OF THE PRODUCT FOR THEIR INTENDED APPLICATION. CUSTOMER SHALL COMPLY WITH APPLICABLE LEGAL REQUIREMENTS, INCLUDING ALL APPLICABLE EXPORT CONTROL RULES, REGULATIONS AND LIMITATIONS.

AOS' products are provided subject to AOS' terms and conditions of sale which are set forth at:
http://www.aosmd.com/terms_and_conditions_of_sale

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

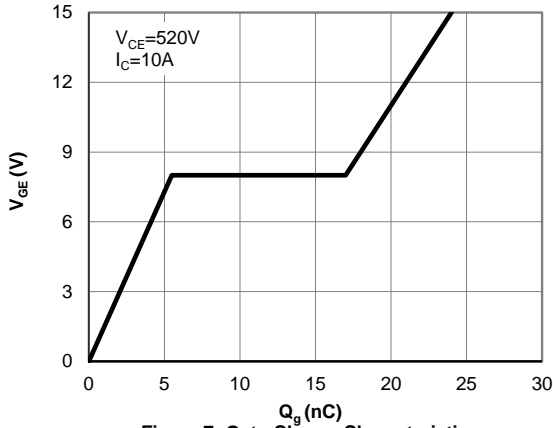


Figure 7: Gate-Charge Characteristics

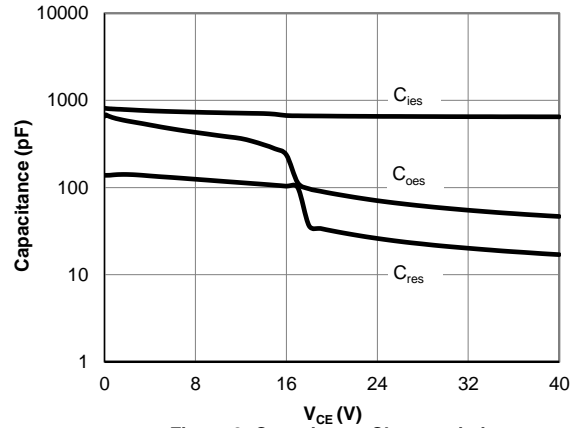


Figure 8: Capacitance Characteristic

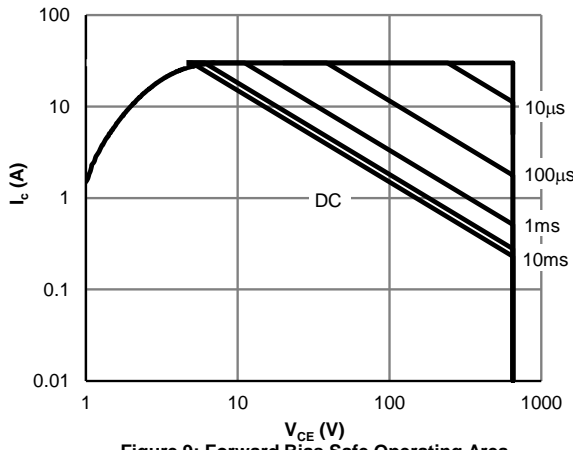


Figure 9: Forward Bias Safe Operating Area
($T_C=25^{\circ}\text{C}$, $V_{GE}=15\text{V}$)

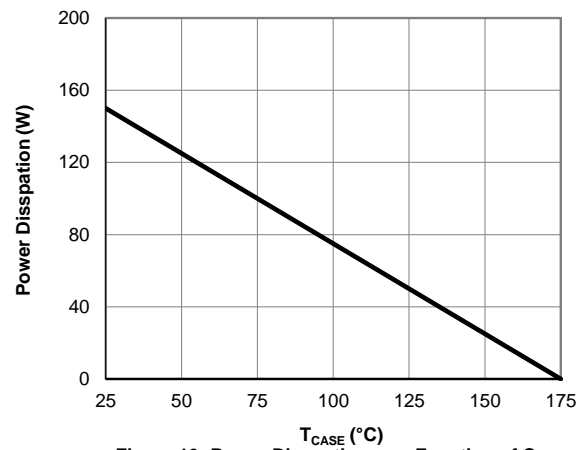


Figure 10: Power Dissipation as a Function of Case

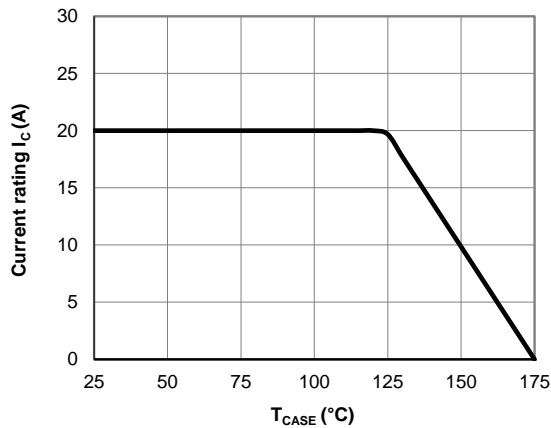


Figure 11: Current De-rating

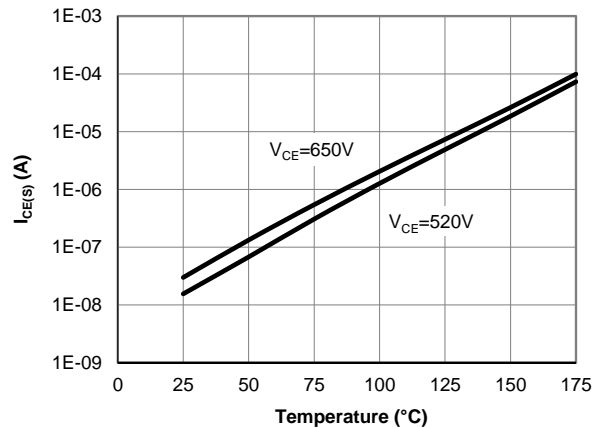


Figure 12: Diode Reverse Leakage Current vs. Junction Temperature

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

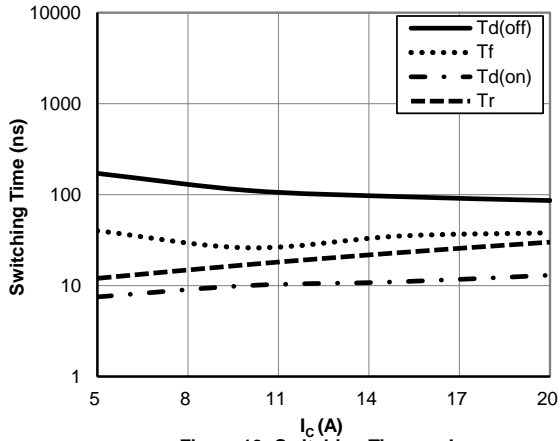


Figure 13: Switching Time vs. I_C
($T_J=175^\circ\text{C}$, $V_{GE}=15\text{V}$, $V_{CE}=400\text{V}$, $R_g=30\Omega$)

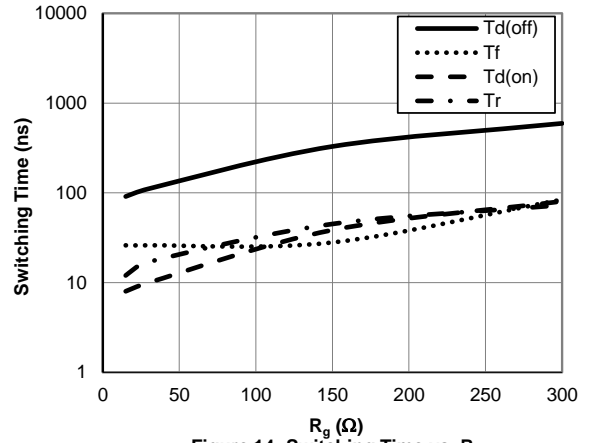


Figure 14: Switching Time vs. R_g
($T_J=175^\circ\text{C}$, $V_{GE}=15\text{V}$, $V_{CE}=400\text{V}$, $I_C=10\text{A}$)

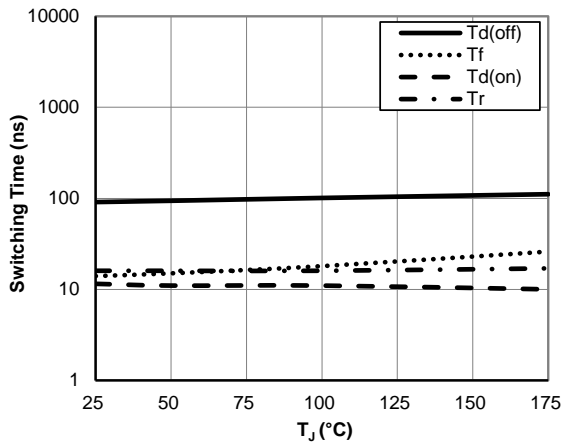


Figure 15: Switching Time vs. T_J
($V_{GE}=15\text{V}$, $V_{CE}=400\text{V}$, $I_C=10\text{A}$, $R_g=30\Omega$)

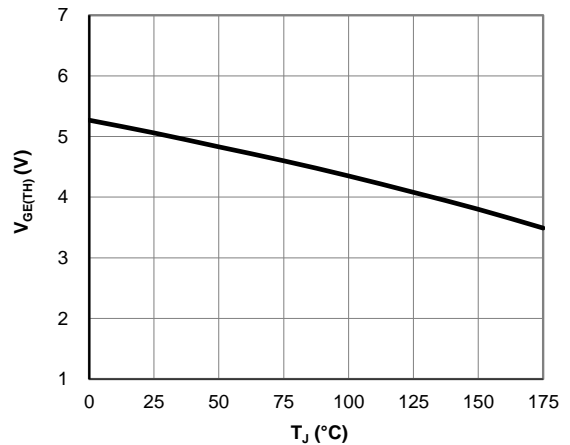


Figure 16: $V_{GE(\text{TH})}$ vs. T_J

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

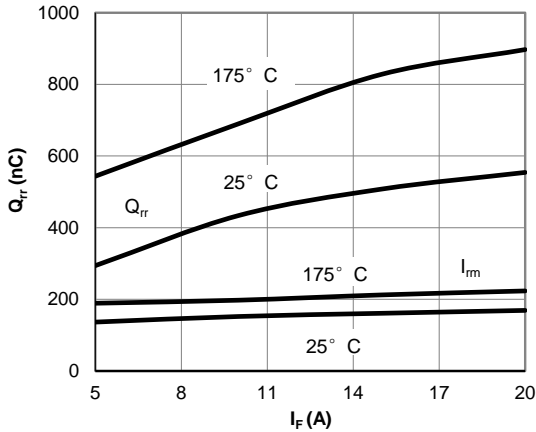


Figure 21: Diode Reverse Recovery Charge and Peak Current vs. Conduction Current
($V_{GE}=15V, V_{CE}=400V, di/dt=200A/\mu s$)

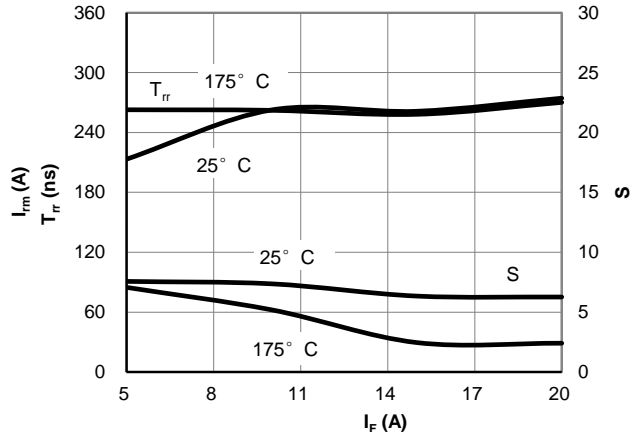


Figure 22: Diode Reverse Recovery Time and Softness Factor vs. Conduction Current
($V_{GE}=15V, V_{CE}=400V, di/dt=200A/\mu s$)

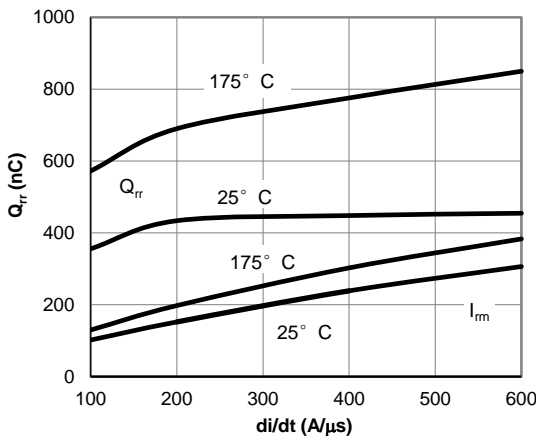


Figure 23: Diode Reverse Recovery Charge and Peak Current vs. di/dt
($V_{GE}=15V, V_{CE}=400V, I_F=10A$)

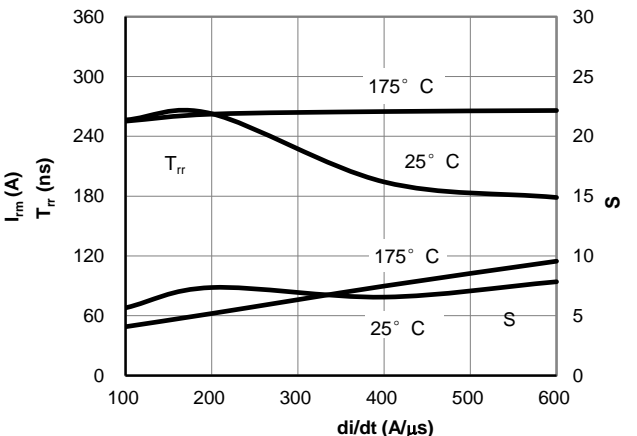


Figure 24: Diode Reverse Recovery Time and Softness Factor vs. di/dt
($V_{GE}=15V, V_{CE}=400V, I_F=10A$)

