

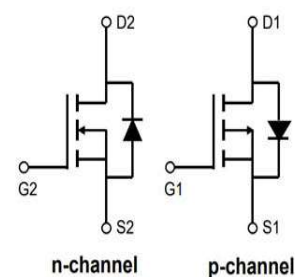
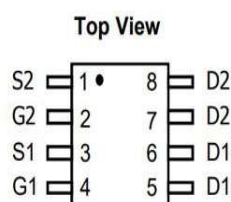
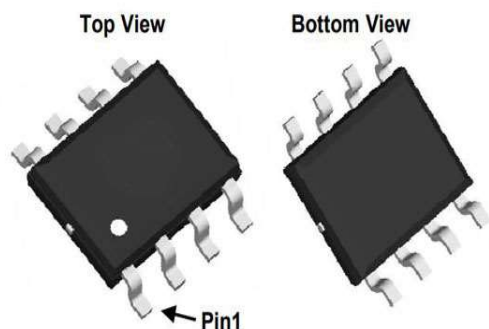
General Description

30V /6A Power MOSFET

Very low on-resistance $R_{DS(on)}$ @ $V_{GS}=4.5V$

Pb-free lead plating; RoHS compliant

V_{DS}	30	-30	V
$R_{DS(on),TYP@V_{GS}=10V}$	29.4	51.8	mΩ
$R_{DS(on),TYP@V_{GS}=4.5}$	46.2	81.4	mΩ
I_D	6	-5.5	A



Part ID	Package Type	Marking	Tape and reel information
AC6D03C	SOP8	6D03	3000



100% UIS Tested
100% Rg Tested

Parameter	Symbol	Maximum		Units
Drain-Source Voltage	V_{DS}	30	-30	V
Gate-Source Voltage	V_{GS}	20	20	±V
Continuous Drain Current A	I_D	$T_A=25^{\circ}C$	6.0	-5.5
		$T_A=70^{\circ}C$	5.0	-4.5
Pulsed Drain Current B	I_{DM}	9.6	-8.8	A
Avalanche Current C	I_{AR}	1.9	-1.8	
Repetitive avalanche energy L=0.1mH C	E_{AR}	4.4	-4.0	mJ
Power Dissipation A	P_D	$T_A=25^{\circ}C$	2.0	2.0
		$T_A=70^{\circ}C$	1.3	1.3
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150		°C

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient A	R_{JA}	105	157	°C/W
Maximum Junction-to-Ambient A		210	252	°C/W
Maximum Junction-to-Lead C	R_{JL}	63	100	°C/W

N-Channel Electrical Characteristics

STATIC PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D = -250\mu A, V_{GS} = 0V$	30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V$			1	μA
					5	
I_{GSS}	Gate-Body leakage current	$V_{DS} = 0V, V_{GS} = \pm 20V$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.2	1.8	2.4	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10V, I_D=6A$		29.4	42.0	m Ω
		$V_{GS}=4.5V, I_D=6A$		46.2	60.1	
g_{FS}	Forward Transconductance	$V_{DS}=5V, I_D=6A$		84		S
V_{SD}	Diode Forward Voltage	$I_S=1A, V_{GS}=19V$		0.72	1	V
I_S	Maximum Body-Diode Continuous Current				6	A

DYNAMIC PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=15V, f=1MHz$		250	305	pF
C_{oss}	Output Capacitance			45	55	pF
C_{rss}	Reverse Transfer Capacitance			35	41	pF
R_g	Gate resistance	$V_{GS}=0V, V_{DS}=0V, f=1MHz$			0.65	Ω

SWITCHING PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
$Q_g(10V)$	Total Gate Charge	$V_{GS}=10V, V_{DS}=15V, I_D=6A$		2.6		nC
$Q_g(4.5V)$	Total Gate Charge			1.3		
Q_{gs}	Gate Source Charge			0.9		
Q_{gd}	Gate Drain Charge			1.3		
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=10V, V_{DS}=15V, R_L=0.75\Omega, R_{GEN}=3\Omega$		4.3		ns
t_r	Turn-On Rise Time			3.4		
$t_{D(off)}$	Turn-Off DelayTime			11.9		
t_f	Turn-Off Fall Time			3.8		
t_{rr}	Body Diode Reverse Recovery Time	$I_F=-8A, di/dt=500A/\mu s$		8.5		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=18A, di/dt=500A/\mu s$		2.2		nC

N-Channel: TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

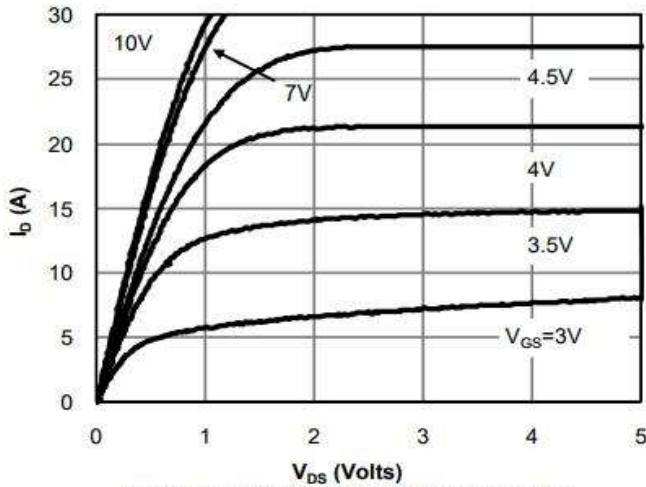


Fig 1: On-Region Characteristics (Note E)

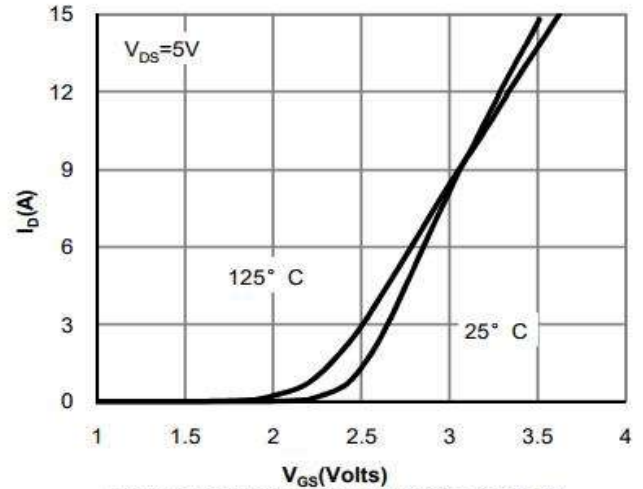


Figure 2: Transfer Characteristics (Note E)

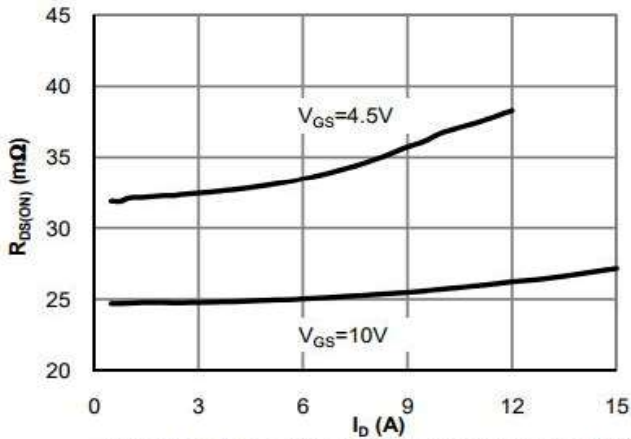


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

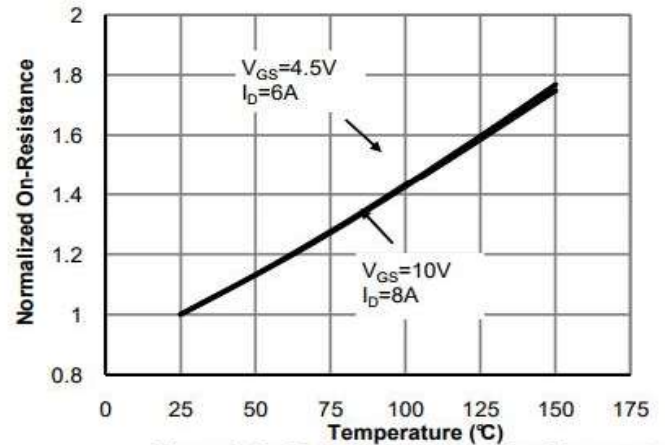


Figure 4: On-Resistance vs. Junction Temperature (Note E)

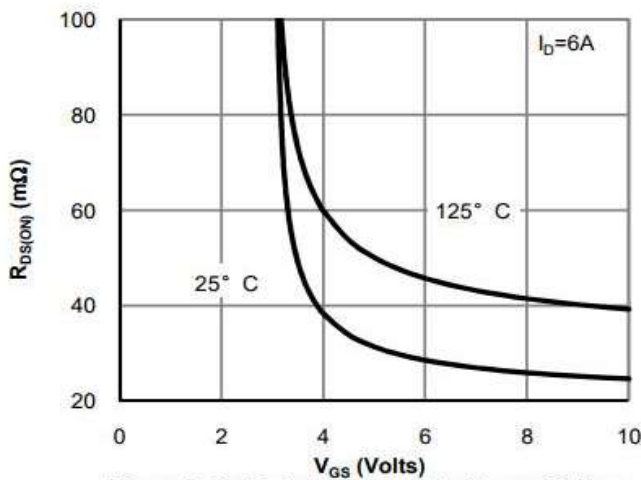


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

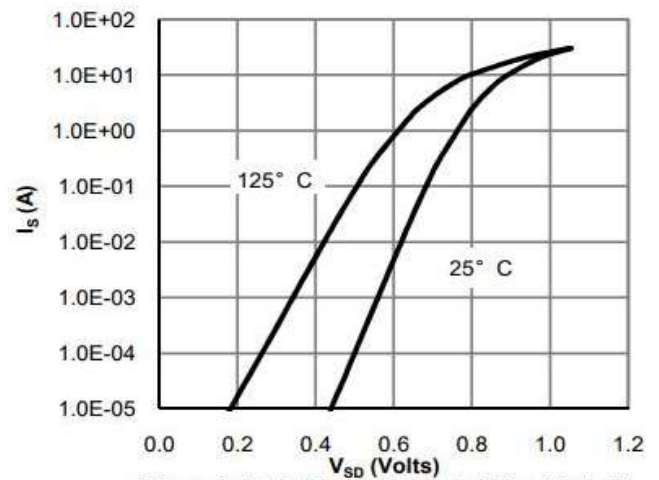


Figure 6: Body-Diode Characteristics (Note E)

N-Channel: TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

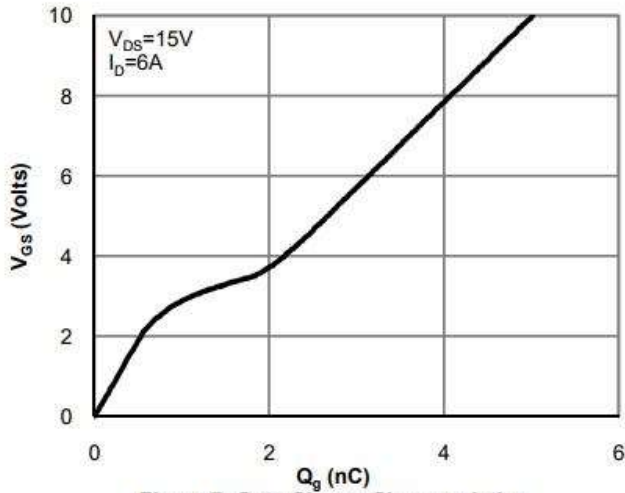


Figure 7: Gate-Charge Characteristics

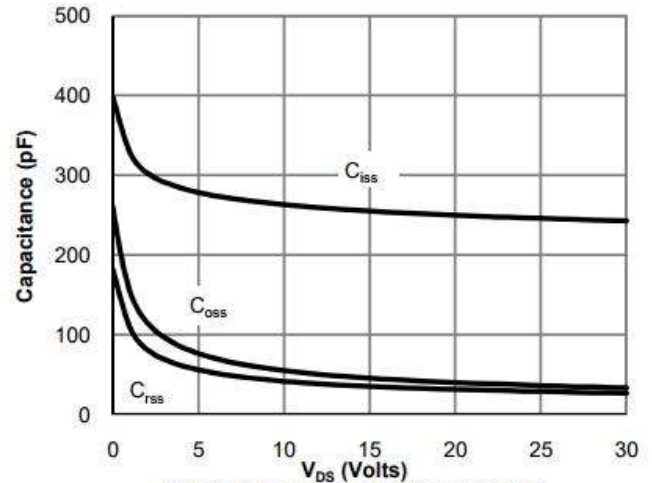


Figure 8: Capacitance Characteristics

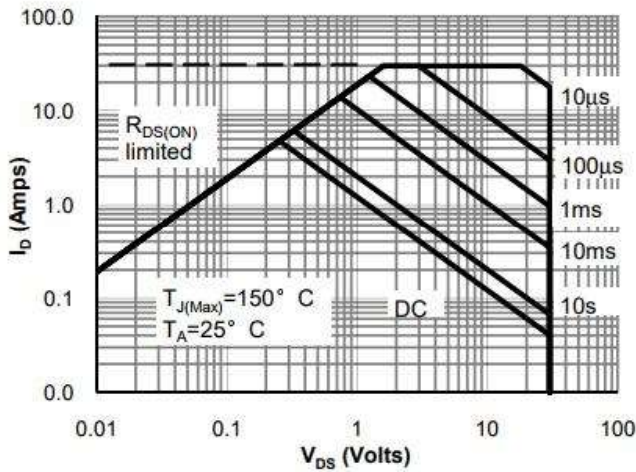


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

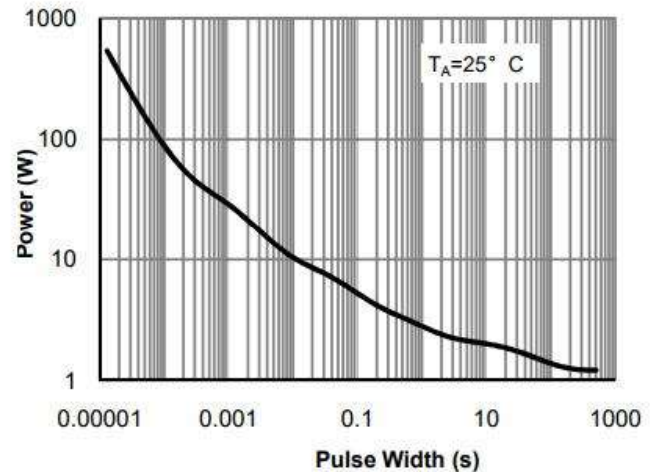


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

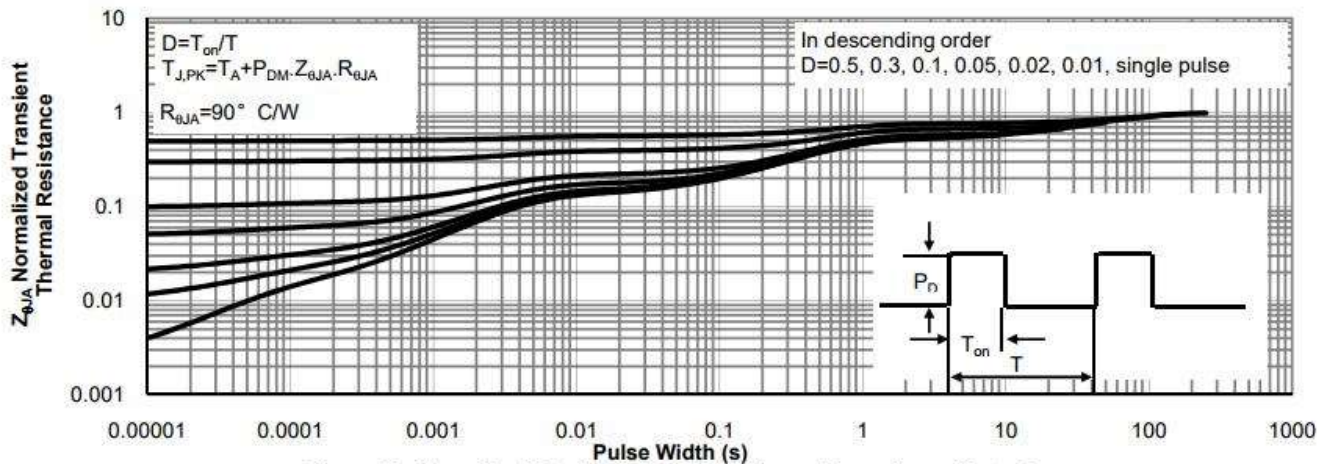
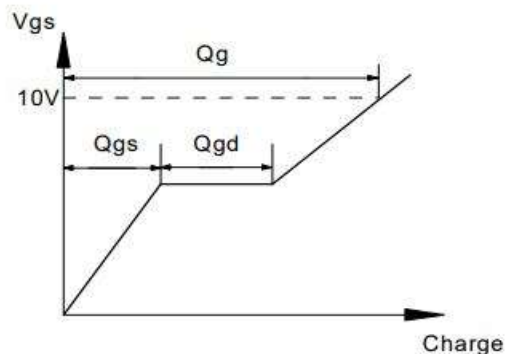
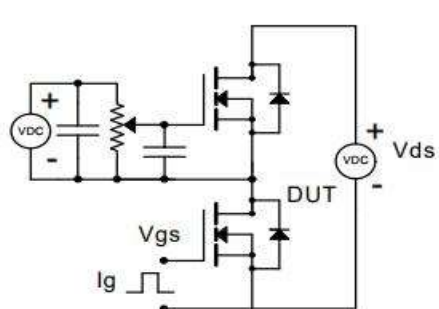
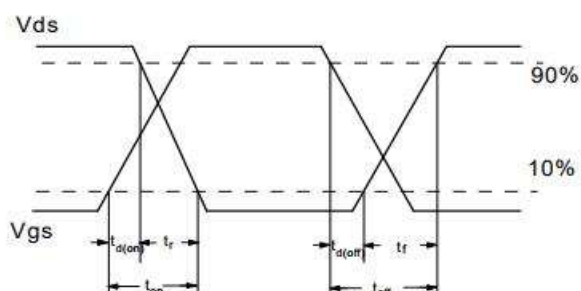
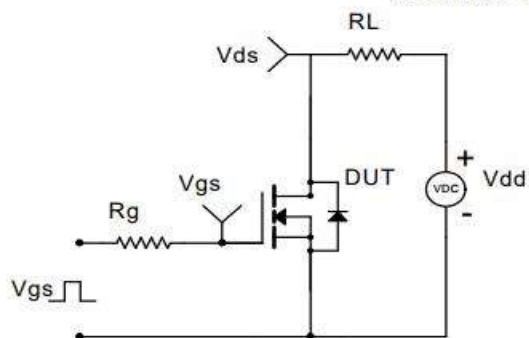


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

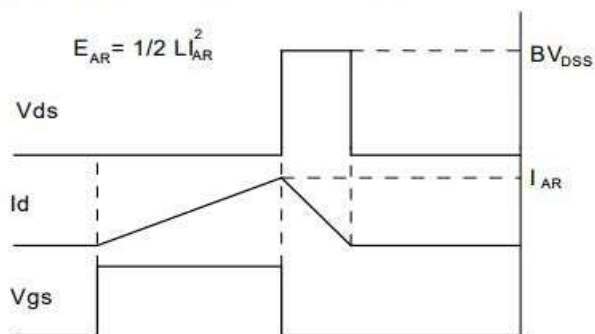
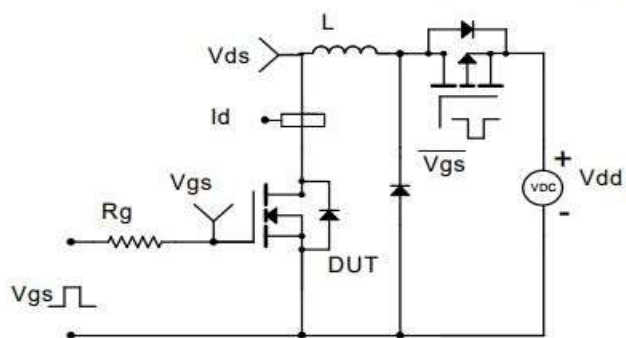
Gate Charge Test Circuit & Waveform



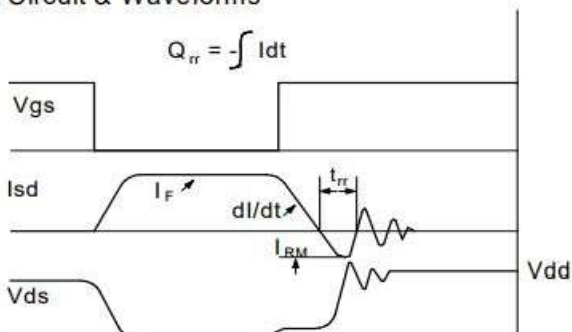
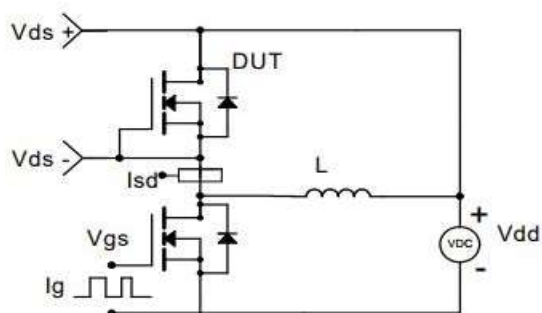
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



P-Channel Electrical Characteristics

STATIC PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D = -250\mu A, V_{GS} = 0V$	-30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -30V, V_{GS} = 0V$			-1 5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS} = 0V, V_{GS} = \pm 20V$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	-1.3	-1.9	-2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = -10V, I_D = -5.5A$		51.8	74.0	m Ω
		$V_{GS} = -4.5V, I_D = -5.5A$		81.4	105.8	
g_{FS}	Forward Transconductance	$V_{DS} = -5V, I_D = -5.5A$		51		S
V_{SD}	Diode Forward Voltage	$I_S = -1A, V_{GS} = 0V$		-0.72	-1	V
I_S	Maximum Body-Diode Continuous Current				-5.5	A

DYNAMIC PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
C_{iss}	Input Capacitance	$V_{GS} = 0V, V_{DS} = -15V, f = 1MHz$		520	634	pF
C_{oss}	Output Capacitance			100	123	pF
C_{rss}	Reverse Transfer Capacitance			65	77	pF
R_g	Gate resistance	$V_{GS} = 0V, V_{DS} = 0V, f = 1MHz$			1.1	Ω

SWITCHING PARAMETERS

Symbol	Parameter	Conditions	Min	Typ	Max	Units
$Q_g(10V)$	Total Gate Charge	$V_{GS} = -10V, V_{DS} = -15V, I_D = -5.5A$		4.6		nC
$Q_g(4.5V)$	Total Gate Charge			2.3		
Q_{gs}	Gate Source Charge			1.5		
Q_{gd}	Gate Drain Charge			2.2		
$t_{D(on)}$	Turn-On DelayTime	$V_{GS} = -10V, V_{DS} = -15V, R_L = 0.75\Omega, R_{GEN} = 3\Omega$		5.5		ns
t_r	Turn-On Rise Time			4.4		
$t_{D(off)}$	Turn-Off DelayTime			15.4		
t_f	Turn-Off Fall Time			5.0		
t_{rr}	Body Diode Reverse Recovery Time	$I_F = -8A, dI/dt = 500A/\mu s$		11.0		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F = 18A, dI/dt = 500A/\mu s$		5.3		nC

P-Channel: TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

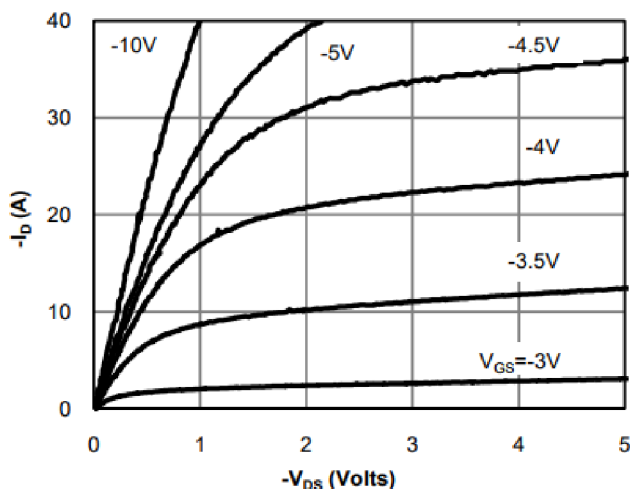


Fig 1: On-Region Characteristics (Note E)

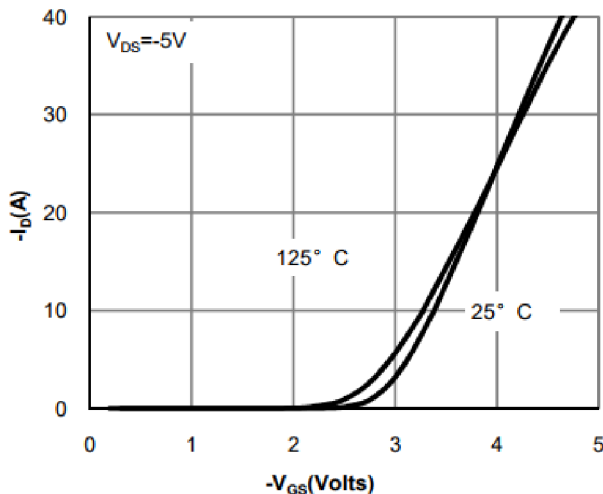


Figure 2: Transfer Characteristics (Note E)

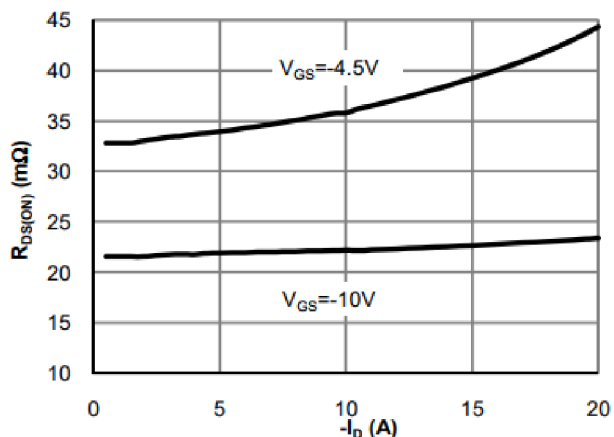


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

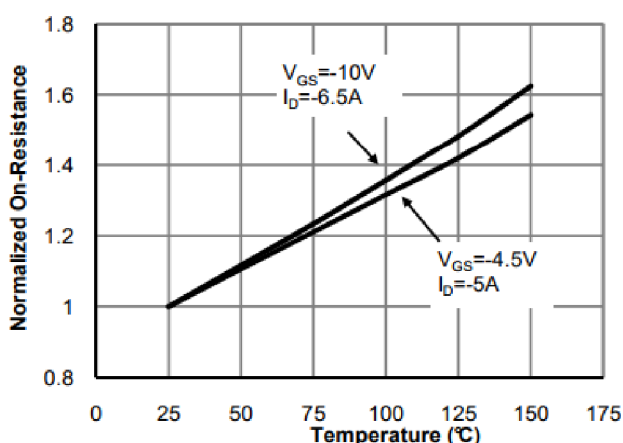


Figure 4: On-Resistance vs. Junction Temperature (Note E)

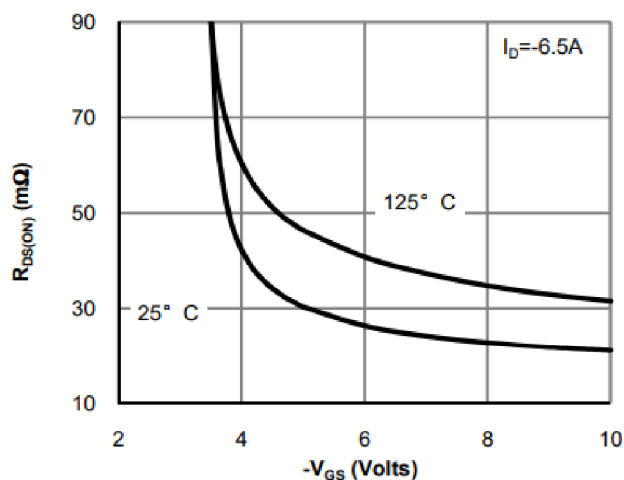


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

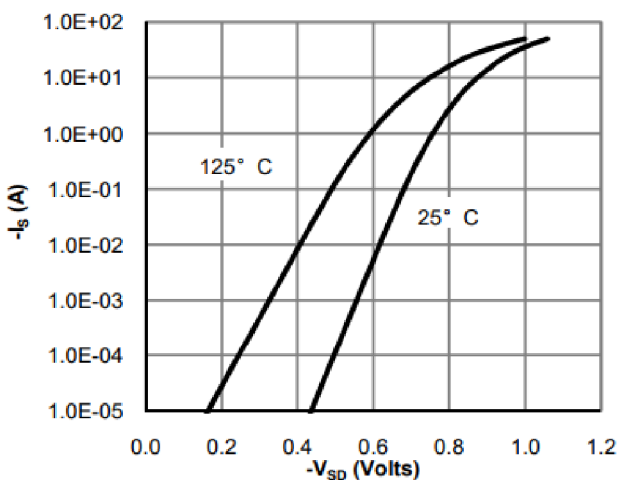


Figure 6: Body-Diode Characteristics (Note E)

P-Channel: TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

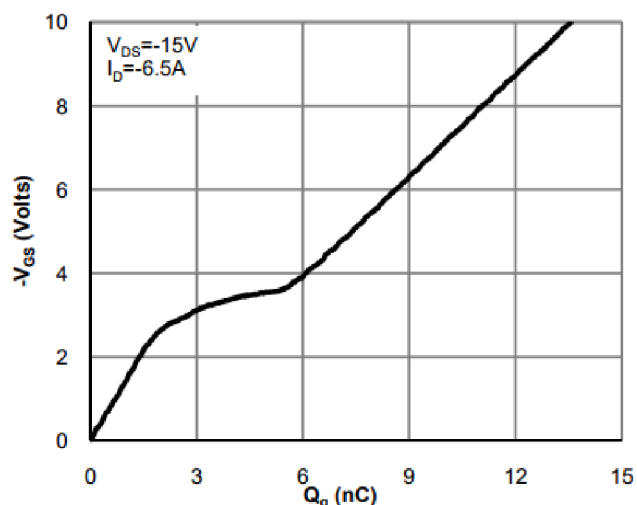


Figure 7: Gate-Charge Characteristics

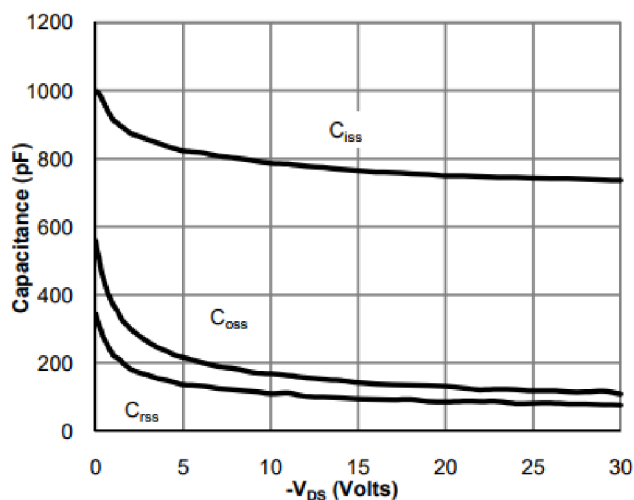


Figure 8: Capacitance Characteristics

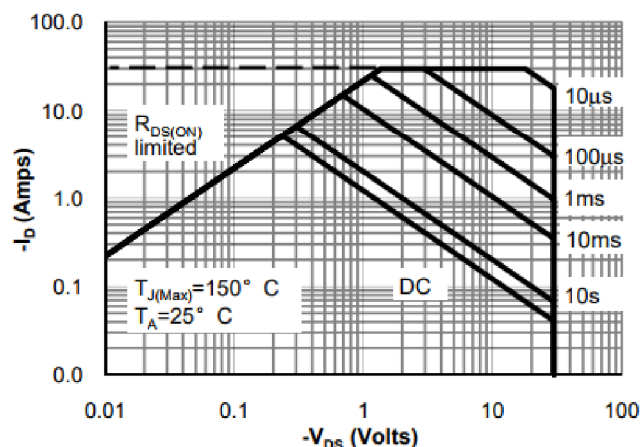


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

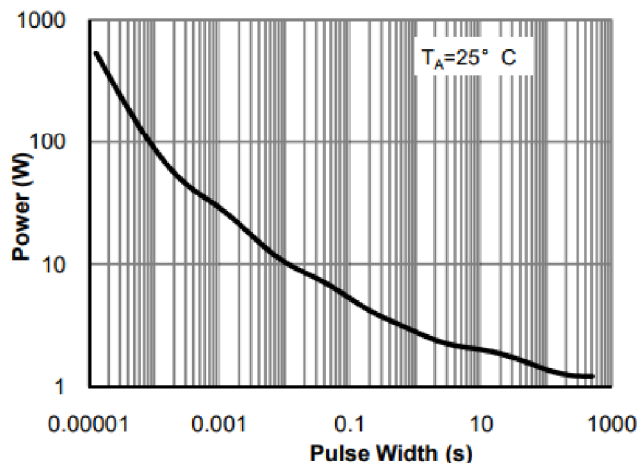


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

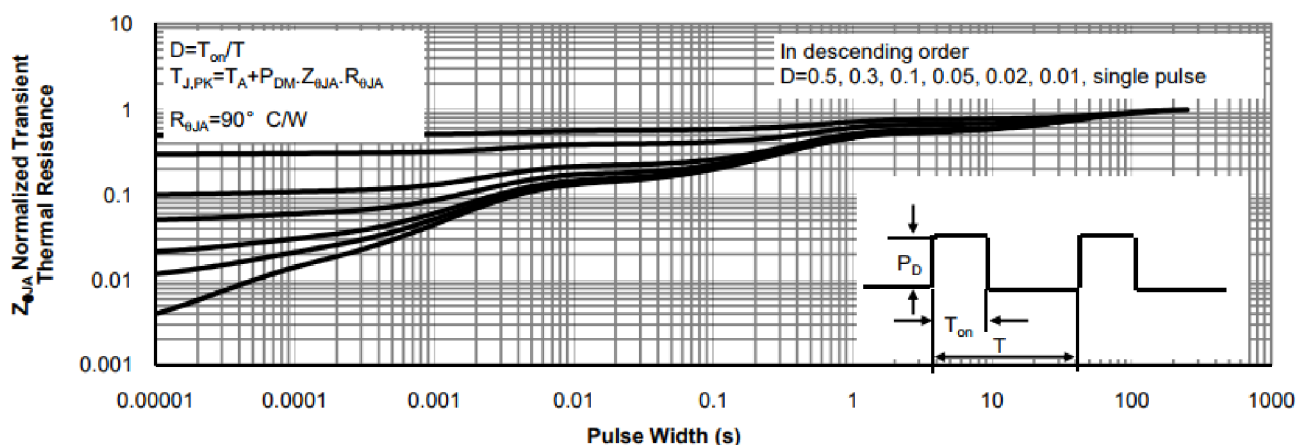
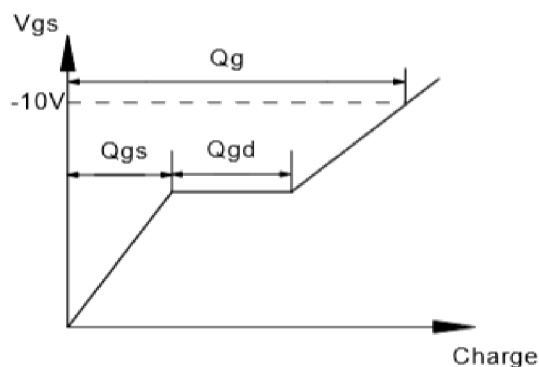
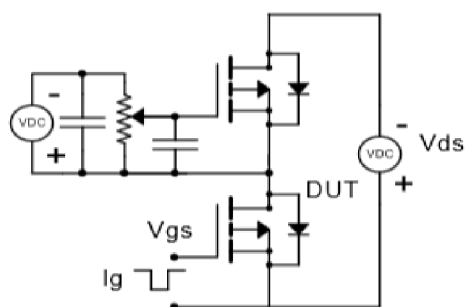
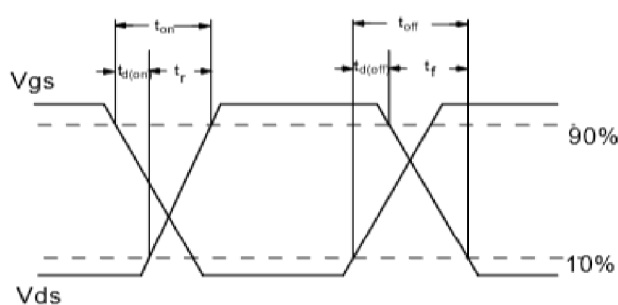
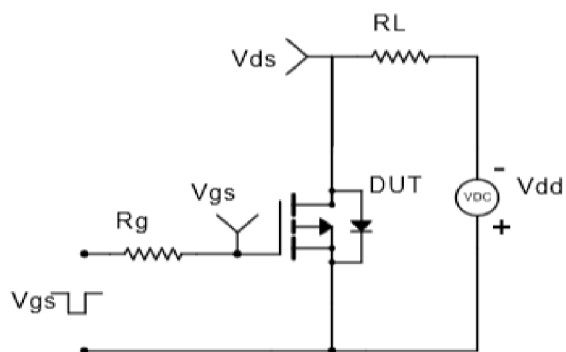


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

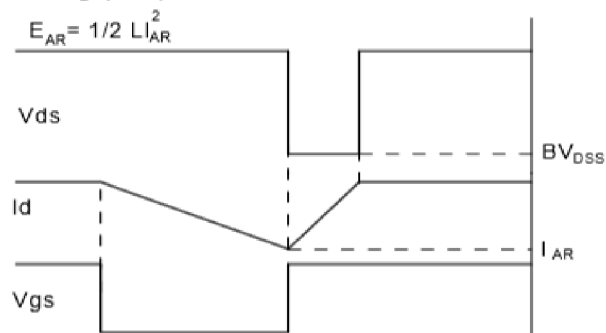
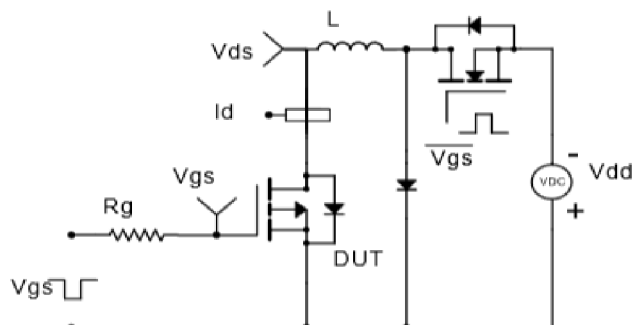
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

