Alfa-MOS Technology

AFC6332ES
20V N & P Pair Enhancement Mode MOSFET

General Description

AFC6332ES, N & P Pair enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.
These devices are particularly suited for low voltage power management, such as smart phone and notebook computer and other battery powered circuits, and low in-line power loss are needed in commercial industrial surface mount applications.

Features

- N-Channel

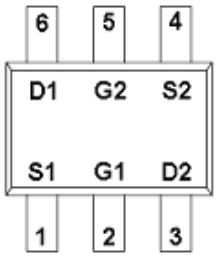
20V/0.7A,RDS(ON)=320mΩ@VGS=4.5V
20V/0.6A,RDS(ON)=420mΩ@VGS=2.5V
20V/0.5A,RDS(ON)=580mΩ@VGS=1.8V

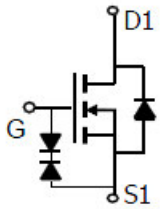
- P-Channel

-20V/-0.6A, RDS(ON)= 580 mΩ@ VGS =-4.5V
-20V/-0.5A, RDS(ON)= 780 mΩ@ VGS =-2.5V
-20V/-0.4A, RDS(ON)= 980 mΩ@ VGS =-1.8V

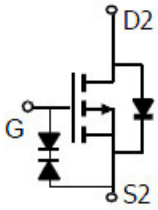
- Super high density cell design
- ESD Protection Diode design–in
- SOT-363 package design

Pin Description (SOT-363)

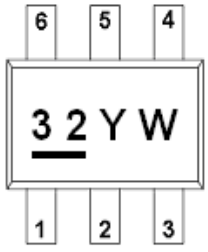




n-channel



p-channel



Application

- Load Switch for Portable Devices, Smart Phones, Pagers

Pin Define

Pin	Symbol	Description
1	S1	Source 1
2	G1	Gate 1
3	D2	Drain 2
4	S2	Source 2
5	G2	Gate 2
6	D1	Drain1

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFC6332ESS36RG	32YW	SOT-363	Tape & Reel	3000 EA

※ 32 parts code
※ Y year code (0 ~ 9)
※ W week code (A ~ Z = 1 ~ 26 / a ~ z = 27 ~ 52)
※ AFC6332ESS36RG : 7” Tape & Reel ; Pb- Free ; Halogen- Free

Absolute Maximum Ratings

(T_A=25℃ Unless otherwise noted)

Parameter		Symbol	Typical		Unit
			N-Channel	P-Channel	
Drain-Source Voltage		V_{DSS}	20	-20	V
Gate –Source Voltage		V_{GSS}	±12	±12	V
Continuous Drain Current(T_J=150℃)	T_A=25℃	I_D	1.2	-1.0	A
	T_A=70℃		0.9	-0.7	
Pulsed Drain Current		I_{DM}	4	-3	A
Continuous Source Current(Diode Conduction)		I_S	0.6	-0.6	A
Power Dissipation	T_A=25℃	P_D	0.3		W
	T_A=70℃		0.2		
Operating Junction Temperature		T_J	-55/150		℃
Storage Temperature Range		T_{STG}	-55/150		℃

Electrical Characteristics (N-Channel)

(T_A=25℃ Unless otherwise noted)

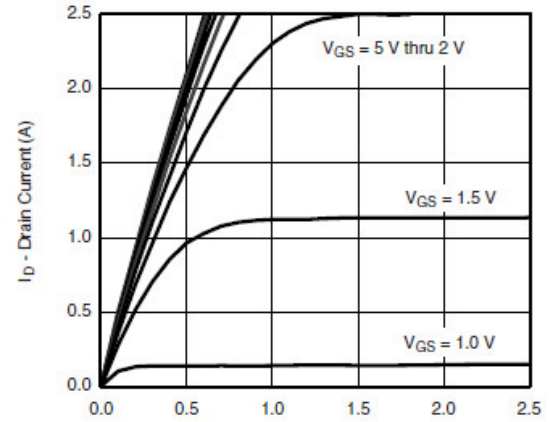
Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V,I_D=250uA	20			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	0.3		1.0	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±12V			±1	mA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=16V,V_{GS}=0V			1	uA
		V_{DS}=16V,V_{GS}=0V T_J=85℃			5	
On-State Drain Current	$I_{D(on)}$	V_{DS}≧5V,V_{GS}=4.5V	1.2			A
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=4.5V,I_D=0.7A		230	320	mΩ
		V_{GS}=2.5V,I_D=0.6A		280	420	
		V_{GS}=1.8V,I_D=0.5A		400	580	
Forward Transconductance	g_{FS}	V_{DS}=10V,I_D=1.0A		1		S
Diode Forward Voltage	V_{SD}	I_S=1.0A,V_{GS}=0V		0.65	1.5	V
Dynamic						
Input Capacitance	C_{iss}	V_{DS}=10V,V_{GS}=0V f=1MHz		70		pF
Output Capacitance	C_{oss}			20		
Reverse Transfer Capacitance	C_{rss}			8		
Total Gate Charge	Q_g	V_{DS}=10V,V_{GS}=4.5V I_D≡1.2A		1.06	1.38	nC
Gate-Source Charge	Q_{gs}			0.18		
Gate-Drain Charge	Q_{gd}			0.32		
Turn-On Time	$t_{d(on)}$	V_{DD}=10V,R_L=20Ω I_D≡1.2A,V_{GEN}=4.5V R_G=1Ω		18	26	ns
	t_r			20	28	
Turn-Off Time	$t_{d(off)}$			70	110	
	t_f			25	40	

Electrical Characteristics (P-Channel)

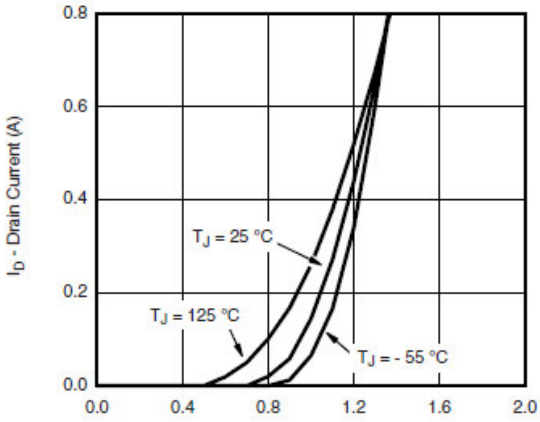
(T_A=25℃ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V,I_D=-250uA	-20			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250uA	-0.3		-1.0	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±12V			±1	mA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-16V,V_{GS}=0V			-1	uA
		V_{DS}=-16V,V_{GS}=0V T_J=85℃			-5	
On-State Drain Current	$I_{D(on)}$	V_{DS}≧5V,V_{GS}=4.5V	0.7			A
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=-4.5V,I_D=-0.6A		380	580	mΩ
		V_{GS}=-2.5V,I_D=-0.5A		520	780	
		V_{GS}=-1.8V,I_D=-0.4A		690	980	
Forward Transconductance	g_{FS}	V_{DS}=-10V,I_D=-0.4A		1		S
Diode Forward Voltage	V_{SD}	I_S=-0.15A,V_{GS}=0V		0.65	1.5	V
Dynamic						
Input Capacitance	C_{iss}	V_{DS}=-10V,V_{GS}=0V f=1MHz		70	100	pF
Output Capacitance	C_{oss}			20		
Reverse Transfer Capacitance	C_{rss}			10		
Total Gate Charge	Q_g	V_{DS}=-10V,V_{GS}=-4.5V I_D≡-0.25A		1.0	1.3	nC
Gate-Source Charge	Q_{gs}			0.1		
Gate-Drain Charge	Q_{gd}			0.3		
Turn-On Time	$t_{d(on)}$	V_{DD}=-10V,R_L=30Ω I_D≡-0.2A,V_{GEN}=-4.5V R_G=10Ω		10	15	ns
	t_r			10	15	
Turn-Off Time	$t_{d(off)}$			40	60	
	t_f			30	50	

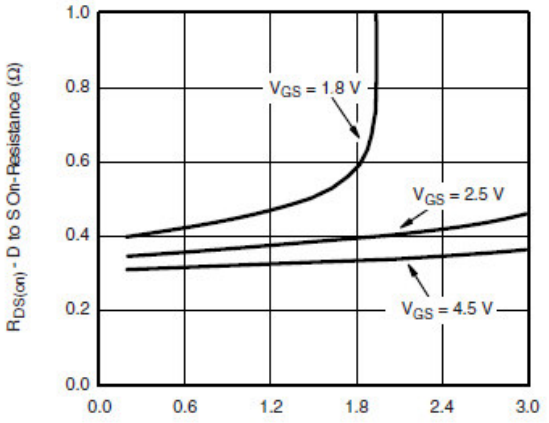
Typical Characteristics (N-Channel)



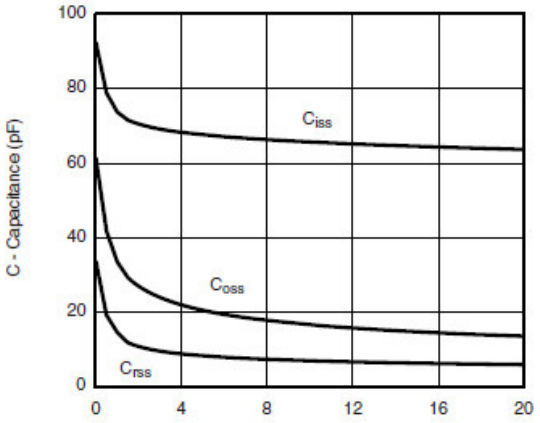
Output Characteristics



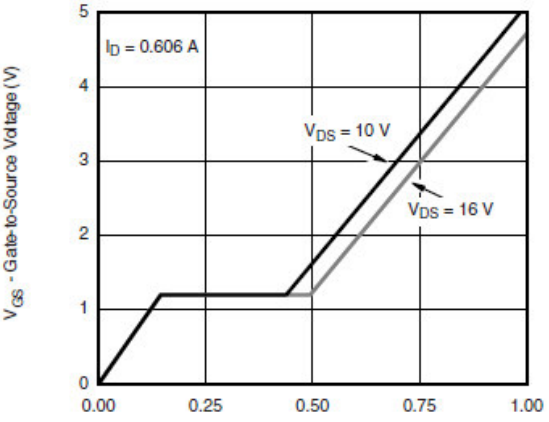
Transfer Characteristics



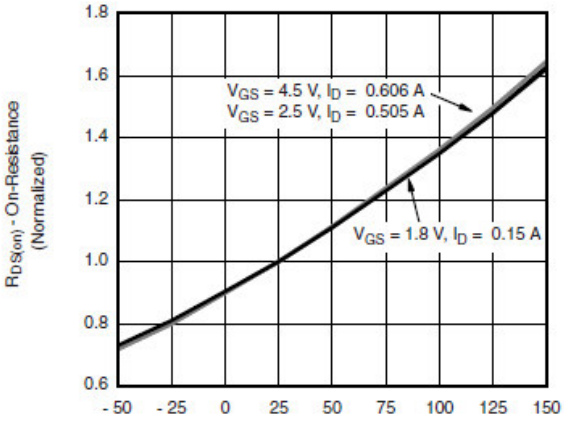
On-Resistance vs. Drain Current



Capacitance

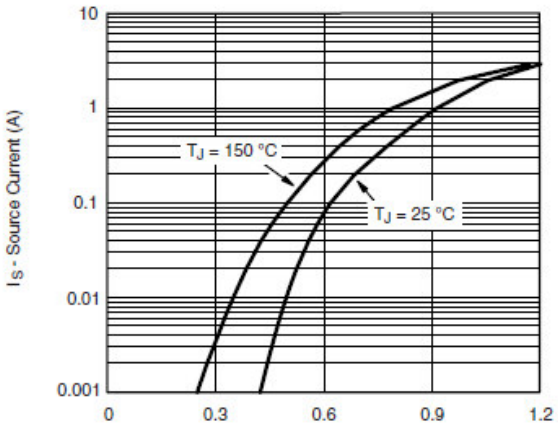


Gate Charge

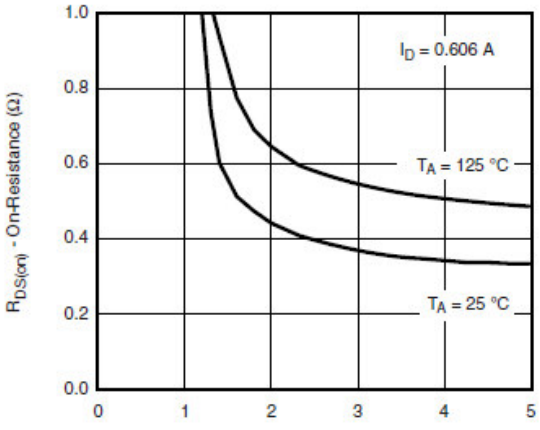


On-Resistance vs. Junction Temperature

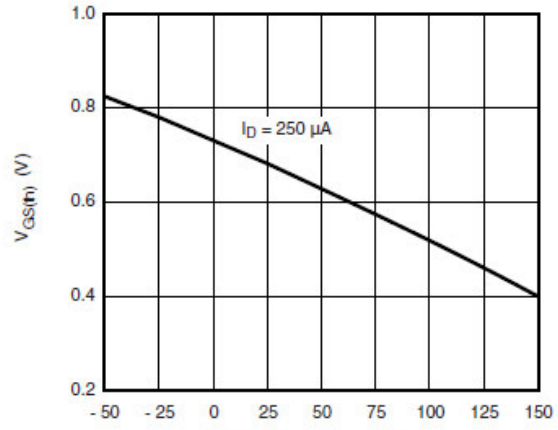
Typical Characteristics (N-Channel)



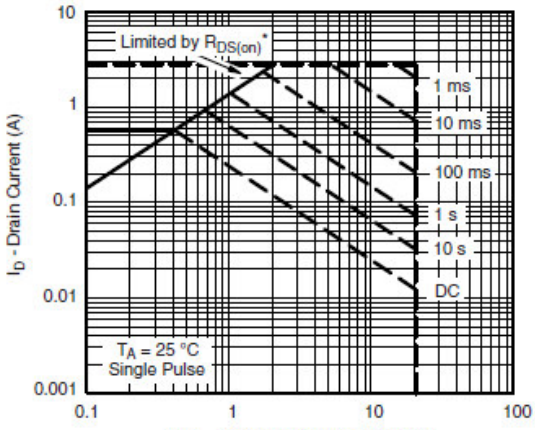
Source-Drain Diode Forward Voltage



$R_{DS(on)}$ vs. V_{GS} vs Temperature

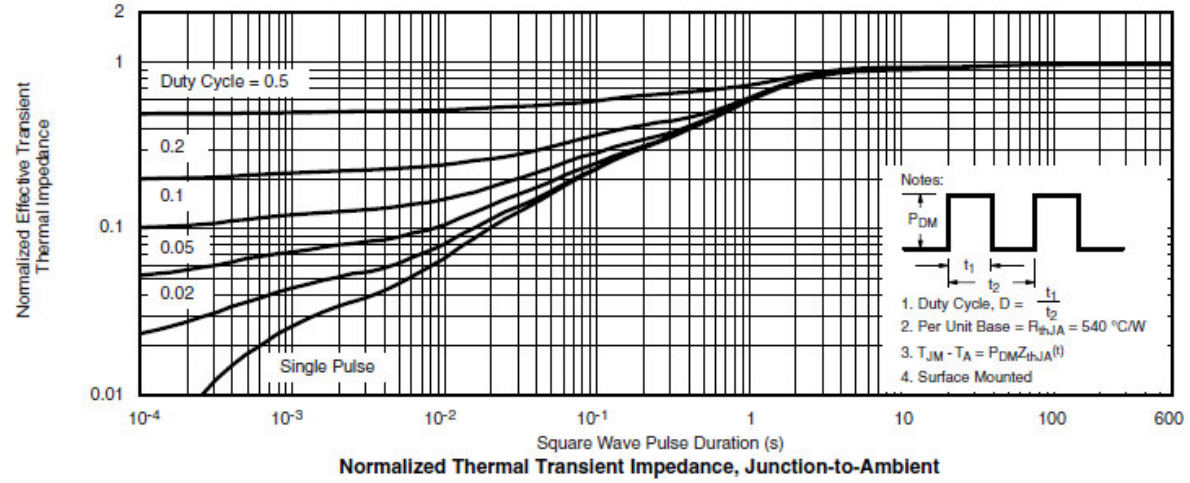


Threshold Voltage



* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

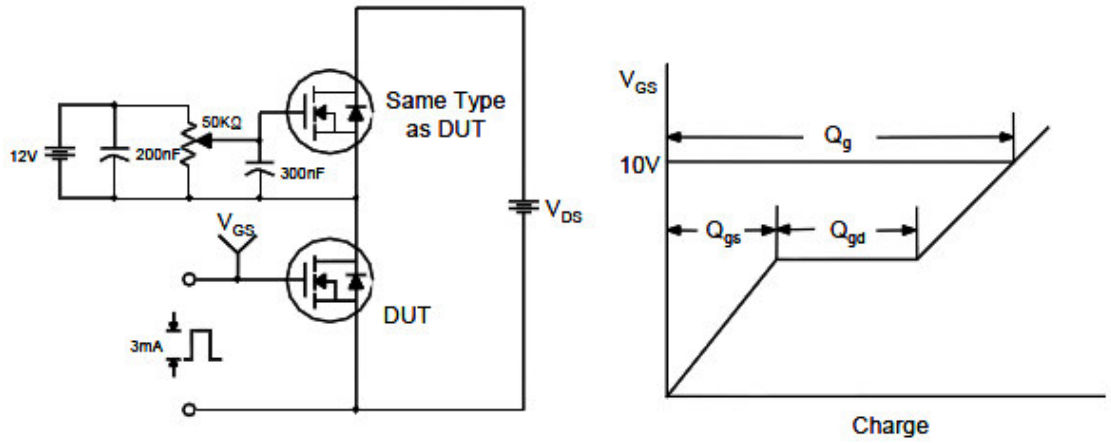
Safe Operating Area, Junction-to-Ambient



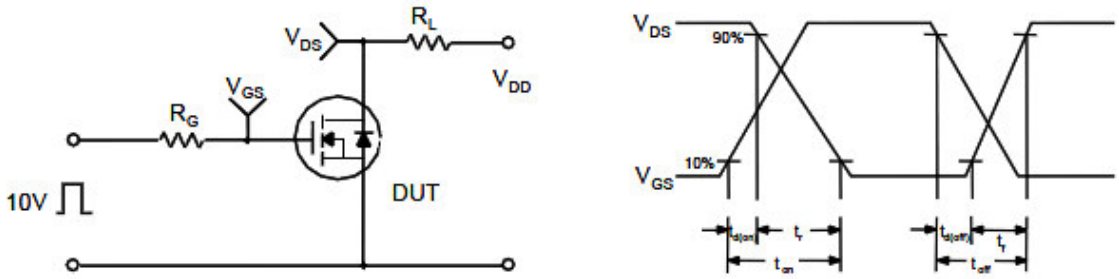
Normalized Thermal Transient Impedance, Junction-to-Ambient

Typical Characteristics (N-Channel)

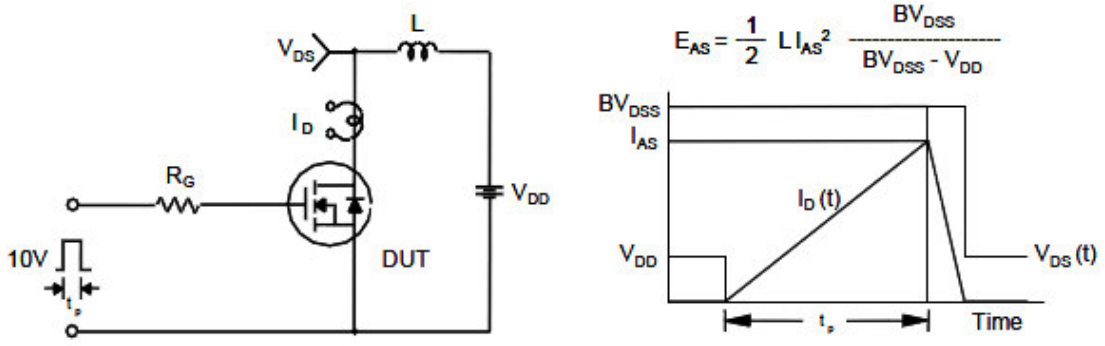
Gate Charge Test Circuit & Waveform



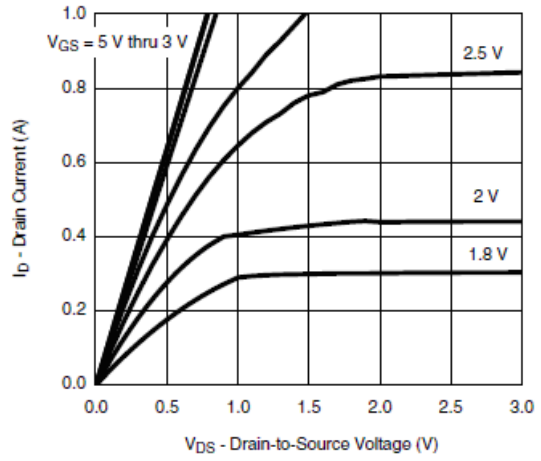
Resistive Switching Test Circuit & Waveforms



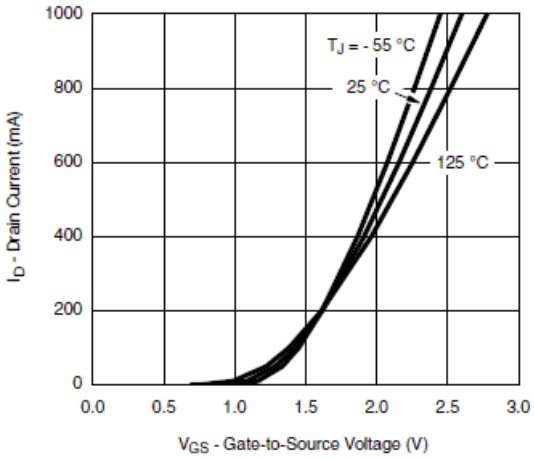
Unclamped Inductive Switching Test Circuit & Waveforms



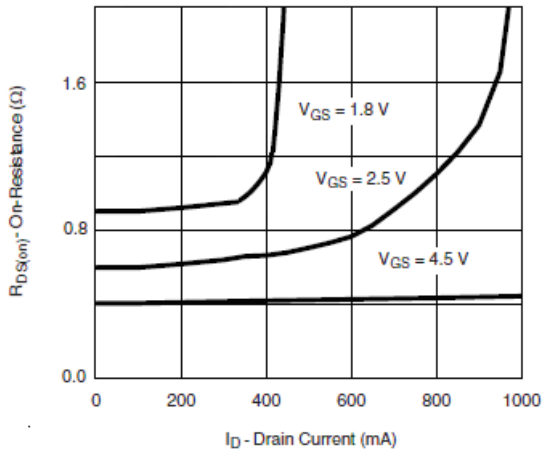
Typical Characteristics (P-Channel)



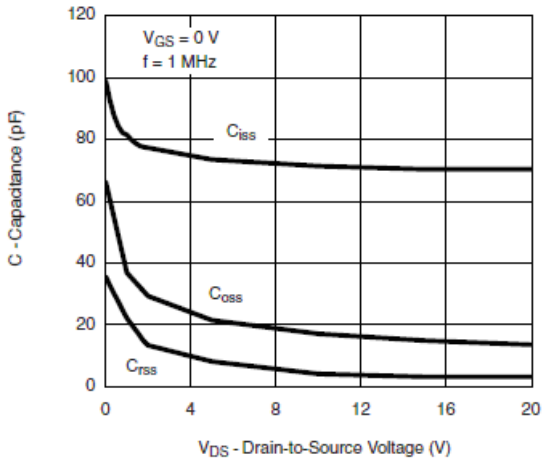
Output Characteristics



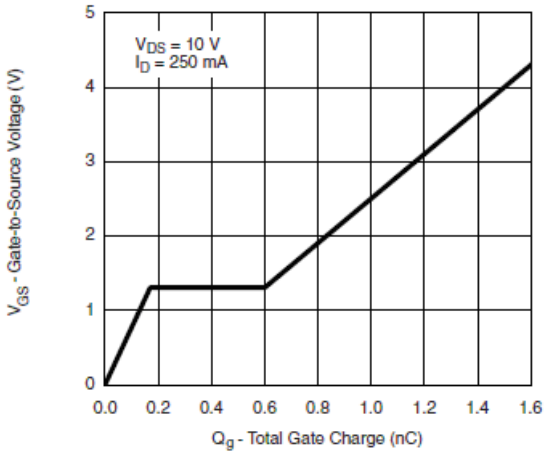
Transfer Characteristics



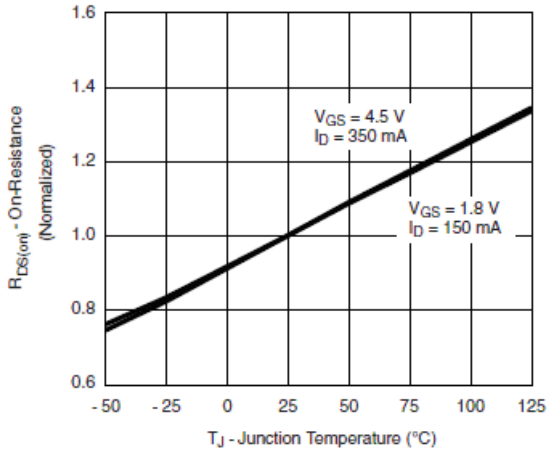
On-Resistance vs. Drain Current



Capacitance

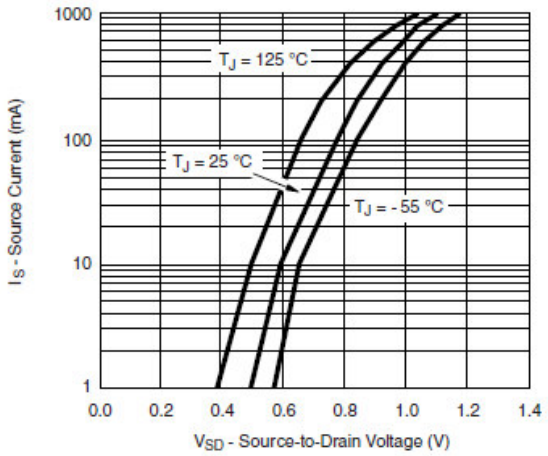


Gate Charge

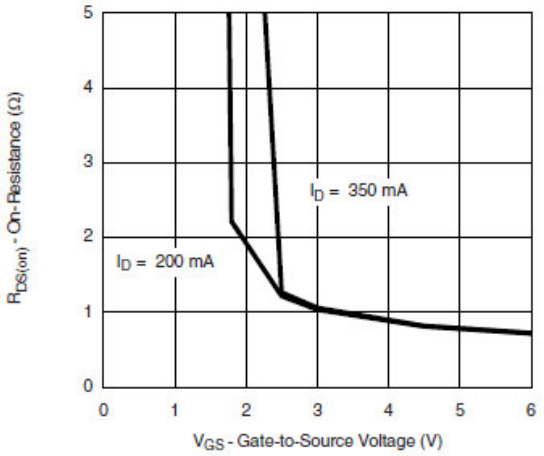


On-Resistance vs. Junction Temperature

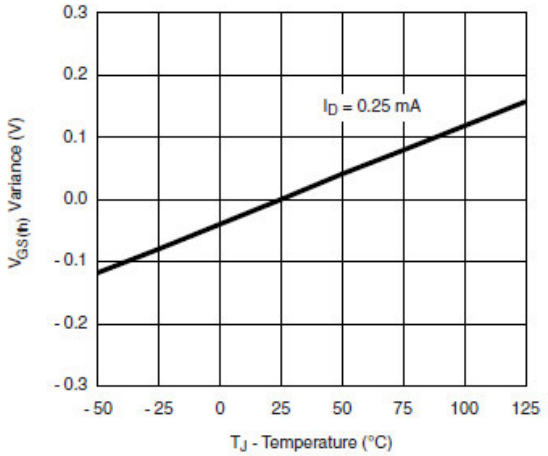
Typical Characteristics (P-Channel)



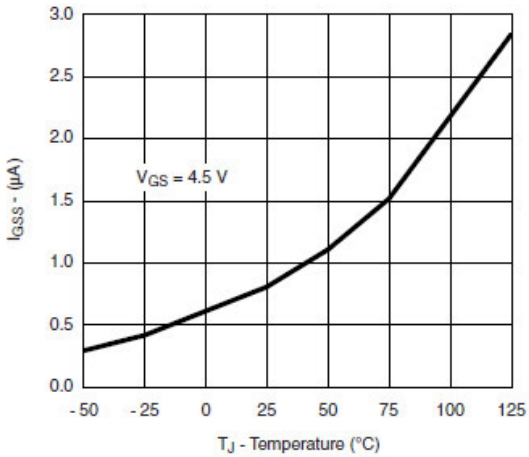
Source-Drain Diode Forward Voltage



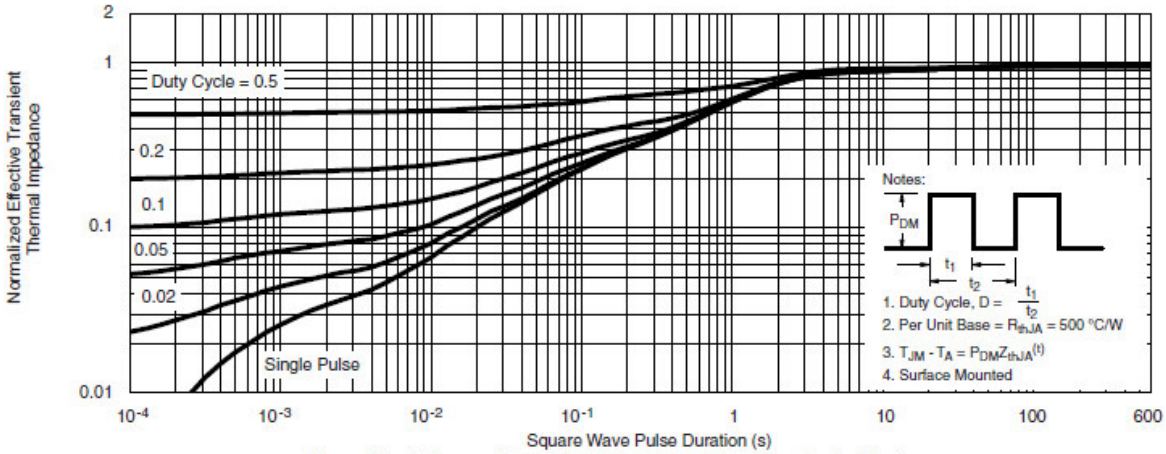
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage Variance vs. Temperature



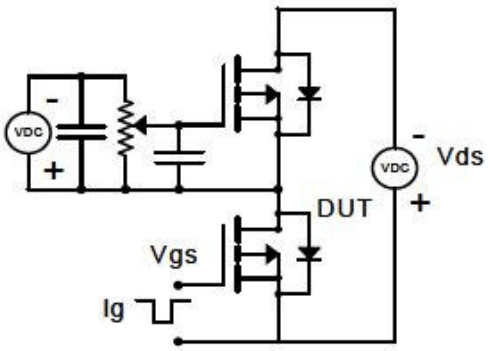
I_{GSS} vs. Temperature

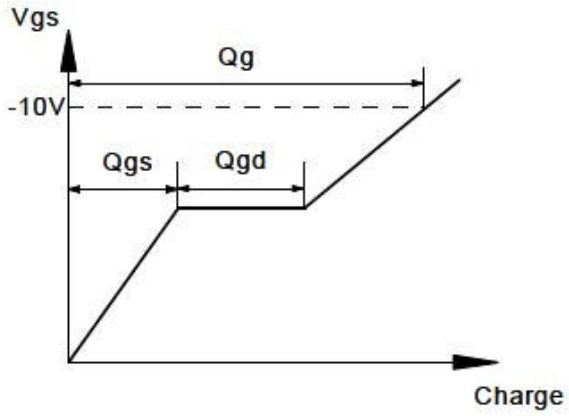


Normalized Thermal Transient Impedance, Junction-to-Ambient

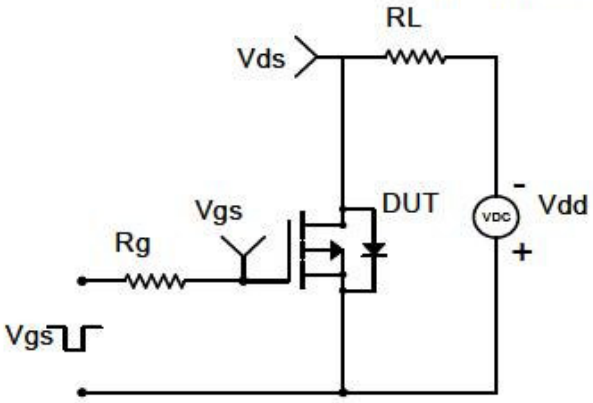
Typical Characteristics (P-Channel)

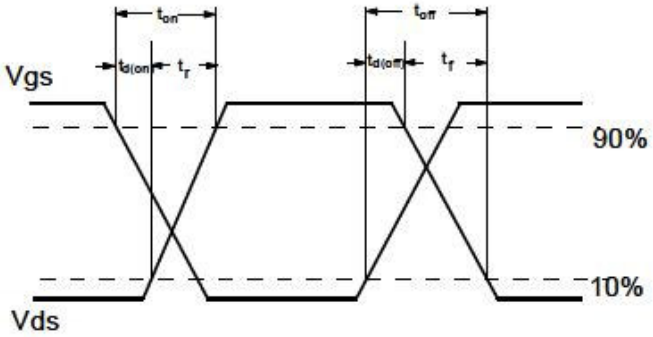
Gate Charge Test Circuit & Waveform



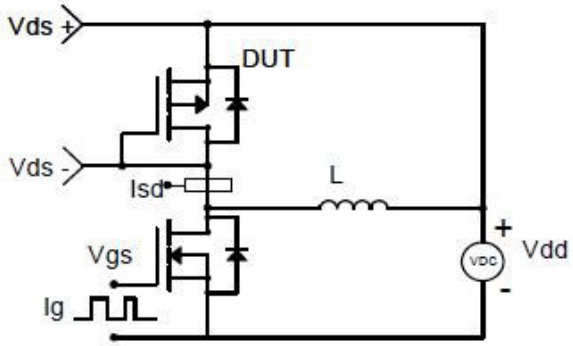


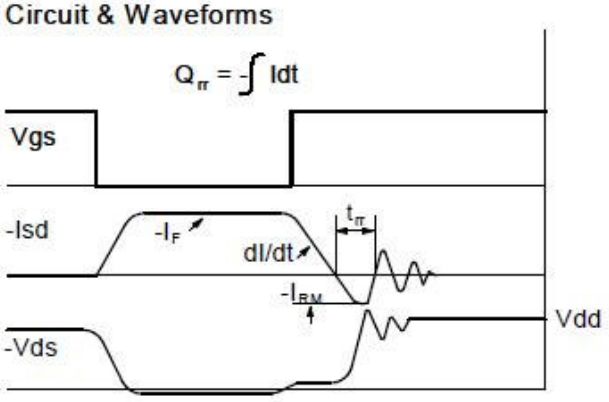
Resistive Switching Test Circuit & Waveforms



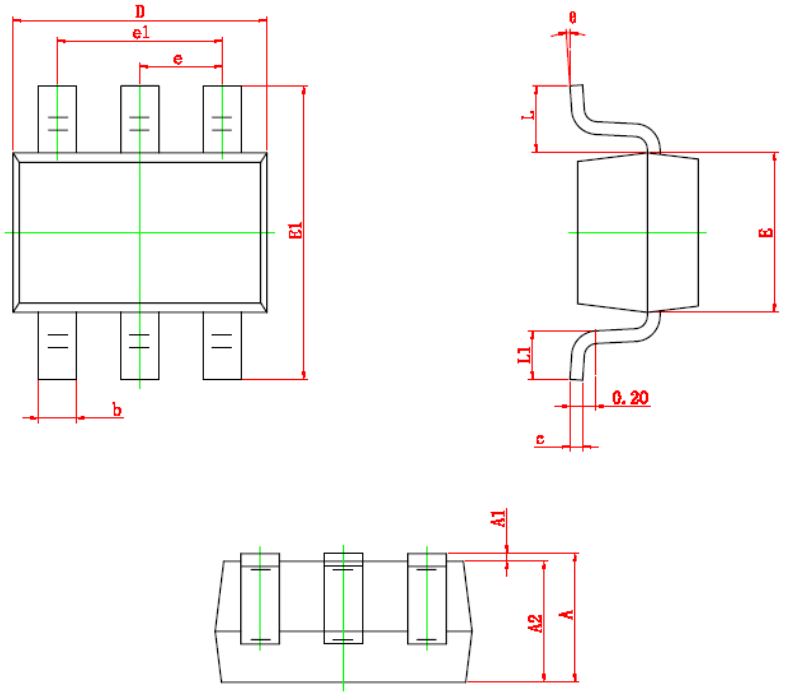


Diode Recovery Test Circuit & Waveforms





Package Information (SOT-363)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

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