Alfa-MOS Technology

AFC6604

20V N & P Pair Enhancement Mode MOSFET

General Description

AFC6604, 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, and low in-line power loss are needed in commercial industrial surface mount applications.

Features

- N-Channel

20V/3.5A,$R_{DS(ON)}$=52mΩ@V_{GS}=4.5V

20V/2.6A,$R_{DS(ON)}$=62mΩ@V_{GS}=2.5V

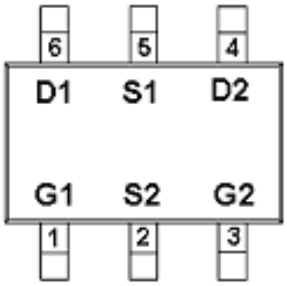
- P-Channel

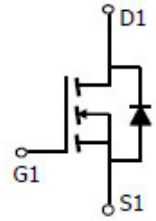
-20V/-3.0A,$R_{DS(ON)}$=105mΩ@V_{GS}=-4.5V

-20V/-2.4A,$R_{DS(ON)}$=150mΩ@V_{GS}=-2.5V

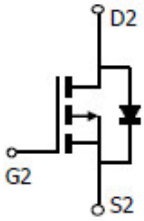
- Super high density cell design for extremely low $R_{DS\ (ON)}$
- Exceptional on-resistance and maximum DC current capability
- TSOP-6 package design

Pin Description (TSOP-6)

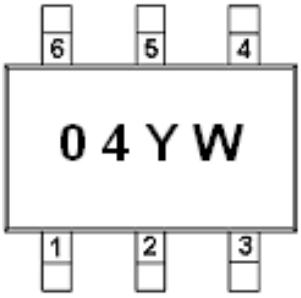




n-channel



p-channel



Application

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- DSC
- LCD Display inverter

Pin Define

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

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AFC6604TS6RG	04YW	TSOP-6	Tape & Reel	3000 EA

※ 04 parts code
※ Y year code (0 ~ 9)
※ W week code (A ~ Z = 1 ~ 26 / a ~ z = 27 ~ 52)
※ AFC6604TS6RG : 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	3.5	-3.0	A
	T_A=70℃		2.6	-2.4	
Pulsed Drain Current		I_{DM}	15	-15	A
Continuous Source Current(Diode Conduction)		I_S	1.5	-1.5	A
Power Dissipation	T_A=25℃	P_D	2.0		W
	T_A=70℃		1.3		
Operating Junction Temperature		T_J	150		℃
Storage Temperature Range		T_{STG}	-55/150		℃
Thermal Resistance-Junction to Ambient		$R_{\theta JA}$	120		℃/W

Electrical Characteristics (N-Channel)

(T_A=25℃ Unless otherwise noted)

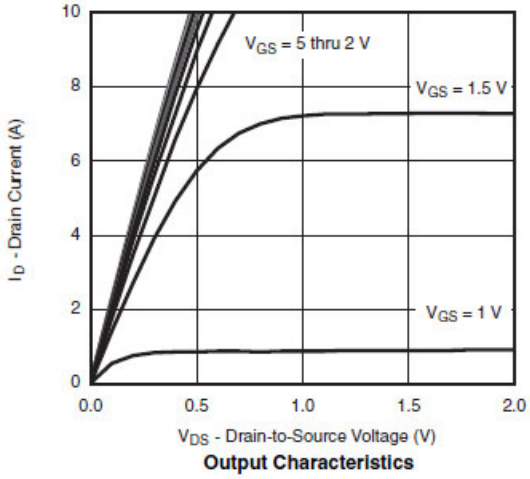
Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V,I_D=250uA	20			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	0.3		0.8	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±12V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=16V,V_{GS}=0V			1	uA
		V_{DS}=16V,V_{GS}=0V T_J=85℃			10	
On-State Drain Current	$I_{D(on)}$	V_{DS}≧5V,V_{GS}=4.5V	6			A
		V_{DS}≧5V,V_{GS}=2.5V	4			
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=4.5V,I_D=3.5A		44	52	mΩ
		V_{GS}=2.5V,I_D=2.6A		52	62	
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=3.6A		10		S
Diode Forward Voltage	V_{SD}	I_S=1.6A,V_{GS}=0V		0.85	1.2	V
Dynamic						
Total Gate Charge	Q_g	V_{DS}=10V,V_{GS}=4.5V I_D≡3.6A		4.2	5.0	nC
Gate-Source Charge	Q_{gs}			0.6		
Gate-Drain Charge	Q_{gd}			0.4		
Input Capacitance	C_{iss}	V_{DS}=10V,V_{GS}=0V f=1MHz		340		pF
Output Capacitance	C_{oss}			115		
Reverse Transfer Capacitance	C_{rss}			33		
Turn-On Time	$t_{d(on)}$	V_{DD}=10V,R_L=2.8Ω I_D≡3.6A,V_{GEN}=4.5V R_G=1Ω		8	15	ns
	t_r			8	15	
Turn-Off Time	$t_{d(off)}$			25	40	
	t_f			8	15	

Electrical Characteristics (P-Channel)

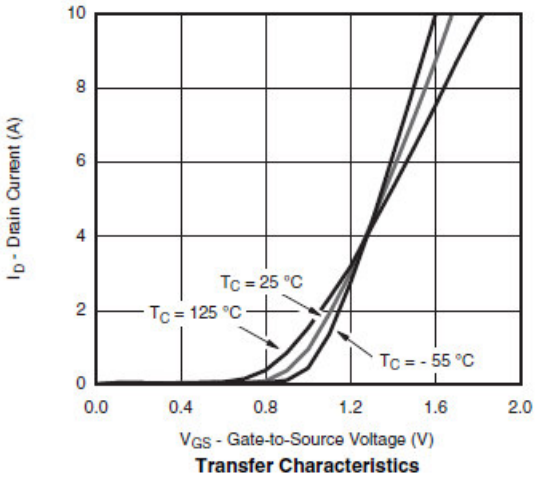
(T_A=25℃ Unless otherwise noted)

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	-0.35		-1.0	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±12V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-16V,V_{GS}=0V			-1	uA
		V_{DS}=-16V,V_{GS}=0V T_J=85℃			-30	
On-State Drain Current	$I_{D(on)}$	V_{DS}≦-5V,V_{GS}=-4.5V	-6			A
		V_{DS}≦-5V,V_{GS}=-2.5V	-3			
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=-4.5V,I_D=-3.0A		96	105	mΩ
		V_{GS}=-2.5V,I_D=-2.4A		138	150	
Forward Transconductance	g_{FS}	V_{DS}=-5V,I_D=-2.8A		6.5		S
Diode Forward Voltage	V_{SD}	I_S=-1.25A,V_{GS}=0V		-0.75	-1.3	V
Dynamic						
Total Gate Charge	Q_g	V_{DS}=-6V,V_{GS}=-4.5V I_D≡-2.8A		5.8	10	nC
Gate-Source Charge	Q_{gs}			0.85		
Gate-Drain Charge	Q_{gd}			1.7		
Input Capacitance	C_{iss}	V_{DS}=-6V,V_{GS}=0V f=1MHz		415		pF
Output Capacitance	C_{oss}			223		
Reverse Transfer Capacitance	C_{rss}			87		
Turn-On Time	$t_{d(on)}$	V_{DD}=-6V,R_L=6Ω I_D≡-1.0A,V_{GEN}=-4.5V R_G=6Ω		13	25	ns
	t_r			36	60	
Turn-Off Time	$t_{d(off)}$			42	70	
	t_f			34	60	

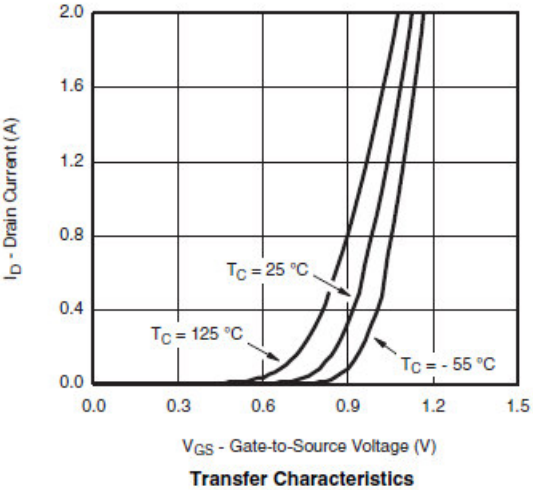
Typical Characteristics (N-Channel)



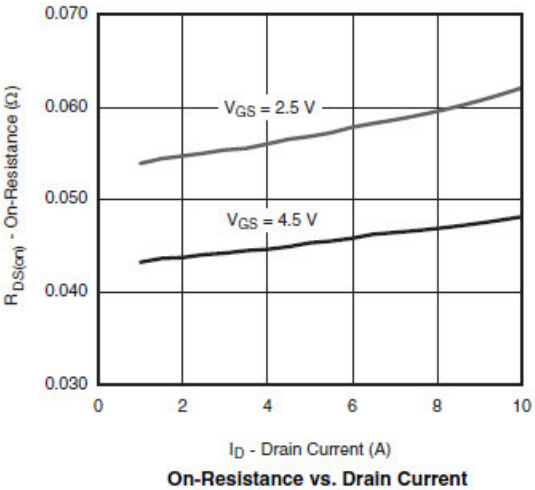
Output Characteristics



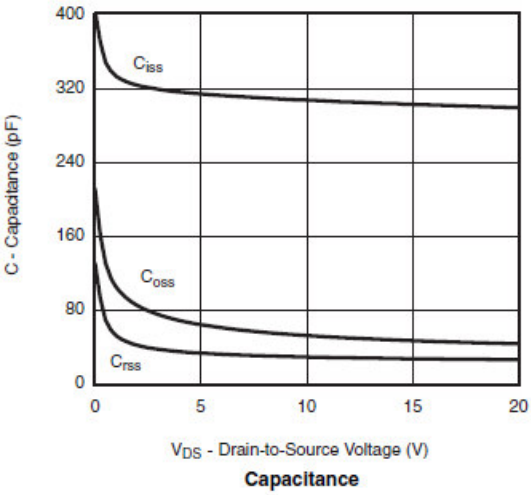
Transfer Characteristics



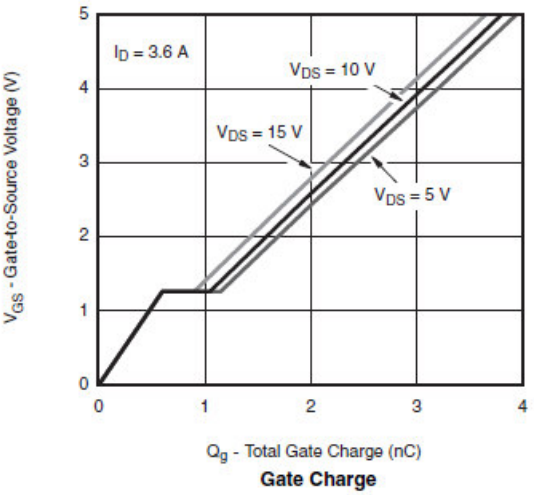
Transfer Characteristics



On-Resistance vs. Drain Current

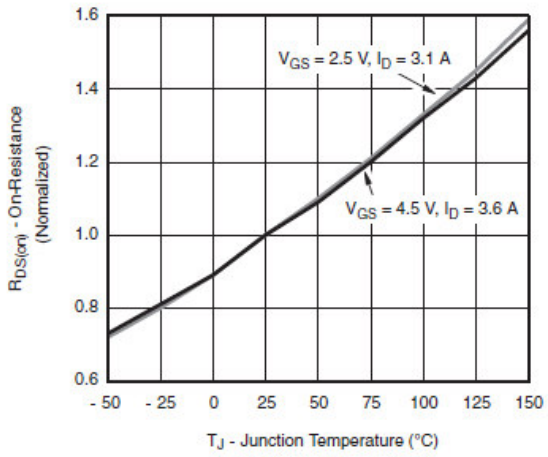


Capacitance

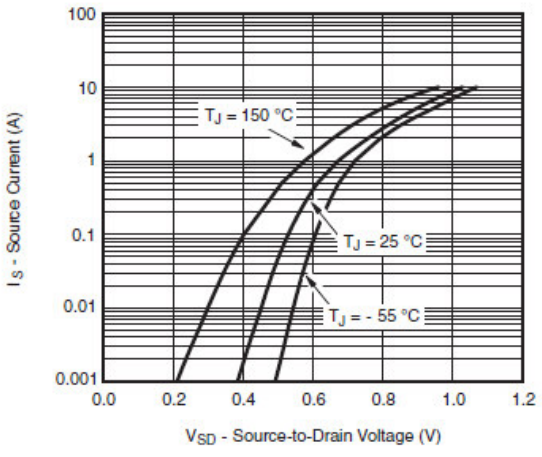


Gate Charge

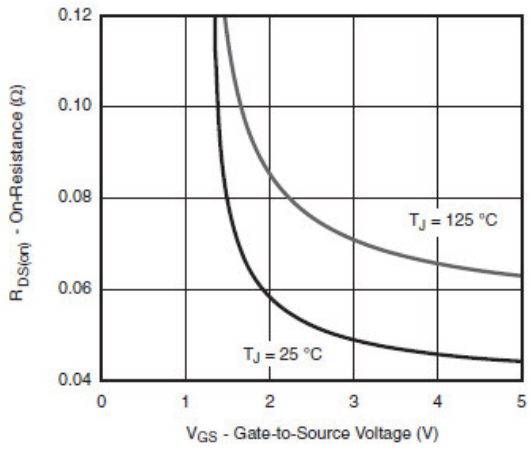
Typical Characteristics (N-Channel)



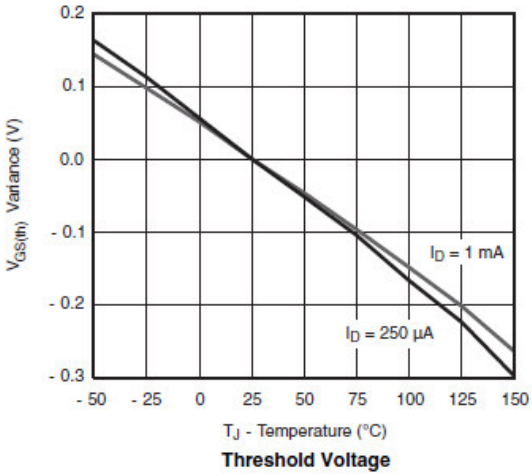
On-Resistance vs. Junction Temperature



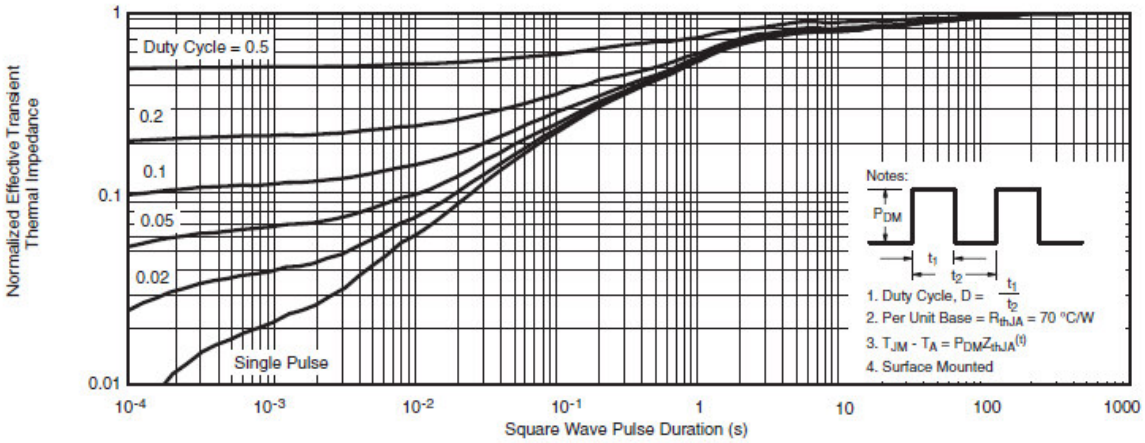
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



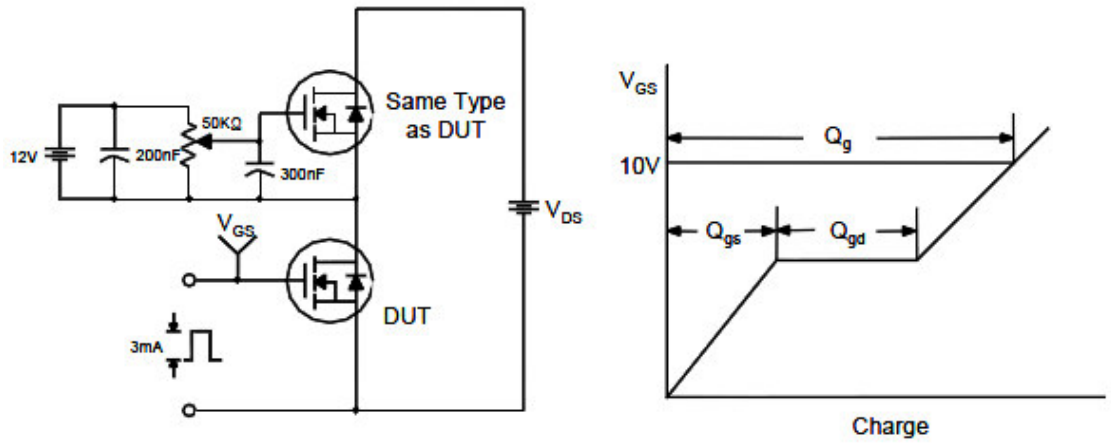
Threshold Voltage



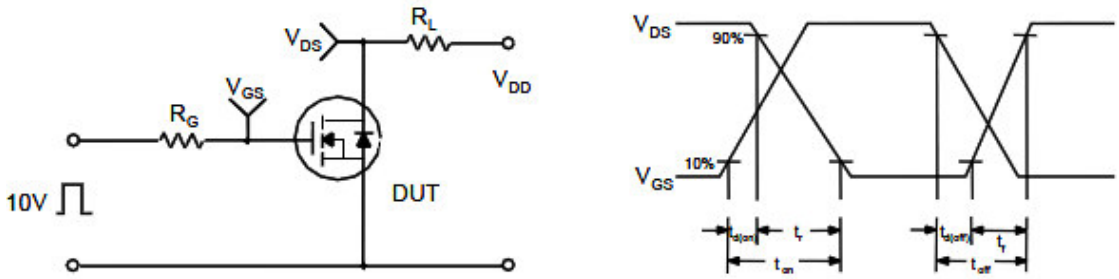
Normalized Thermal Transient Impedance, Junction-to-Ambient

Typical Characteristics (N-Channel)

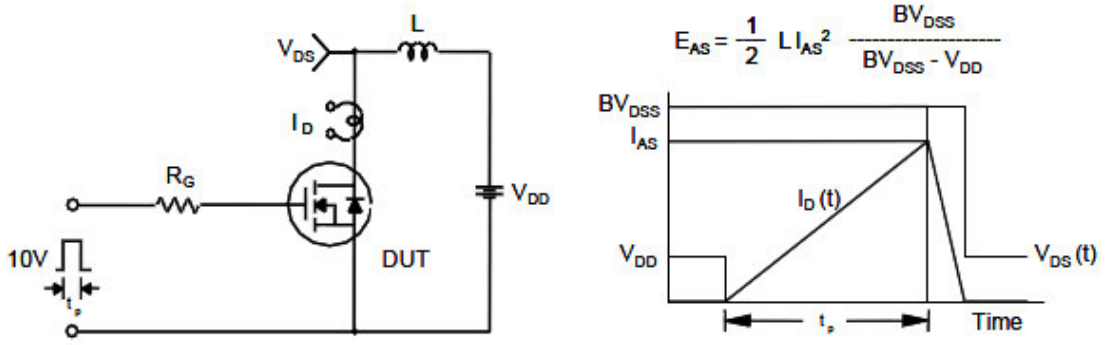
Gate Charge Test Circuit & Waveform



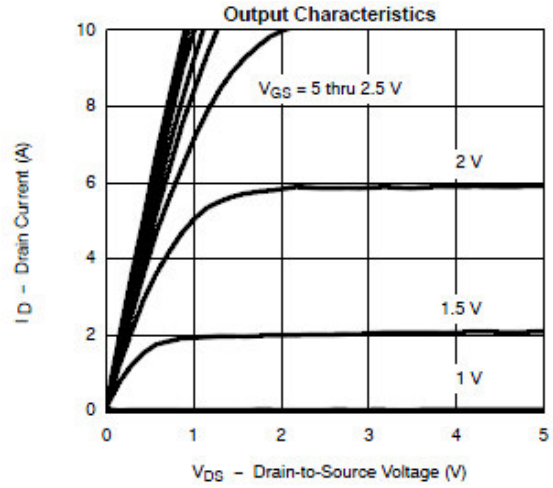
Resistive Switching Test Circuit & Waveforms

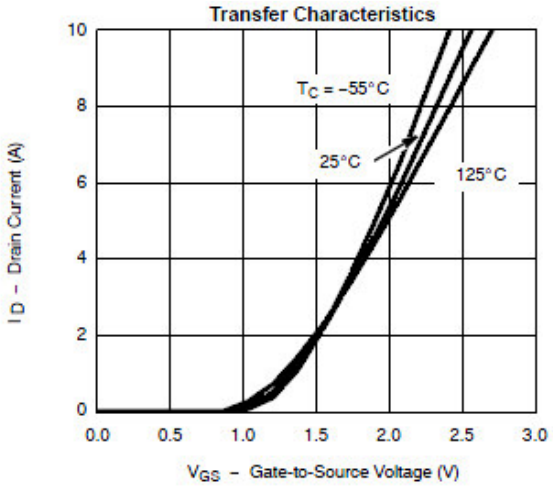


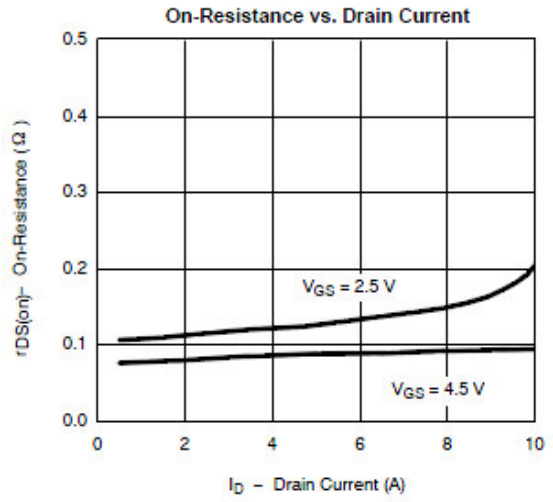
Unclamped Inductive Switching Test Circuit & Waveforms

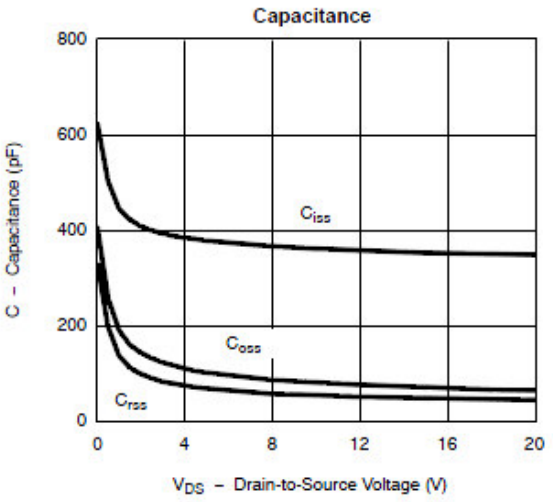


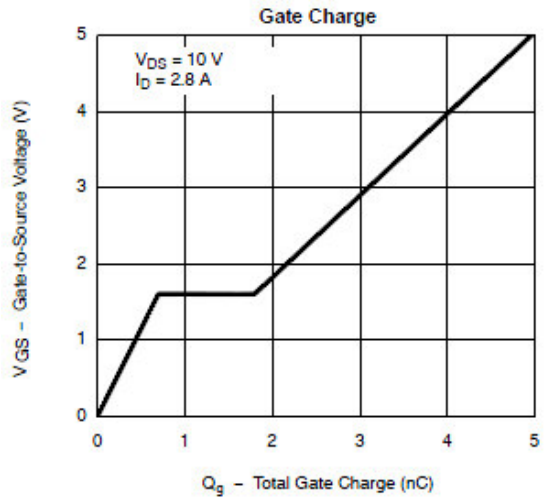
Typical Characteristics (P-Channel)

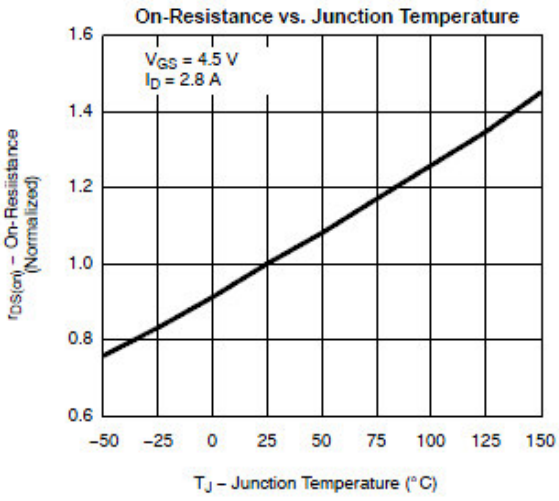




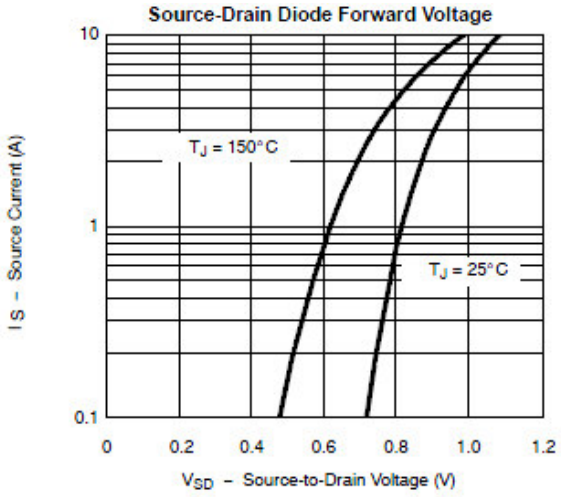


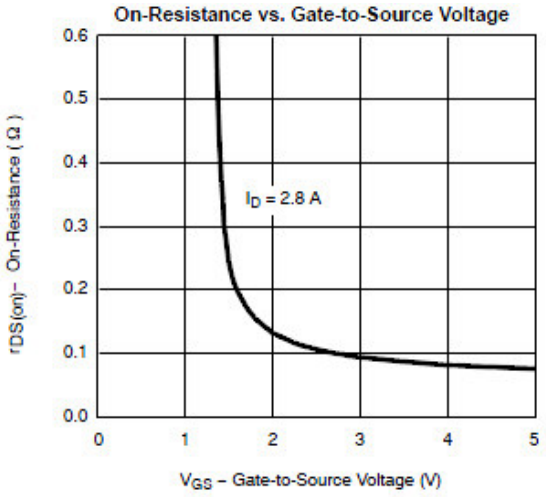


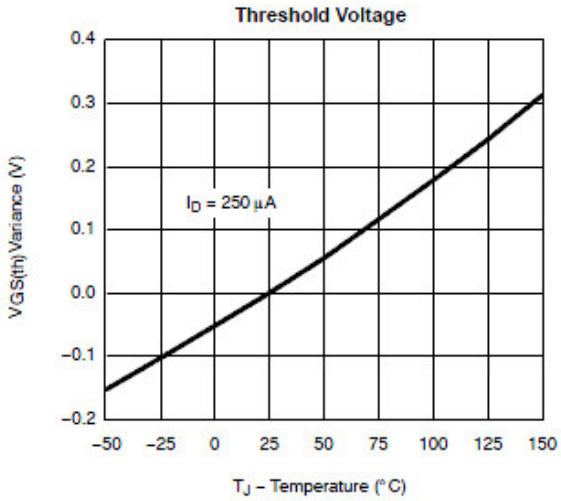


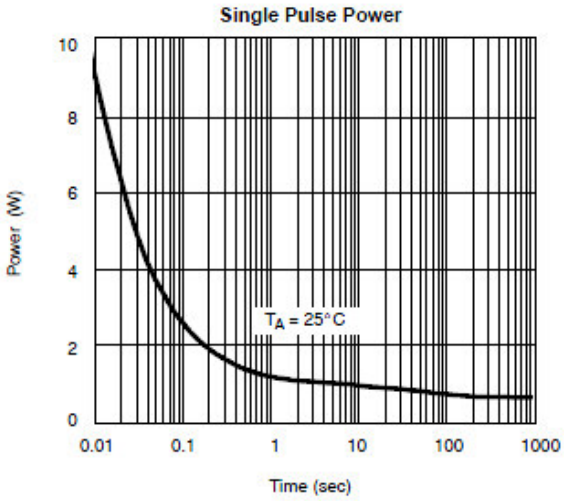


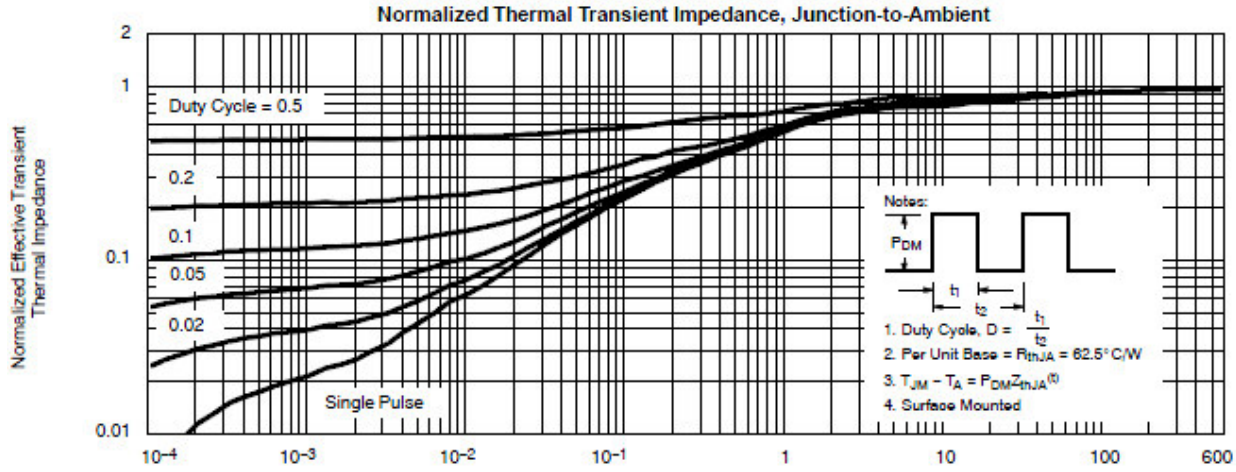
Typical Characteristics (P-Channel)





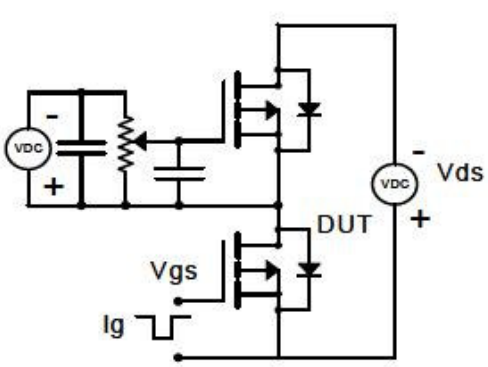


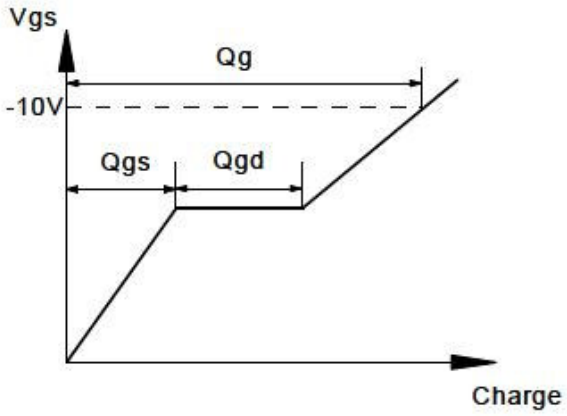




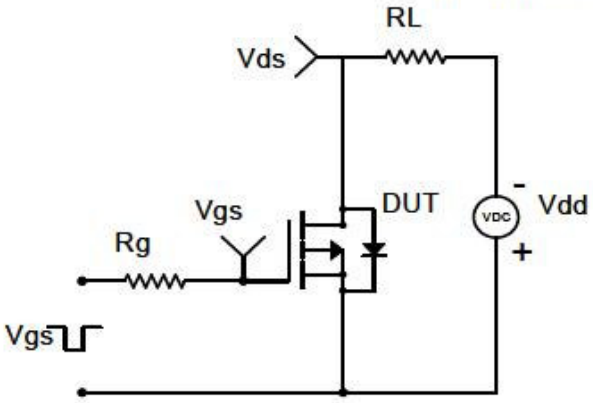
Typical Characteristics (P-Channel)

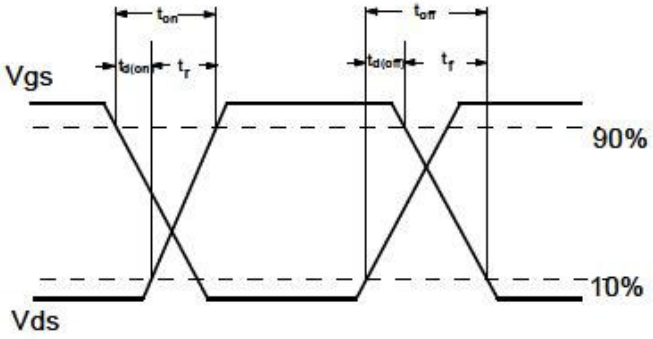
Gate Charge Test Circuit & Waveform



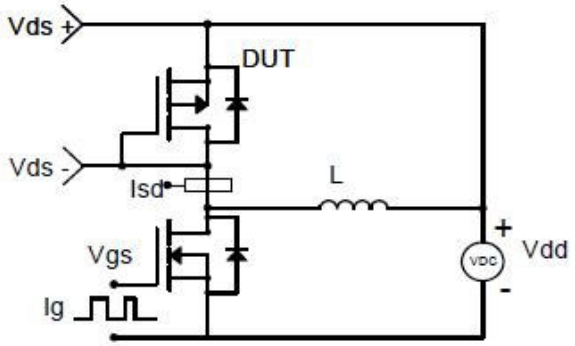


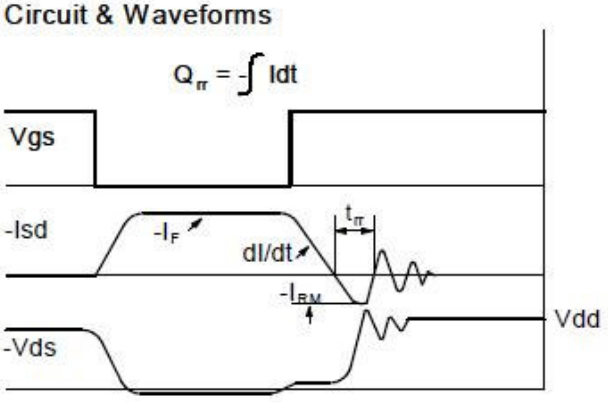
Resistive Switching Test Circuit & Waveforms



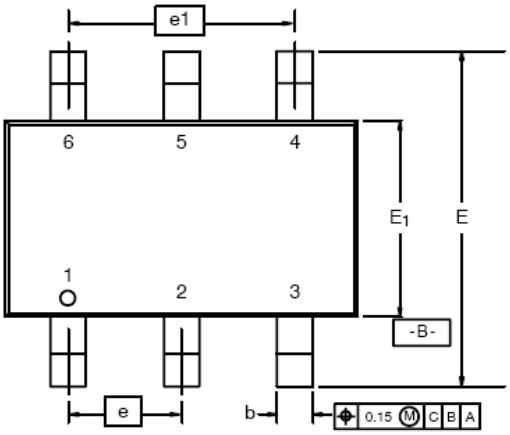


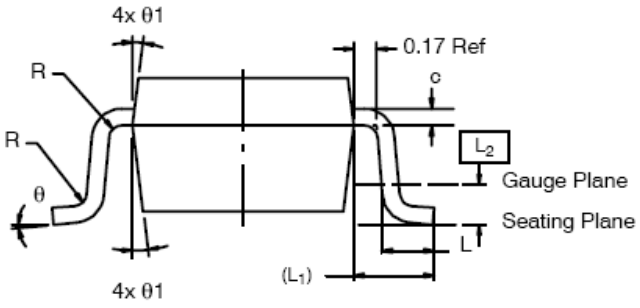
Diode Recovery Test Circuit & Waveforms





Package Information (TSOP-6)





Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
A	0.91	-	1.10	0.036	-	0.043
A_1	0.01	-	0.10	0.0004	-	0.004
A_2	0.90	-	1.00	0.035	0.038	0.039
b	0.30	0.32	0.45	0.012	0.013	0.018
c	0.10	0.15	0.20	0.004	0.006	0.008
D	2.95	3.05	3.10	0.116	0.120	0.122
E	2.70	2.85	2.98	0.106	0.112	0.117
E_1	1.55	1.65	1.70	0.061	0.065	0.067
e	1.00 BSC			0.0394 BSC		
e_1	1.90	2.00	2.10	0.075	0.080	0.085
L	0.35	-	0.50	0.014	-	0.020
L_1	0.60 Ref			0.024 Ref		
L_2	0.25 BSC			0.010 BSC		
R	0.10	-	-	0.004	-	-
θ	0°	4°	8°	0°	4°	8°
θ_1	7° Nom			7° Nom		

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