



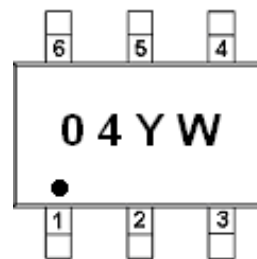
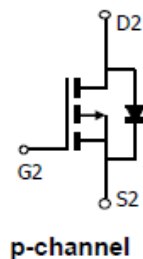
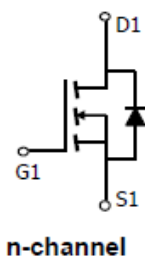
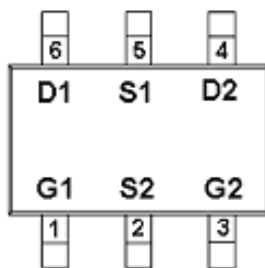
General Description

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, $R_{DS(ON)}=52m\Omega@V_{GS}=4.5V$
20V/2.6A, $R_{DS(ON)}=62m\Omega@V_{GS}=2.5V$
- P-Channel
-20V/-3.0A, $R_{DS(ON)}=105m\Omega@V_{GS}=-4.5V$
-20V/-2.4A, $R_{DS(ON)}=150m\Omega@V_{GS}=-2.5V$
- 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)



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°C Unless otherwise noted)

Parameter	Symbol	Value		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°C)	I _D	T _A =25°C	3.5	-3.0	A
		T _A =70°C	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	P _D	T _A =25°C	2.0	W	
		T _A =70°C	1.3		
Operating Junction Temperature	T _J	150		°C	
Storage Temperature Range	T _{STG}	-55/150		°C	
Thermal Resistance-Junction to Ambient	R _{θJA}	120		°C/W	



Electrical Characteristics (N-Channel)

(T_A=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250μA	20			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	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	μA
		V _{DS} =16V, V _{GS} =0V T _J =85°C			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	



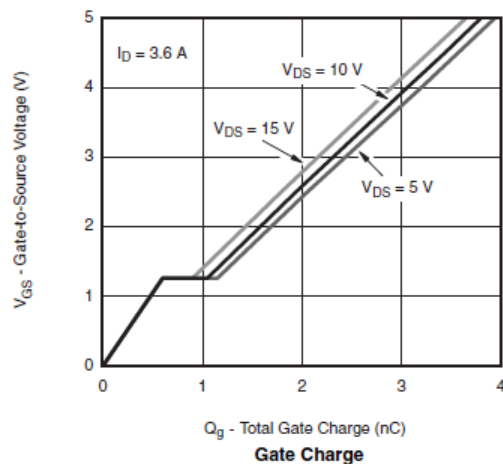
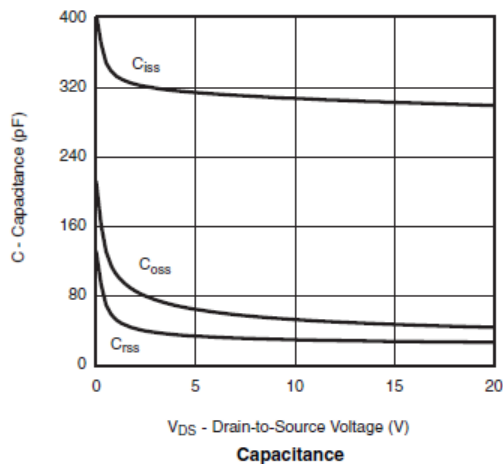
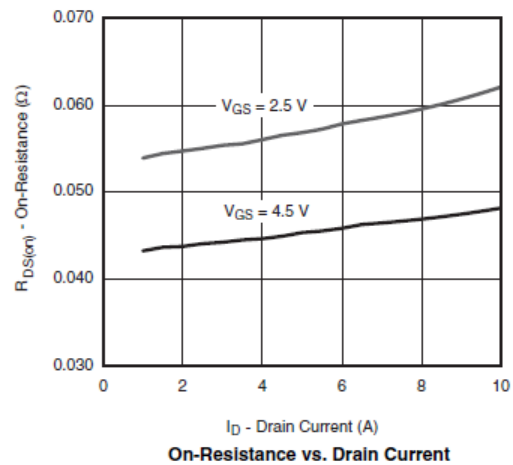
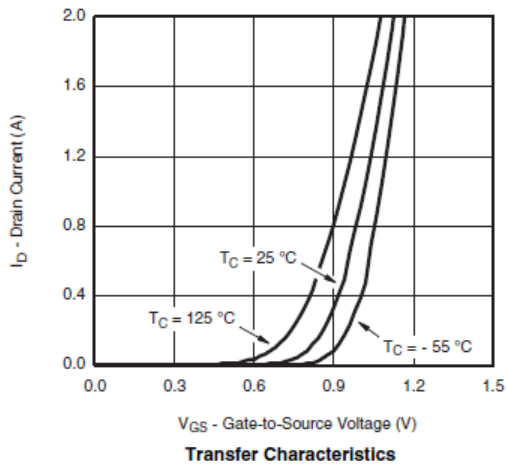
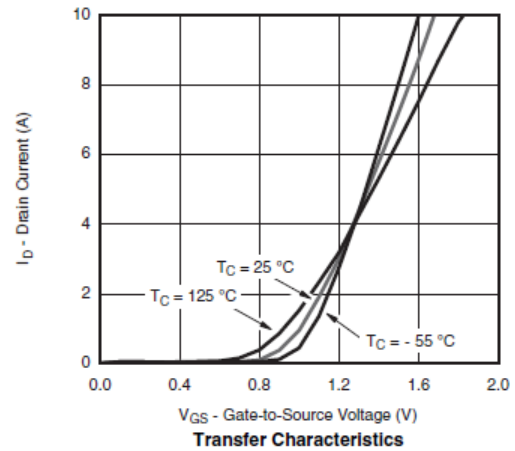
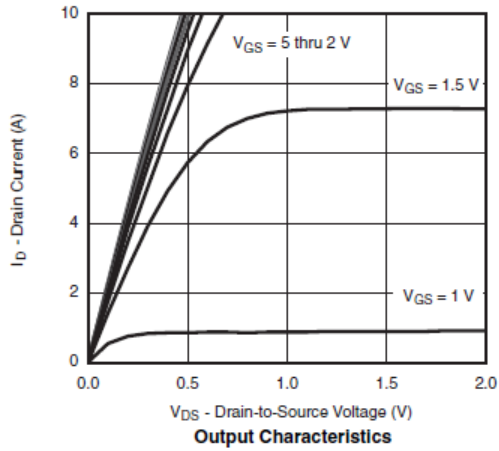
Electrical Characteristics (P-Channel)

($T_A=25^\circ\text{C}$ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.35		-1.0	
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 12V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-16V, V_{GS}=0V$			-1	uA
		$V_{DS}\leq -5V, V_{GS}=-2.5V$ $T_J=85^\circ\text{C}$			-30	
On-State Drain Current	$I_{D(on)}$	$V_{DS}\leq -5V, V_{GS}=-4.5V$	-6			A
		$V_{DS}\leq -5V, V_{GS}=-2.5V$	-3			
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-3.0A$		96	105	m Ω
		$V_{GS}=-2.5V, I_D=-2.4A$		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	$V_{DS}=-6V, V_{GS}=-4.5V$ $I_D\equiv -2.8A$		5.8	10	nC
Gate-Source Charge	Q_{gs}			0.85		
Gate-Drain Charge	Q_{gd}			1.7		
Input Capacitance	C_{iss}	$V_{DS}=-6V, V_{GS}=0V$ $f=1\text{MHz}$		415		pF
Output Capacitance	C_{oss}			223		
Reverse Transfer Capacitance	C_{rss}			87		
Turn-On Time	$t_{d(on)}$	$V_{DD}=-6V, R_L=6\Omega$ $I_D\equiv -1.0A, V_{GEN}=-4.5V$ $R_G=6\Omega$		13	25	ns
	t_r			36	60	
Turn-Off Time	$t_{d(off)}$			42	70	
	t_f			34	60	

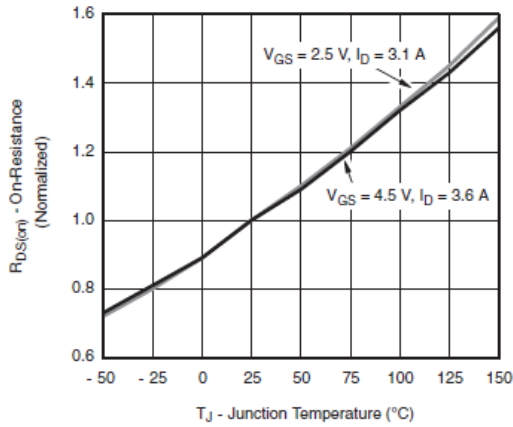


Typical Characteristics (N-Channel)

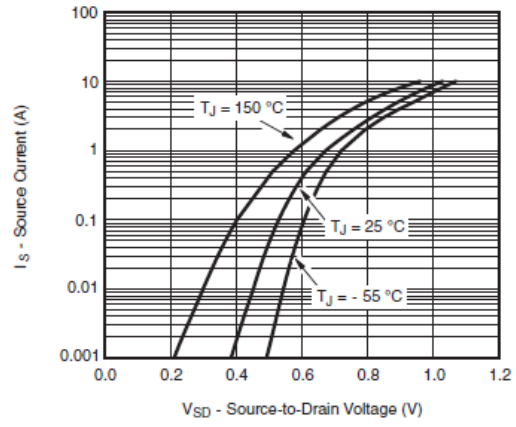




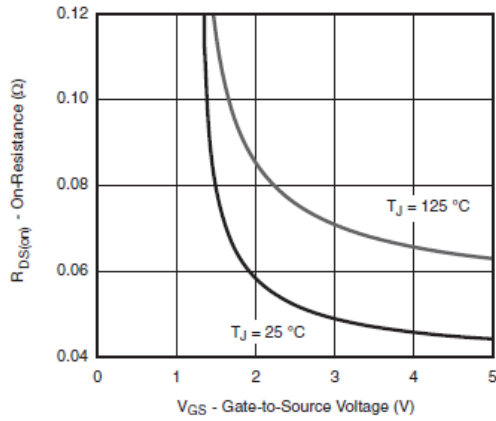
Typical Characteristics (N-Channel)



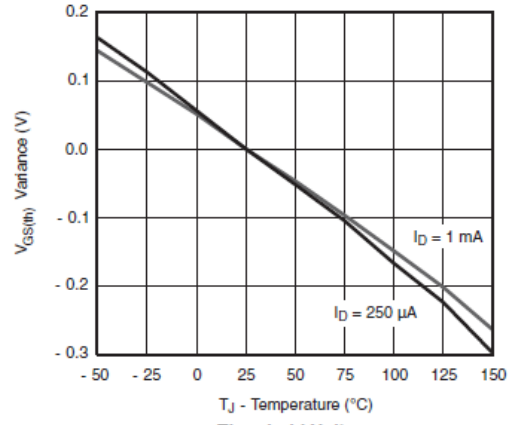
On-Resistance vs. Junction Temperature



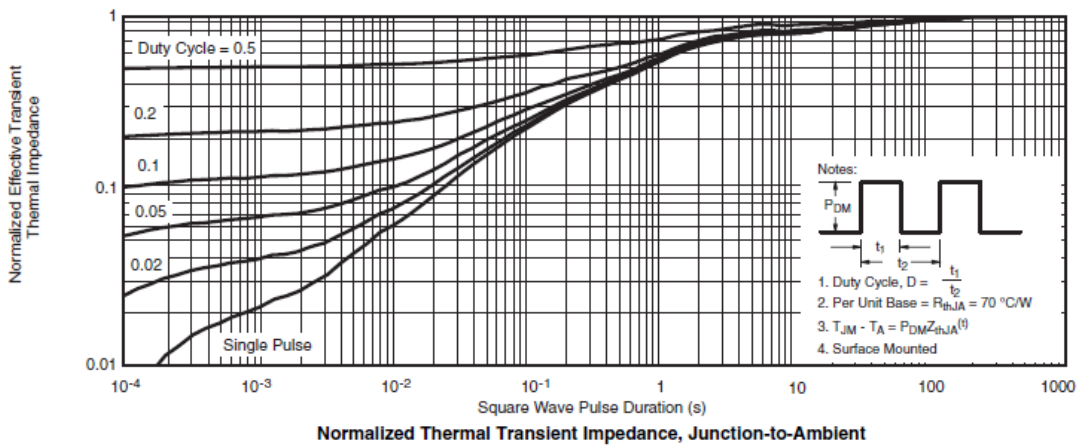
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

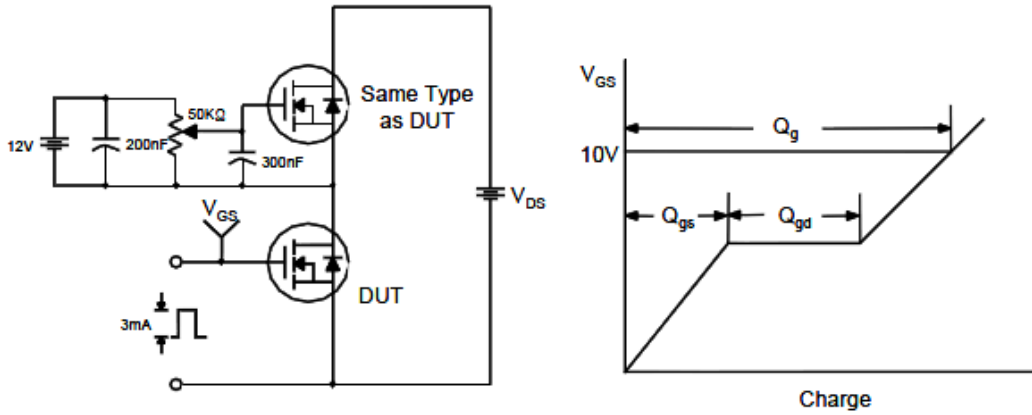


Normalized Thermal Transient Impedance, Junction-to-Ambient

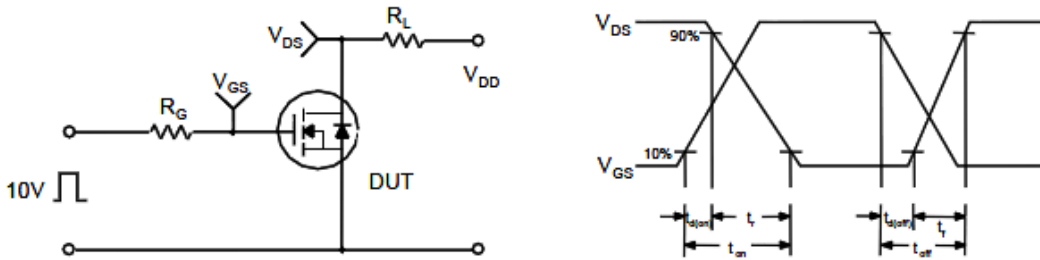


Typical Characteristics (N-Channel)

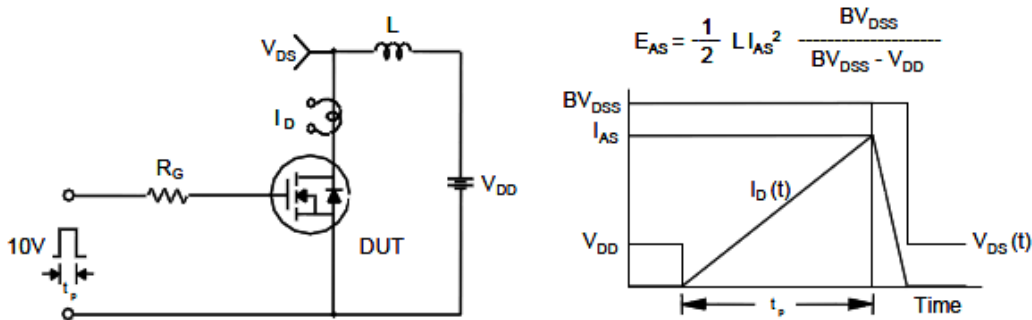
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

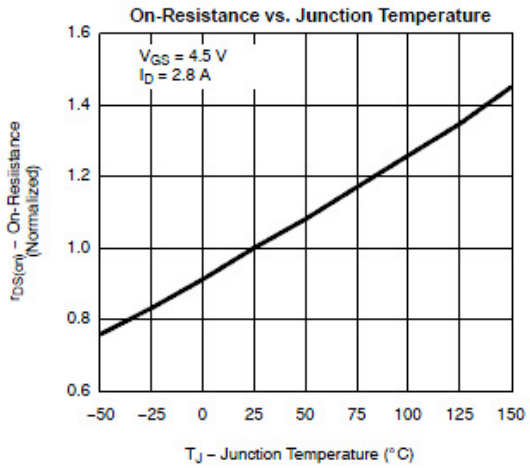
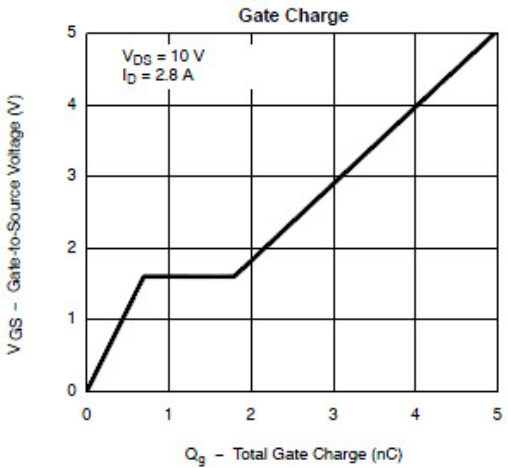
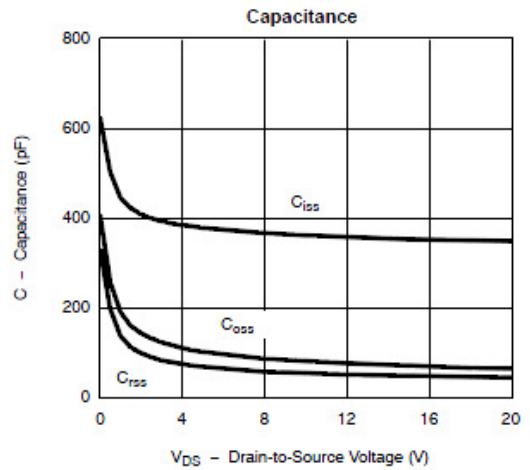
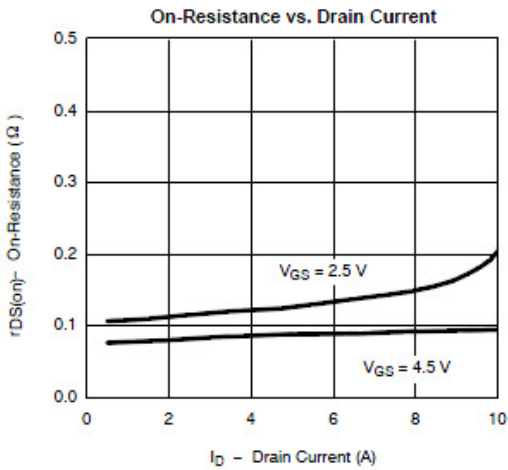
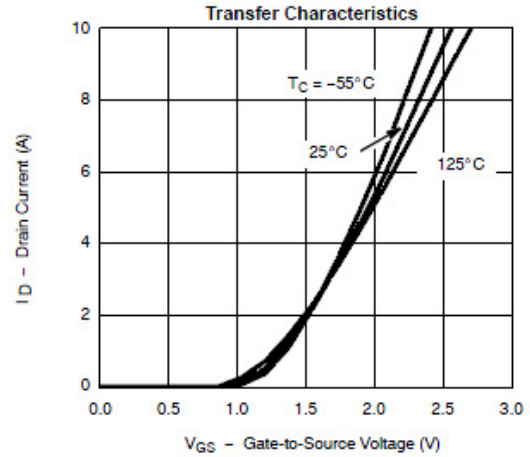
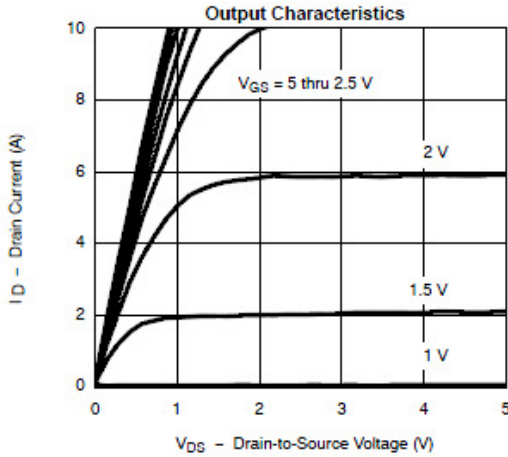


Unclamped Inductive Switching Test Circuit & Waveforms



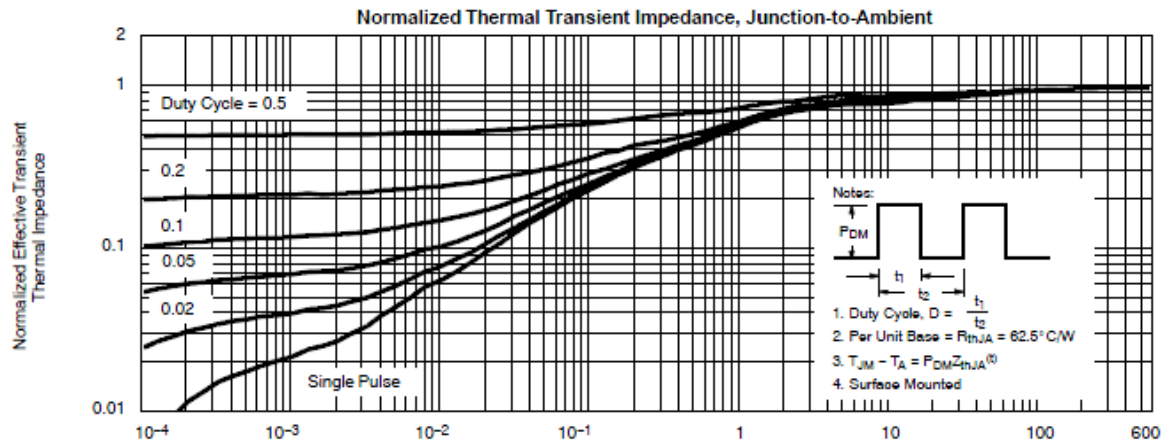
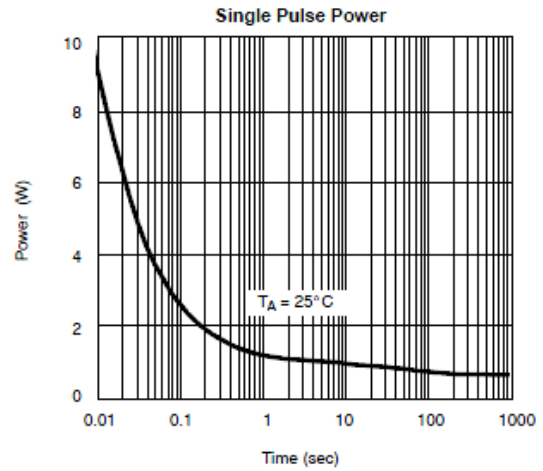
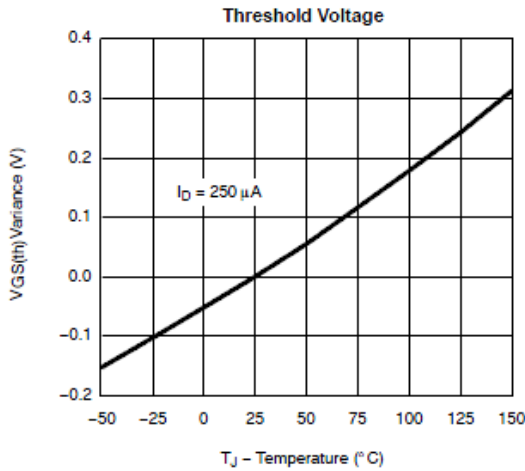
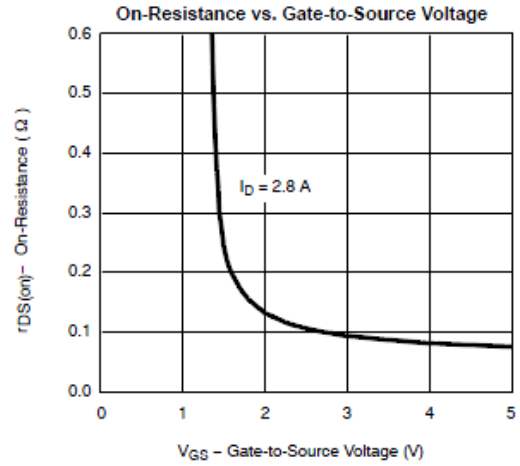
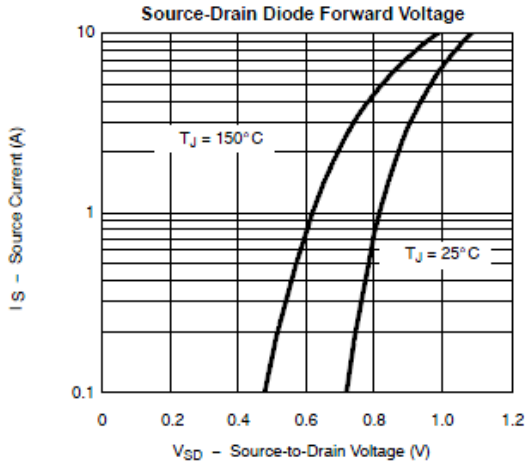


Typical Characteristics (P-Channel)





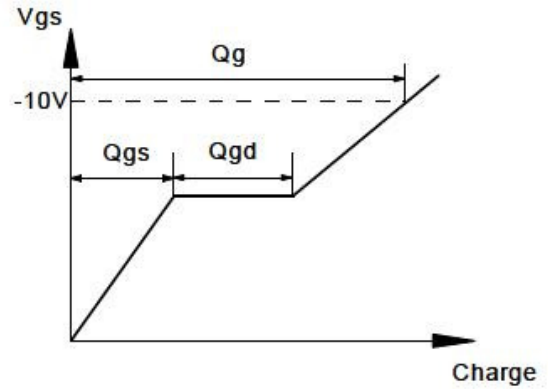
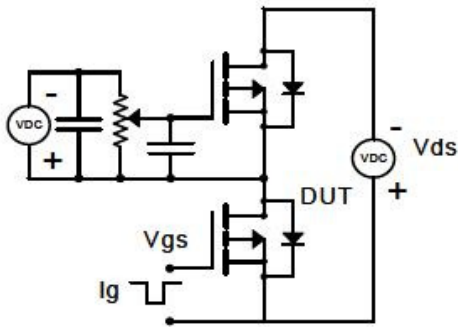
Typical Characteristics (P-Channel)



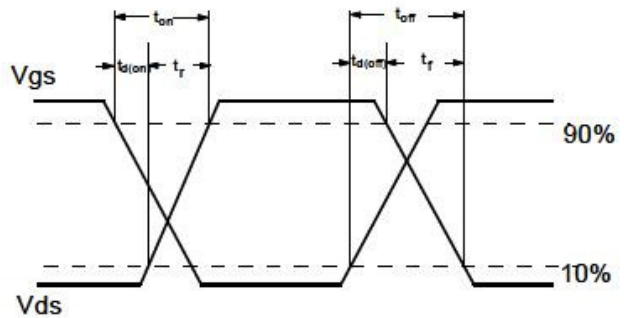
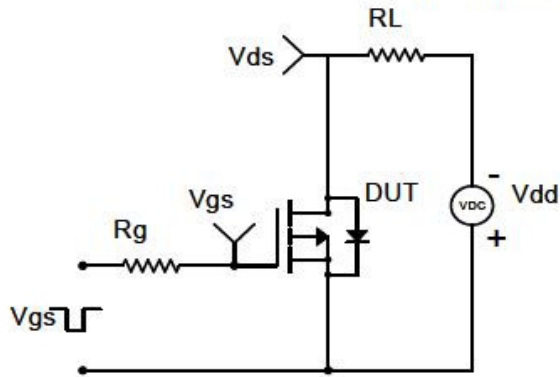


Typical Characteristics (P-Channel)

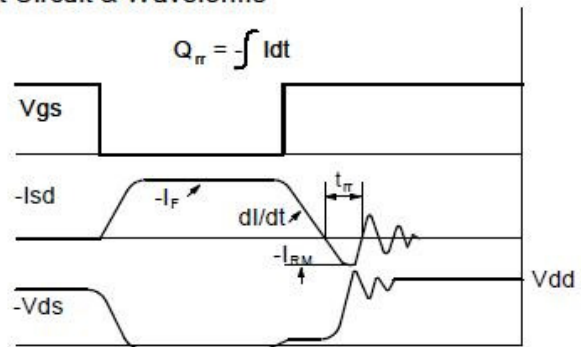
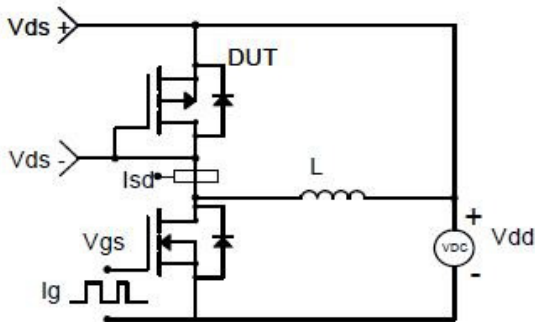
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

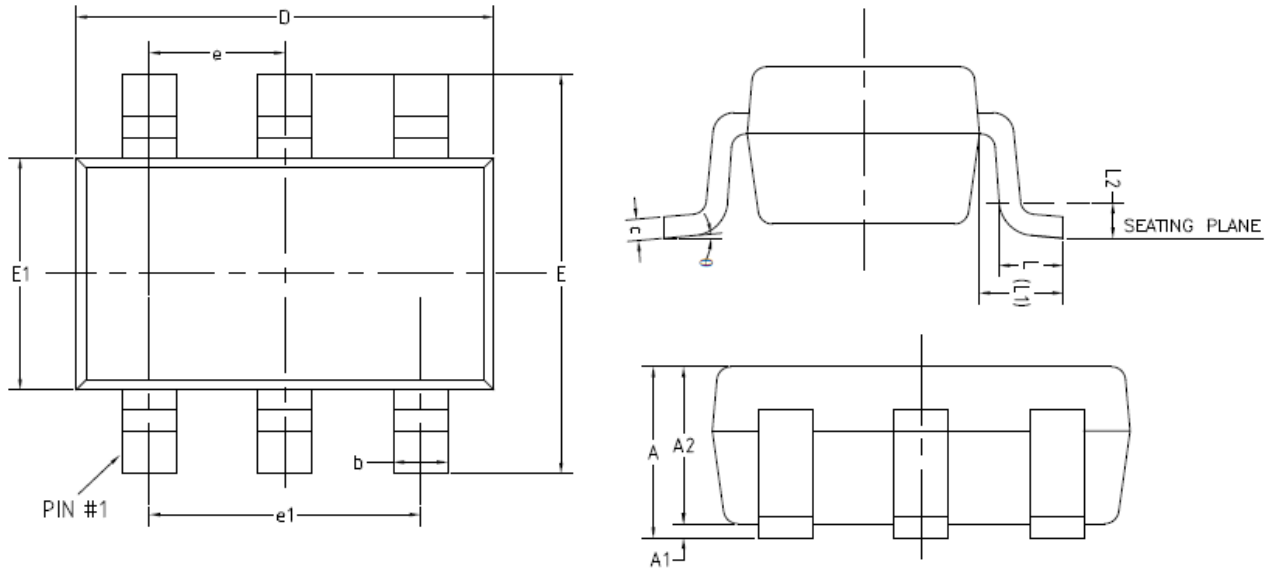


Diode Recovery Test Circuit & Waveforms





Package Information (TSOP-6)



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.70	-	0.90
A1	0	-	0.10
A2	0.70	0.75	0.80
b	0.35	-	0.50
c	0.08	-	0.20
D	2.82	2.92	3.02
E	2.65	2.80	2.95
E1	1.60	1.65	1.70
e	0.95(BSC)		
e1	1.90(BSC)		
L	0.30	0.45	0.60
L1	0.59REF		
L2	0.25BSC		
θ	0°	-	8°

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