

GSM6604

20V N & P Pair Enhancement Mode MOSFET

Product Description

GSM6604, 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.

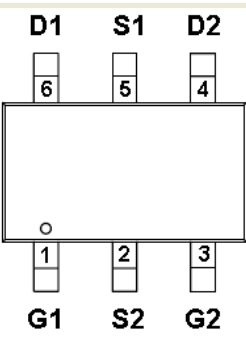
Features

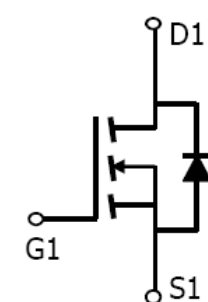
- N-Channel
20V/3.5A, $R_{DS(ON)}=52m\Omega@V_{GS}=4.5V$
20V/2.6A, $R_{DS(ON)}=62m\Omega@V_{GS}=2.5V$
- P-Channel
-20V/-3.0A, $R_{DS(ON)}=105m\Omega@V_{GS}=-4.5V$
-20V/-2.4A, $R_{DS(ON)}=150m\Omega@V_{GS}=-2.5V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- TSOP-6P package design

Applications

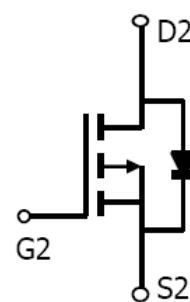
- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- DSC
- LCD Display inverter

Packages & Pin Assignments

GSM6604TSF (TSOP-6P)		
		
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

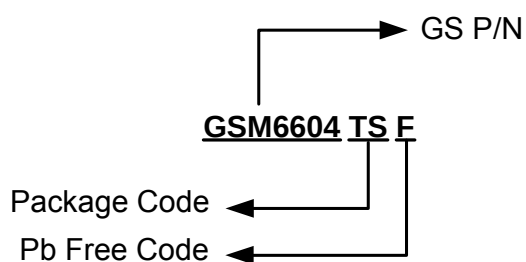


n-channel

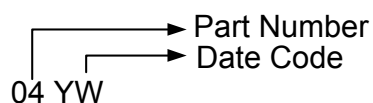


p-channel

Ordering Information



Marking Information



Part Number	Package	Quantity Reel
GSM6604TSF	TSOP-6P	3000 PCS

Absolute Maximum Ratings

T_A=25°C Unless otherwise noted

Symbol	Parameter		Typical		Unit
			N-Channel	P-Channel	
V _{DSS}	Drain-Source Voltage		20	-20	V
V _{GSS}	Gate –Source Voltage		±12	±12	V
I _D	Continuous Drain Current(T _J =150°C)	T _A =25°C	3.5	-3.0	A
		T _A =70°C	2.6	-2.4	
I _{DM}	Pulsed Drain Current		15	-15	A
I _S	Continuous Source Current (Diode Conduction)		1.5	-1.5	A
P _D	Power Dissipation	T _A =25°C	2.0		W
		T _A =70°C	1.3		
T _J	Operating Junction Temperature		150		°C
T _{STG}	Storage Temperature Range		-55/150		°C
R _{θJA}	Thermal Resistance-Junction to Ambient		120		°C/W

Electrical Characteristics (N-Channel)

(T_A=25°C unless otherwise noted)

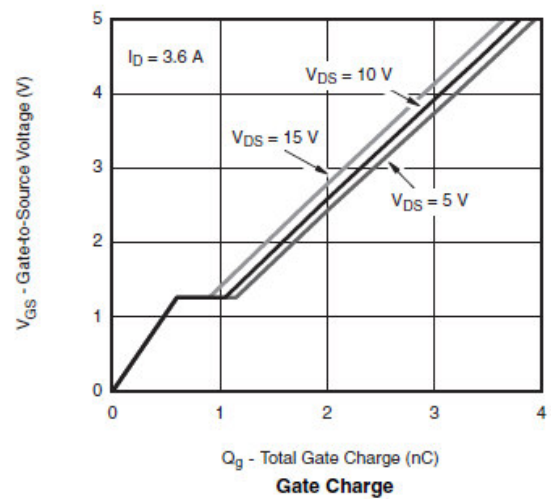
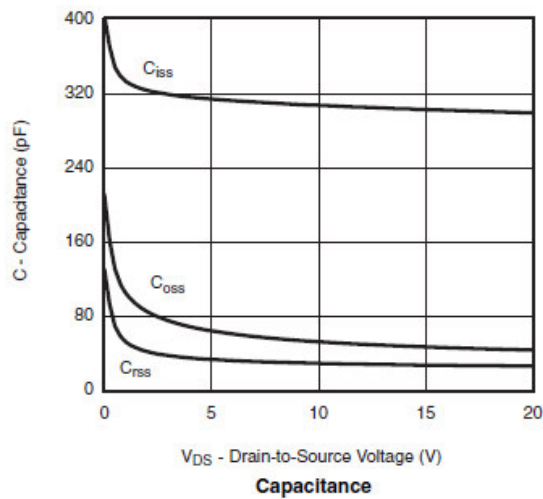
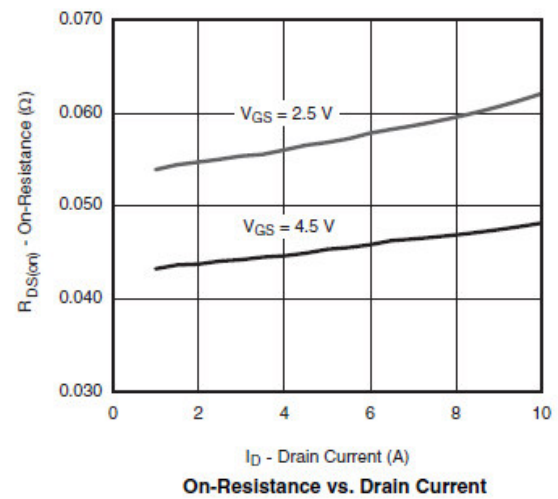
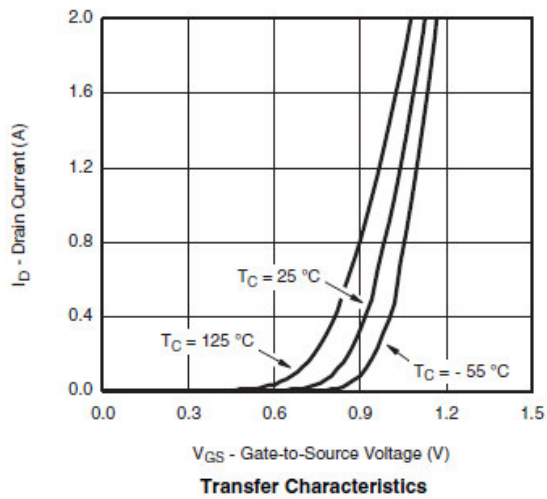
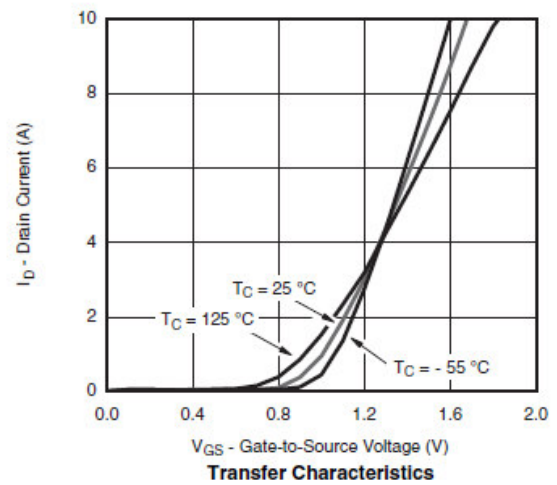
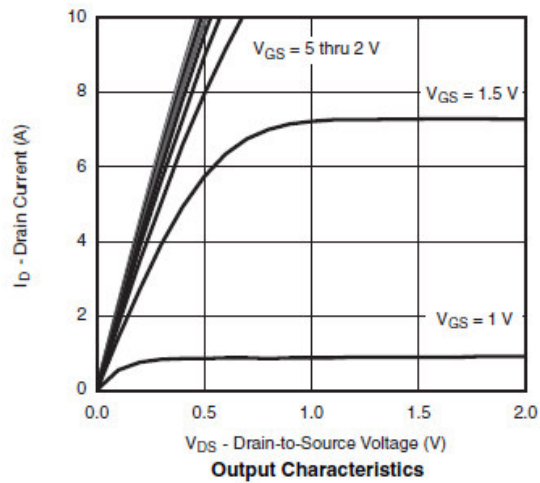
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V,I _D =250uA	20			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} ,I _D =250uA	0.3		0.8	
I _{GSS}	Gate Leakage Current	V _{DS} =0V,V _{GS} =±12V			±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =16V,V _{GS} =0V			1	uA
		V _{DS} =16V,V _{GS} =0V, T _J =85°C			10	
I _{D(on)}	On-State Drain Current	V _{DS} ≥5V,V _{GS} =4.5V	6			A
		V _{DS} ≥5V,V _{GS} =2.5V	4			
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =4.5V,I _D =3.5A		44	52	mΩ
		V _{GS} =2.5V,I _D =2.6A		52	62	
g _{FS}	Forward Transconductance	V _{DS} =5V,I _D =3.6A		10		S
V _{SD}	Diode Forward Voltage	I _S =1.6A,V _{GS} =0V		0.85	1.2	V
Dynamic						
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V,f=1MHz		340		pF
C _{oss}	Output Capacitance			115		
C _{rss}	Reverse Transfer Capacitance			33		
Q _g	Total Gate Charge	V _{DS} =10V, V _{GS} =4.5V,I _D =3.6A		4.2	5.0	nC
Q _{gs}	Gate-Source Charge			0.6		
Q _{gd}	Gate-Drain Charge			0.4		
t _{d(on)}	Turn-On Time	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	
t _{d(off)}	Turn-Off Time			25	40	
T _f				8	15	

Electrical Characteristics (P-Channel)

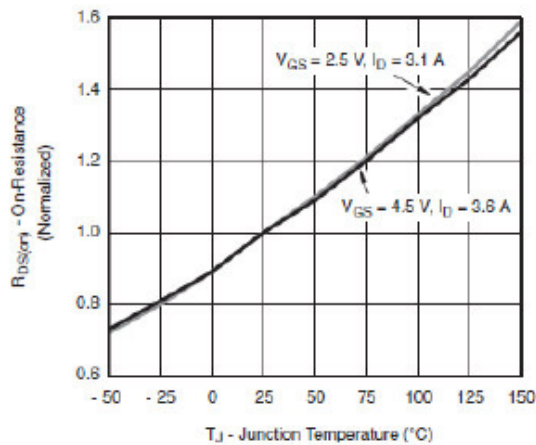
(T_A=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V,I _D =-250uA	-20			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} ,I _D =-250uA	-0.5		-1.0	
I _{GSS}	Gate Leakage Current	V _{DS} =0V,V _{GS} =±12V			±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-16V,V _{GS} =0V			-1	uA
		V _{DS} =-16V,V _{GS} =0V, T _J =85°C			-30	
I _{D(on)}	On-State Drain Current	V _{DS} ≤-5V,V _{GS} =-4.5V	-6			A
		V _{DS} ≤-5V,V _{GS} =-2.5V	-3			
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} =-4.5V,I _D =-3.0A		96	105	mΩ
		V _{GS} =-2.5V,I _D =-2.4A		138	150	
g _{FS}	Forward Transconductance	V _{DS} =-5V,I _D =-2.8A		6.5		S
V _{SD}	Diode Forward Voltage	I _S =-1.25A,V _{GS} =0V		-0.75	-1.3	V
Dynamic						
C _{iss}	Input Capacitance	V _{DS} =-6V, V _{GS} =0V,f=1MHz		415		pF
C _{Oss}	Output Capacitance			223		
C _{rss}	Reverse Transfer Capacitance			87		
Q _g	Total Gate Charge	V _{DS} =-6V, V _{GS} =-4.5V,I _D =-2.8A		5.8	10	nC
Q _{gs}	Gate-Source Charge			0.85		
Q _{gd}	Gate-Drain Charge			1.7		
t _{d(on)}	Turn-On Time	V _{DD} =-6V, R _L =6Ω,I _D =-1.0A, V _{GEN} =-4.5V,R _G =6Ω		13	25	ns
T _r				36	60	
t _{d(off)}	Turn-Off Time			42	70	
T _f				34	60	

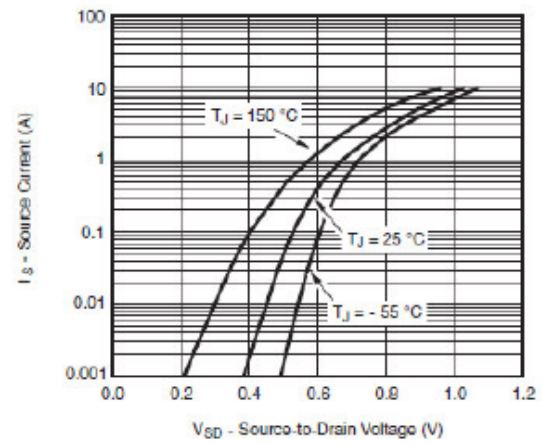
Typical Performance Characteristics (N-Channel)



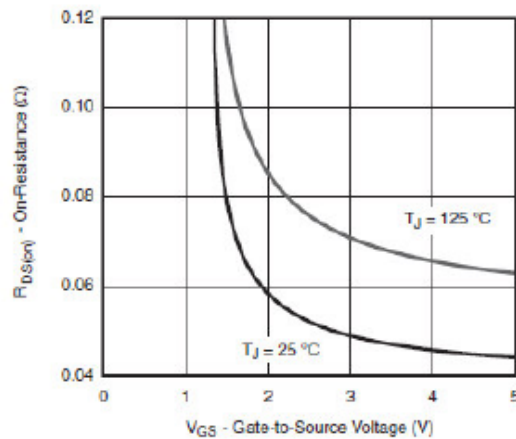
Typical Performance Characteristics (N-Channel Continue)



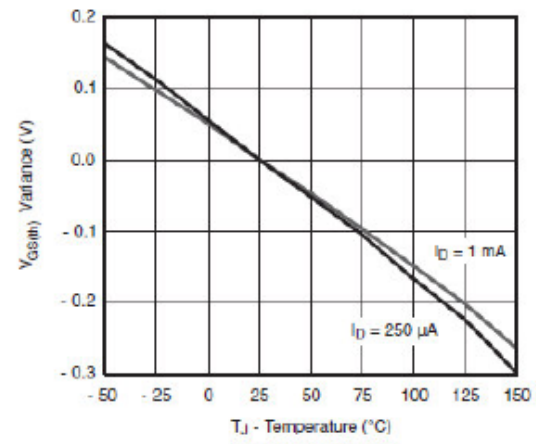
On-Resistance vs. Junction Temperature



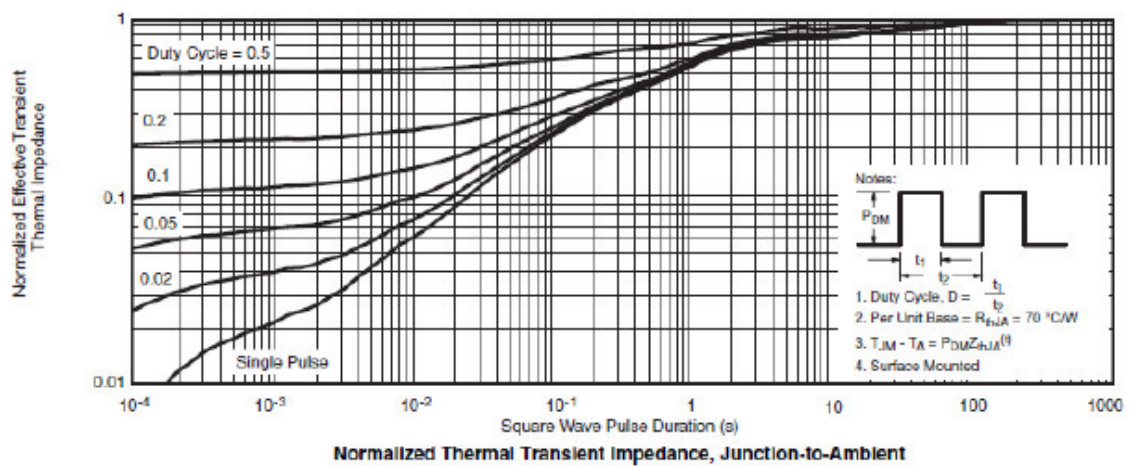
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



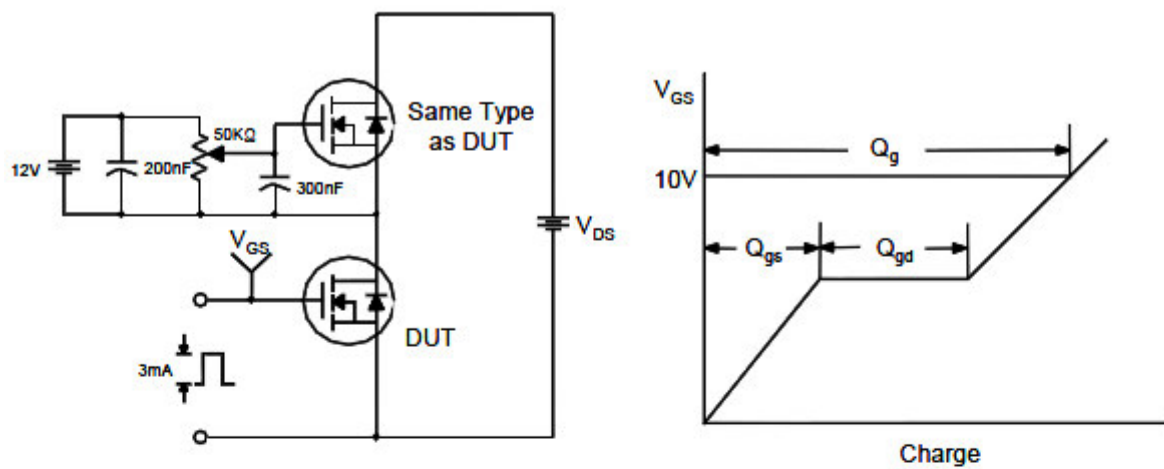
Threshold Voltage



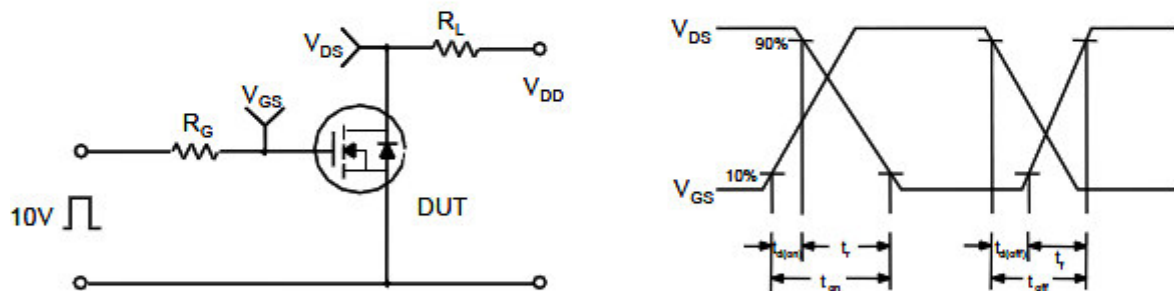
Normalized Thermal Transient Impedance, Junction-to-Ambient

Typical Performance Characteristics (N-Channel Continue)

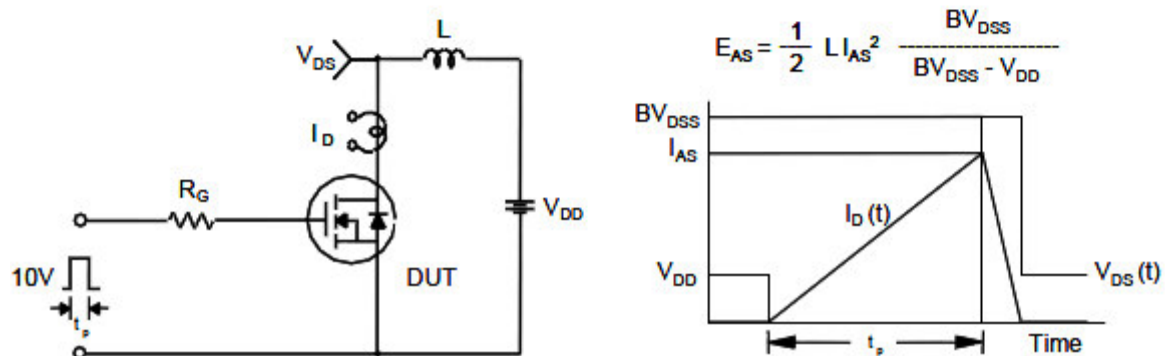
Gate Charge Test Circuit & Waveform



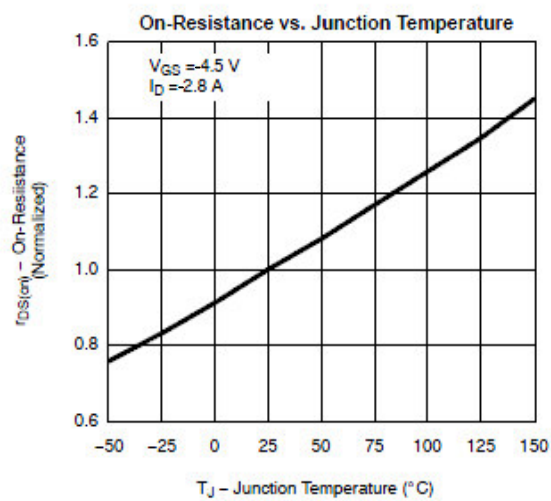
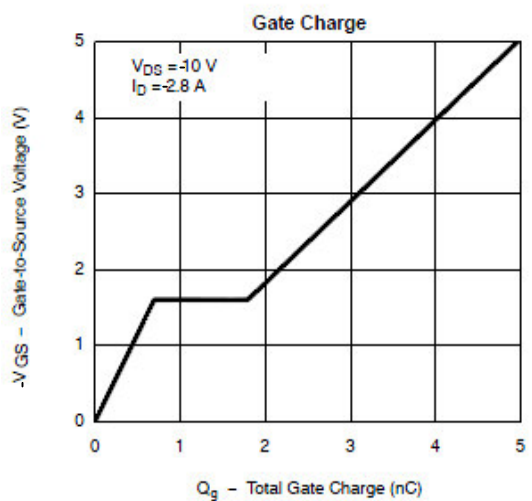
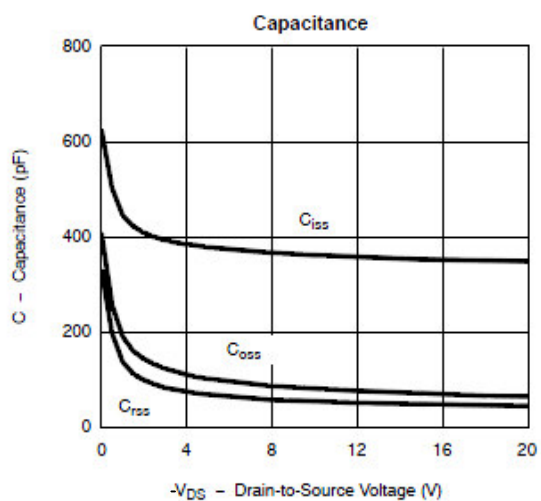
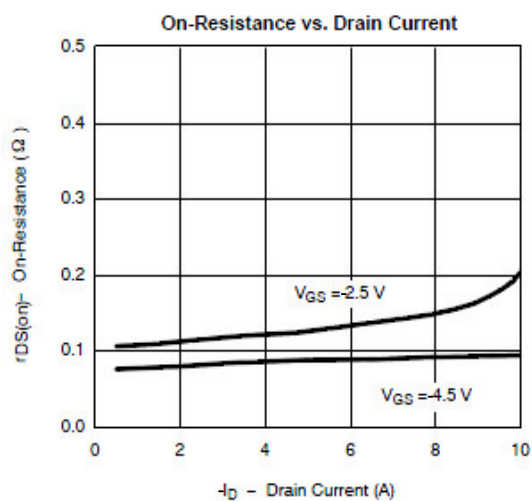
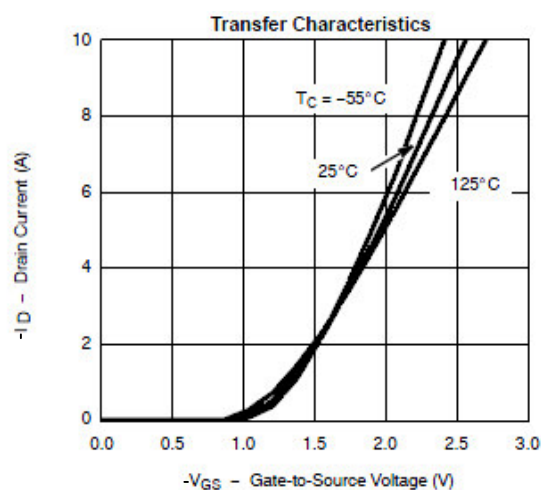
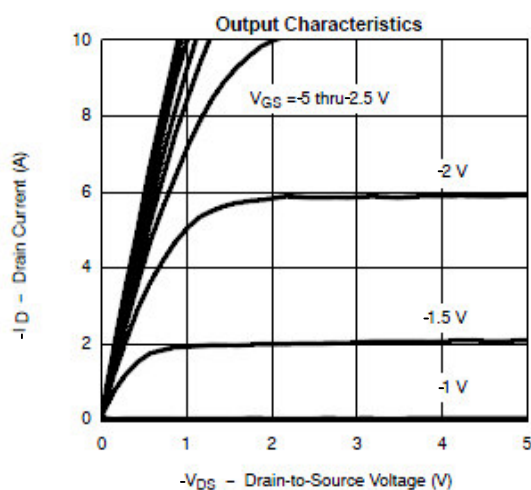
Resistive Switching Test Circuit & Waveforms



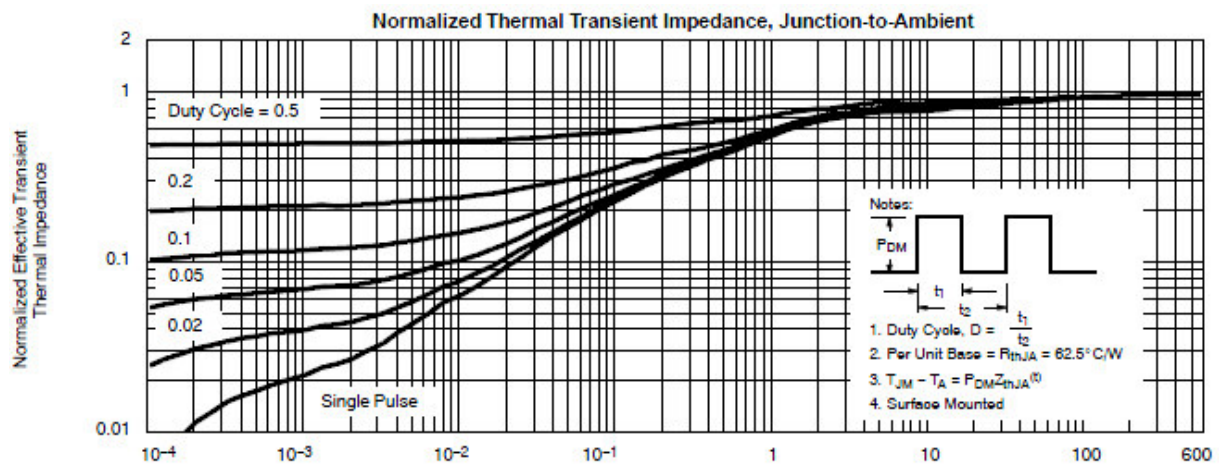
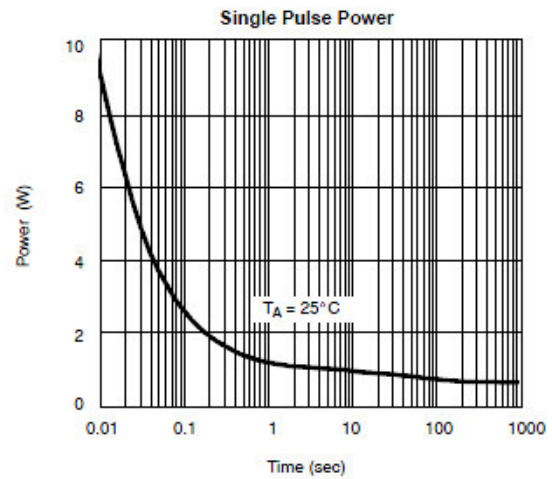
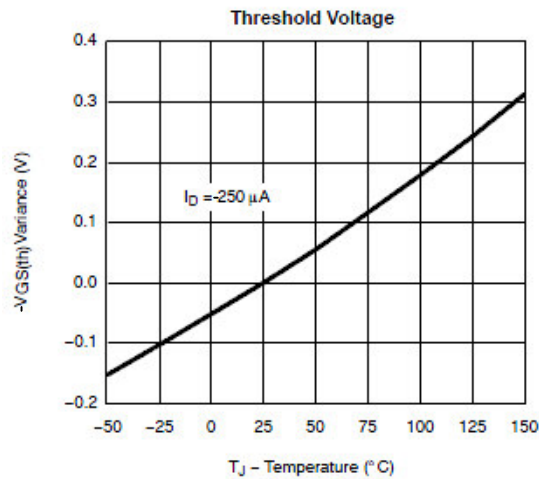
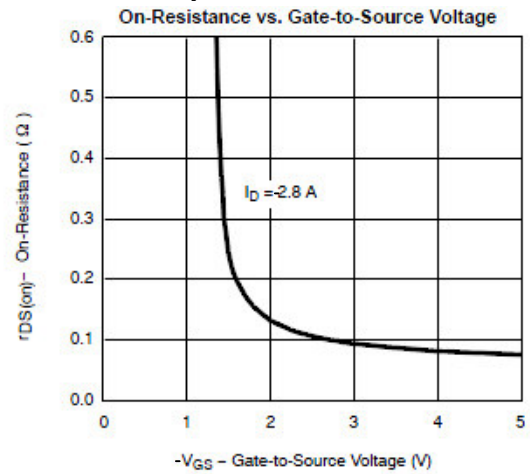
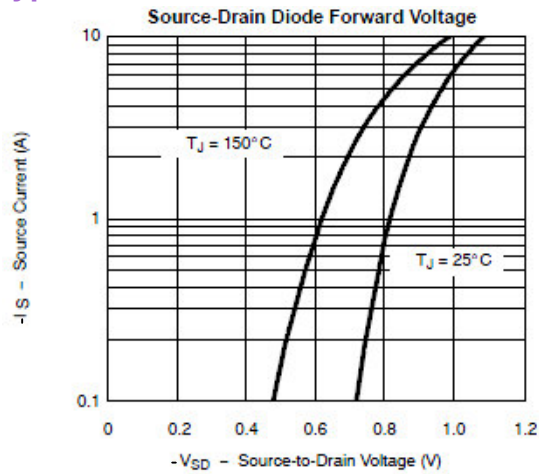
Unclamped Inductive Switching Test Circuit & Waveforms



Typical Performance Characteristics (P-Channel)

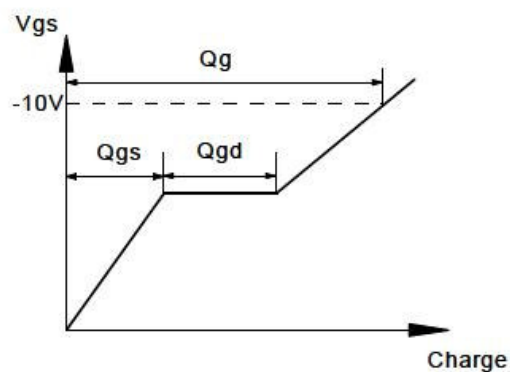
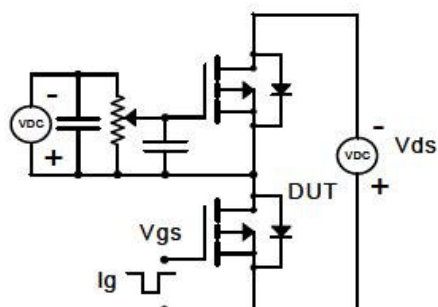


Typical Performance Characteristics (P-Channel Continue)

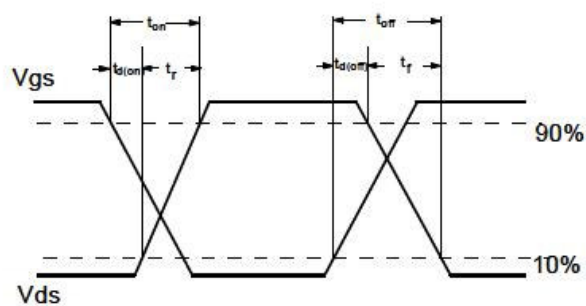
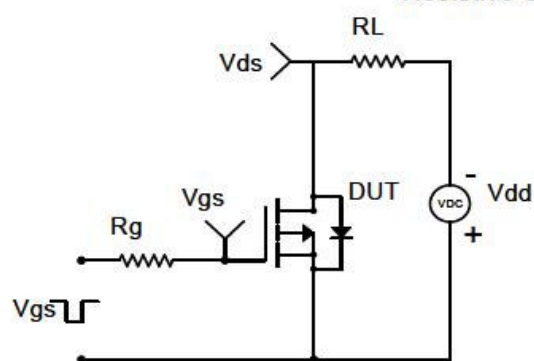


Typical Performance Characteristics (P-Channel Continue)

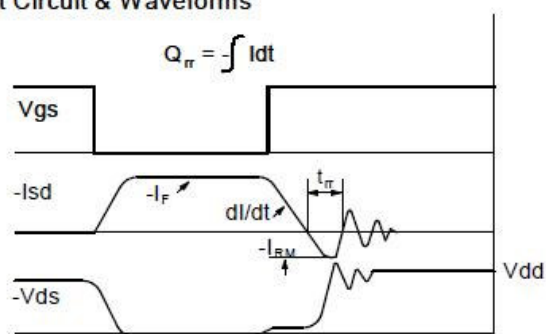
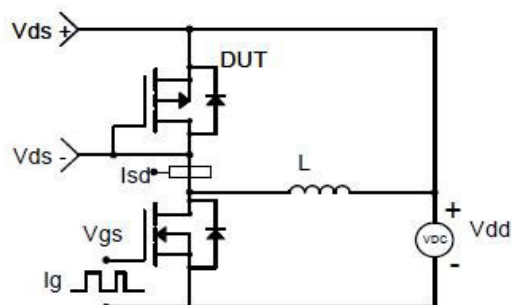
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

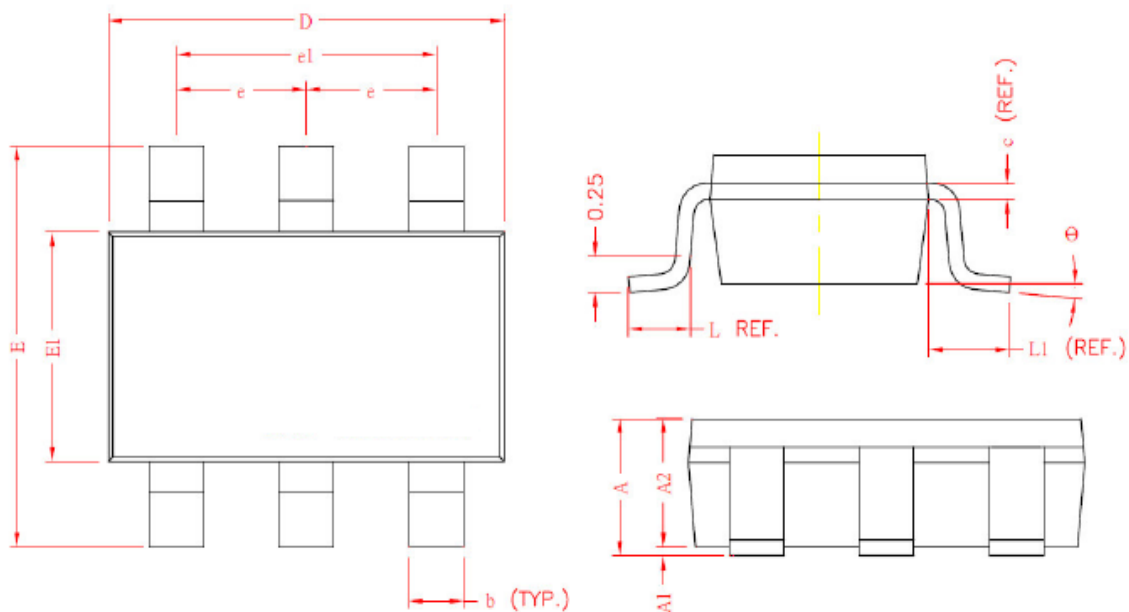


Diode Recovery Test Circuit & Waveforms



Package Dimension

TSOP-6P



Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	-	1.45	-	0.057
A1	0.00	0.10	0.000	0.004
A2	0.70	1.35	0.028	0.053
c	0.12 (REF)		0.005 (REF)	
D	2.70	3.10	0.106	0.122
E	2.60	3.00	0.102	0.118
E1	1.40	1.80	0.055	0.071
L	0.45 (REF)		0.018 (REF)	
L1	0.60 (REF)		0.024 (REF)	
θ	0°	10°	0°	10°
b	0.30	0.50	0.012	0.020
e	0.95 (REF)		0.037 (REF)	
e1	1.90 (REF)		0.075 (REF)	

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