

# GSM1563

## 20V N & P Pair Enhancement Mode MOSFET

### Product Description

GSM1563, 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.

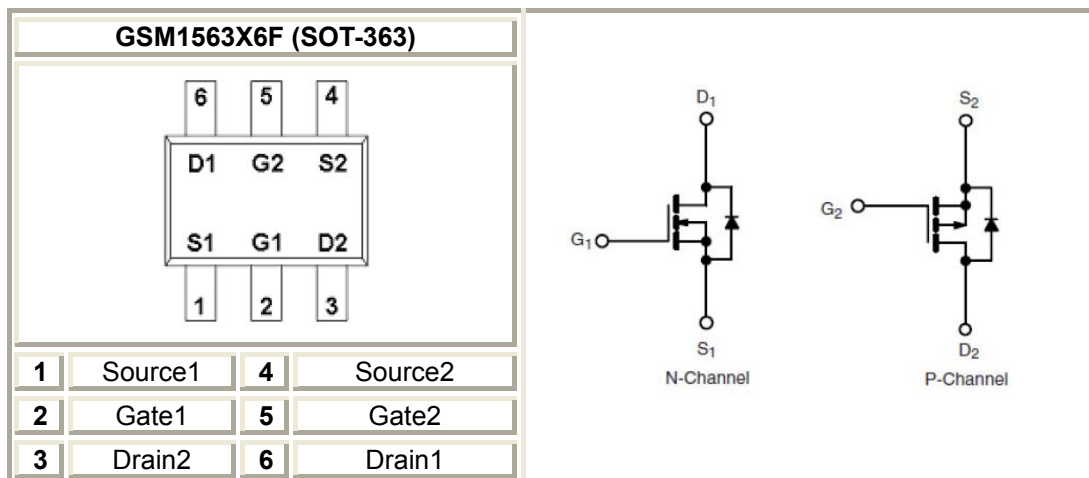
### Features

- N-Channel  
 $20V/1.0A, R_{DS(ON)}=280m\Omega@V_{GS}=4.5V$   
 $20V/0.8A, R_{DS(ON)}=340m\Omega@V_{GS}=2.5V$   
 $20V/0.7A, R_{DS(ON)}=580m\Omega@V_{GS}=1.8V$
- P-Channel  
 $-20V/-1.0A, R_{DS(ON)}=600m\Omega@V_{GS}=-4.5V$   
 $-20V/-0.8A, R_{DS(ON)}=840m\Omega@V_{GS}=-2.5V$   
 $-20V/-0.7A, R_{DS(ON)}=1440m\Omega@V_{GS}=-1.8V$
- Low-Voltage Operation
- High-Speed Circuits
- Low Battery Voltage Operation
- SOT-363 package design

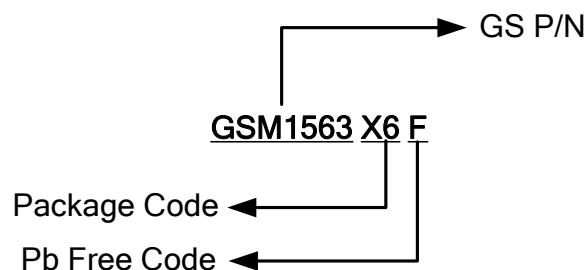
### Applications

- Load Switch for Portable Devices, Smart Phones, Pagers

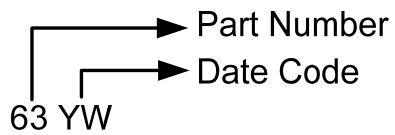
### Packages & Pin Assignments



### Ordering Information



## Marking Information



Part Number	Package	Part Marking
GSM1563X6F	SOT-363	63YW

## Absolute Maximum Ratings

(T<sub>A</sub>=25°C unless otherwise noted)

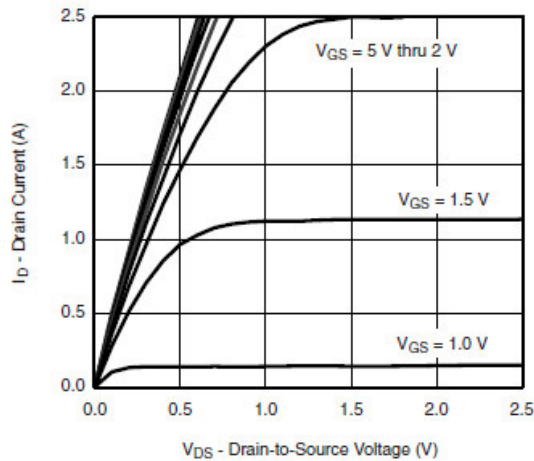
Symbol	Parameter	Typical		Unit	
		N-Channel	P-Channel		
V <sub>DSS</sub>	Drain-Source Voltage	20	-20	V	
V <sub>GSS</sub>	Gate –Source Voltage	±12	±12	V	
I <sub>D</sub>	Continuous Drain Current(T <sub>J</sub> =150°C)	T <sub>A</sub> =25°C	1.0	-1.0	A
		T <sub>A</sub> =70°C	0.7	-0.7	
I <sub>DM</sub>	Pulsed Drain Current	6	-6	A	
I <sub>S</sub>	Continuous Source Current(Diode Conduction)	1	-1	A	
P <sub>D</sub>	Power Dissipation	T <sub>A</sub> =25°C	0.3	W	
		T <sub>A</sub> =70°C	0.2		
T <sub>J</sub>	Operating Junction Temperature	-55/150		°C	
T <sub>STG</sub>	Storage Temperature Range	-55/150		°C	

## Electrical Characteristics

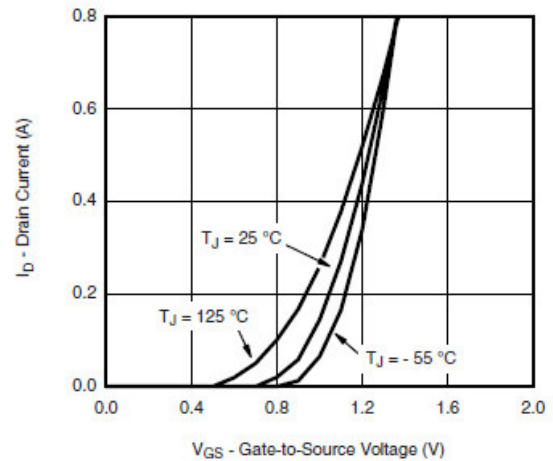
(T<sub>A</sub>=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ	Max.	Unit	
<b>Static</b>							
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	N-CH	20		V	
		V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	P-CH	-20			
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	N-CH	0.4	1.0		
		V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA	P-CH	-0.4	-1.0		
I <sub>GSS</sub>	Gate Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V	N-CH		±100	nA	
		V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V	P-CH		±100		
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 20V, V <sub>GS</sub> =0V	N-CH		1	uA	
		V <sub>DS</sub> = 20V, V <sub>GS</sub> =0V, T <sub>J</sub> =85°C			5		
		V <sub>DS</sub> = -20V, V <sub>GS</sub> =0V	P-CH		-1		
		V <sub>DS</sub> = -20V, V <sub>GS</sub> =0V, T <sub>J</sub> =85°C			-5		
I <sub>D(on)</sub>	On-State Drain Current	V <sub>DS</sub> ≥5V, V <sub>GS</sub> =4.5V	N-CH	1.2		A	
		V <sub>DS</sub> ≥5V, V <sub>GS</sub> =4.5V	P-CH	0.7			
R <sub>DS(on)</sub>	Drain-Source On-Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =1.0A	N-CH		220	280	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =0.8A			260	340	
		V <sub>GS</sub> =1.8V, I <sub>D</sub> =0.7A			340	480	
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1.0A	P-CH		500	600	
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-0.8A			700	840	
		V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-0.7A			1000	1440	
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =1.0A	N-CH		1	S	
		V <sub>DS</sub> =-10V, I <sub>D</sub> =-0.4A	P-CH		1		
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =1.0A, V <sub>GS</sub> =0V	N-CH		0.65	1.2	V
		I <sub>S</sub> =-0.15A, V <sub>GS</sub> =0V	P-CH				
<b>Dynamic</b>							
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz	N-CH		70		
		V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, f=1MHz	P-CH		70	100	
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz	N-CH		20		pF
		V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, f=1MHz	P-CH		20		
C <sub>rss</sub>	Reverse Transfer Capacitance	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz	N-CH		8		
		V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, f=1MHz	P-CH		10		
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V, I <sub>D</sub> ≅1.2A	N-CH		1.06	1.38	
		V <sub>DS</sub> =-10V, V <sub>GS</sub> =4.5V, I <sub>D</sub> ≅-0.25A	P-CH		1.0	1.3	
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V, I <sub>D</sub> ≅1.2A	N-CH		0.18		nC
		V <sub>DS</sub> =-10V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> ≅0.25A	P-CH		0.1		
Q <sub>gd</sub>	Gate-Drain Charge	V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V, I <sub>D</sub> ≅1.2A	N-CH		0.32		
		V <sub>DS</sub> =-10V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> ≅0.25A	P-CH		0.3		
td(on)	Turn-On Time	N-Channel V <sub>DD</sub> =10V, R <sub>L</sub> =20Ω, I <sub>D</sub> ≅1.2A, V <sub>GEN</sub> =4.5V, R <sub>G</sub> =1Ω	N-CH		18	26	ns
			P-CH		10	15	
tr			N-CH		20	28	
			P-CH		10	15	
td(off)	Turn-Off Time	P-Channel V <sub>DD</sub> =-10V, R <sub>L</sub> =30Ω, I <sub>D</sub> ≅-0.2A, V <sub>GEN</sub> =-4.5V, R <sub>G</sub> =10Ω	N-CH		70	110	
			P-CH		40	60	
			N-CH		25	40	
tf			P-CH		30	50	

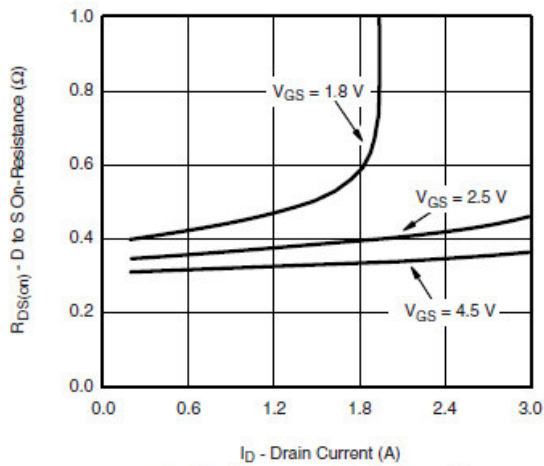
## Typical Performance Characteristics (N-Channel)



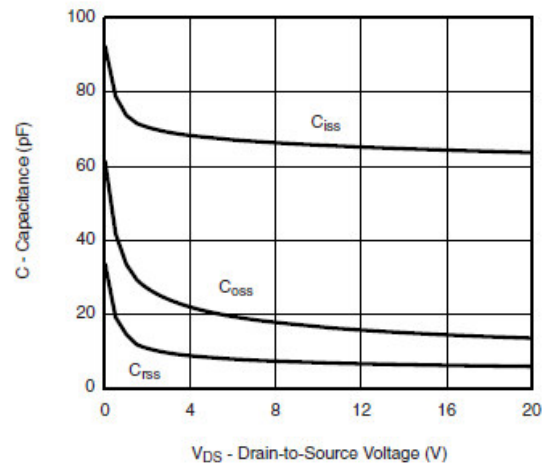
Output Characteristics



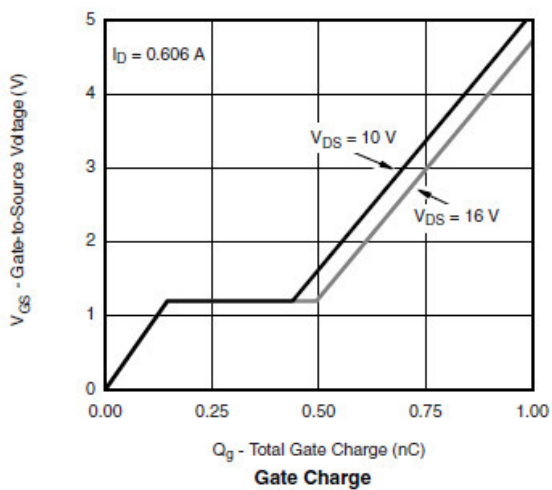
Transfer Characteristics



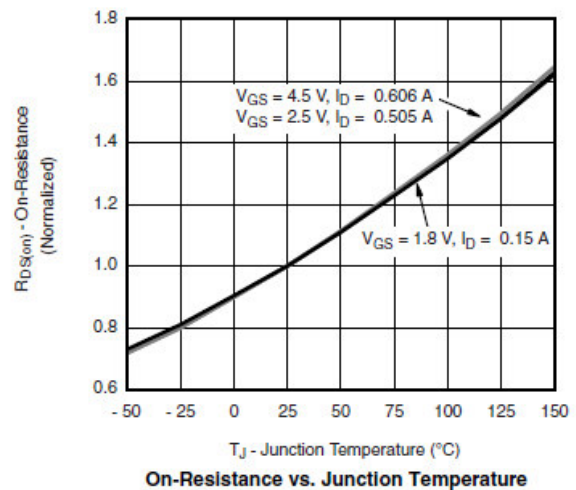
On-Resistance vs. Drain Current



Capacitance

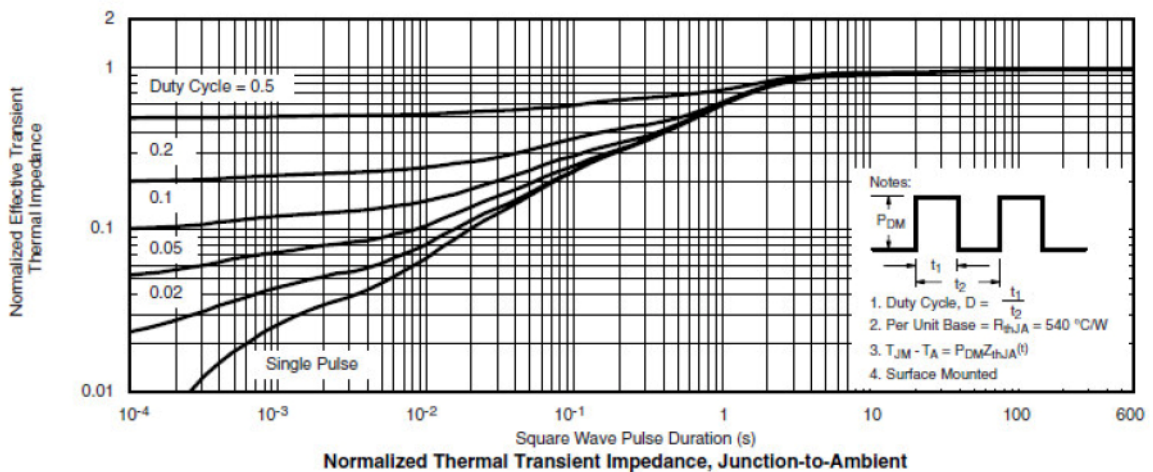
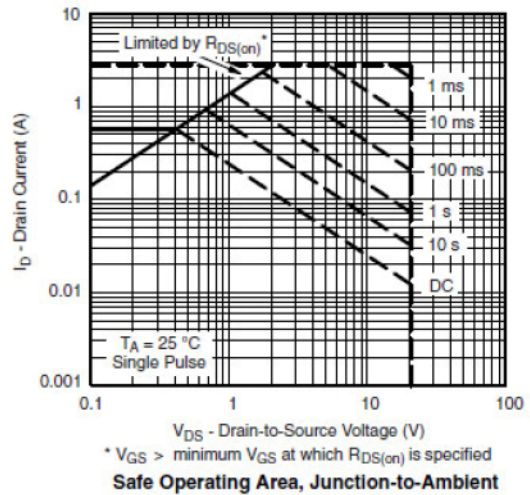
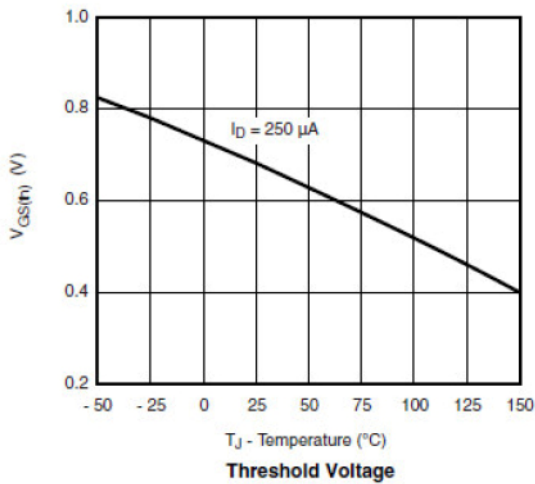
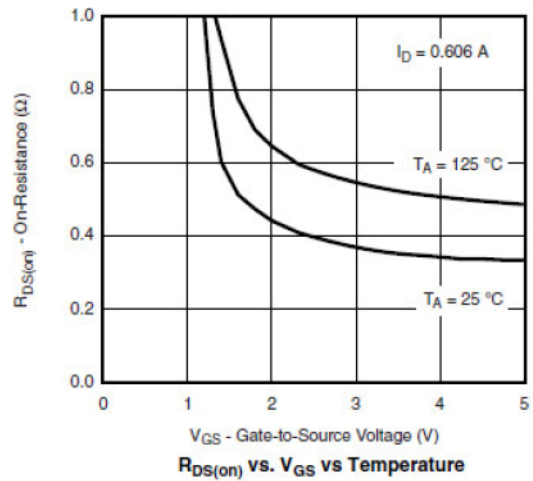
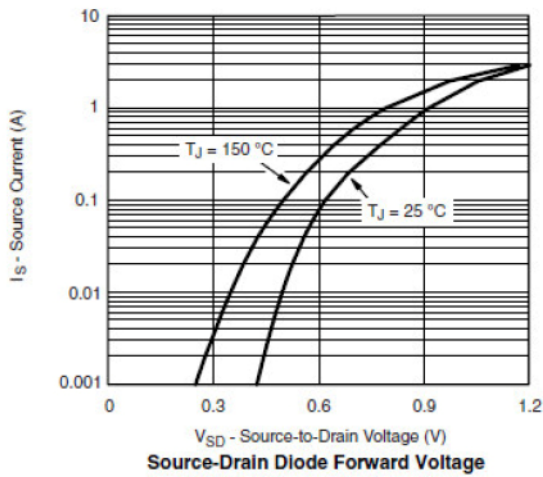


Gate Charge

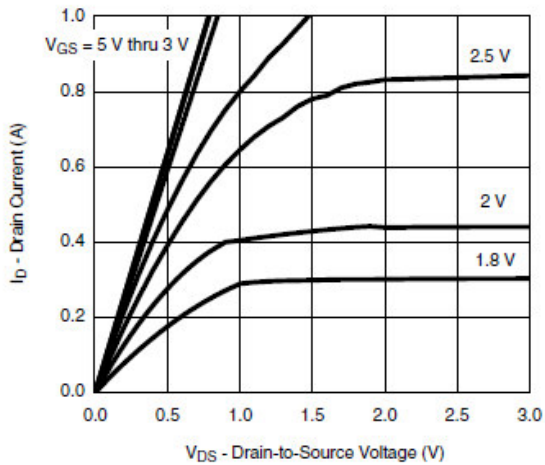


On-Resistance vs. Junction Temperature

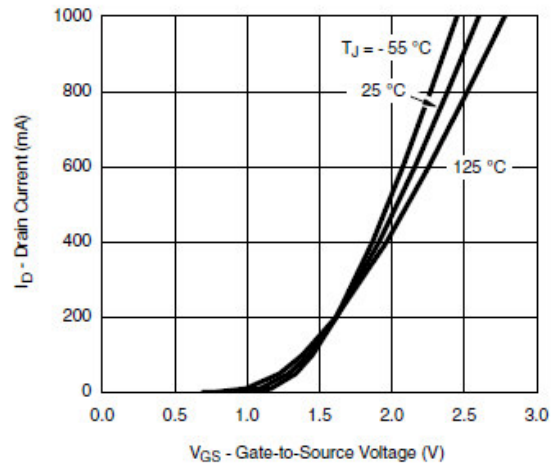
## Typical Performance Characteristics (N-Channel continue)



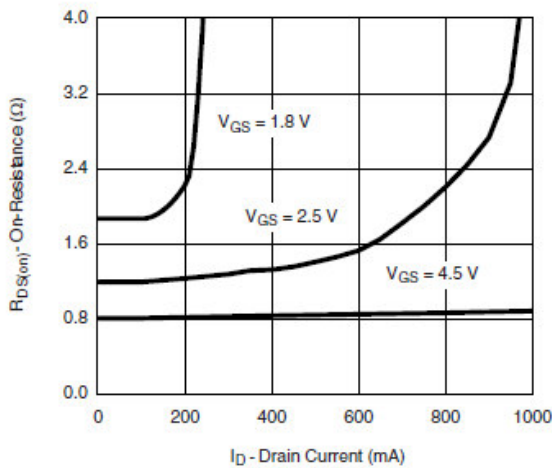
## Typical Performance Characteristics (P-Channel)



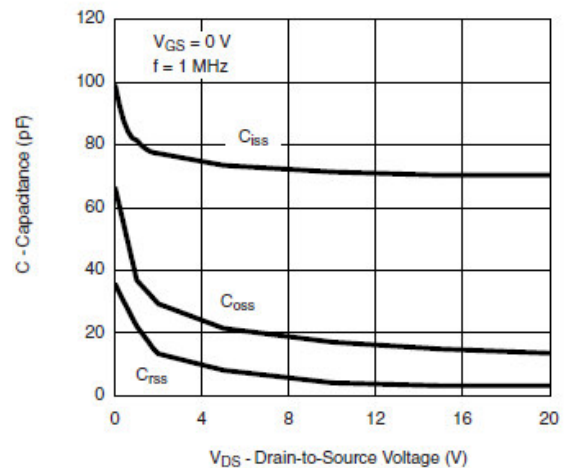
Output Characteristics



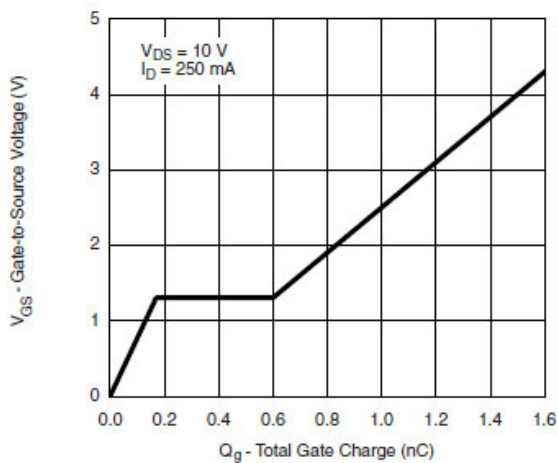
Transfer Characteristics



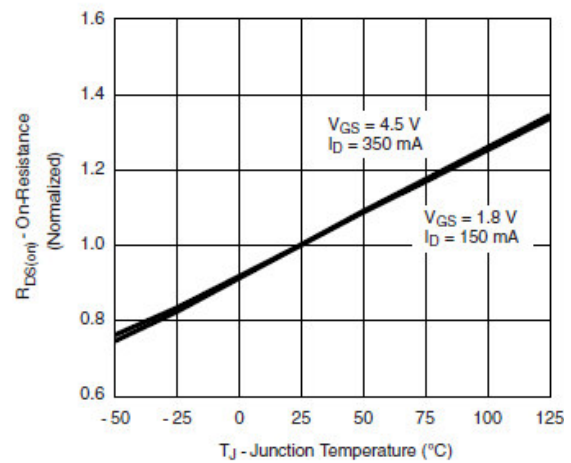
On-Resistance vs. Drain Current



Capacitance

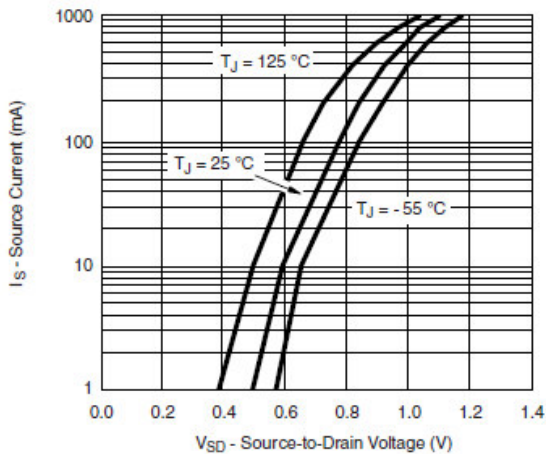


Gate Charge

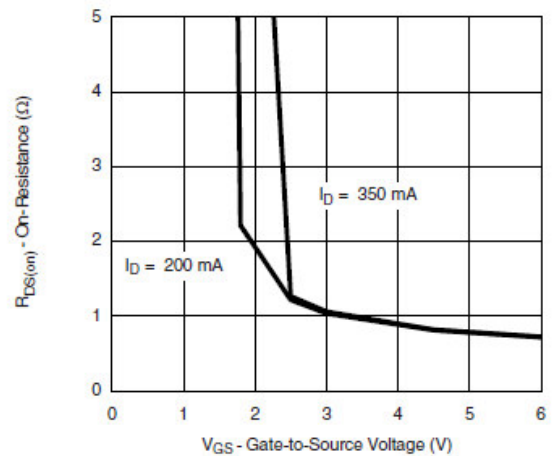


On-Resistance vs. Junction Temperature

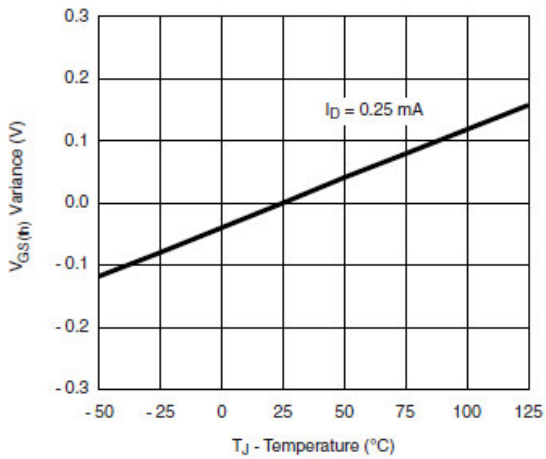
## Typical Performance Characteristics (P-Channel continue)



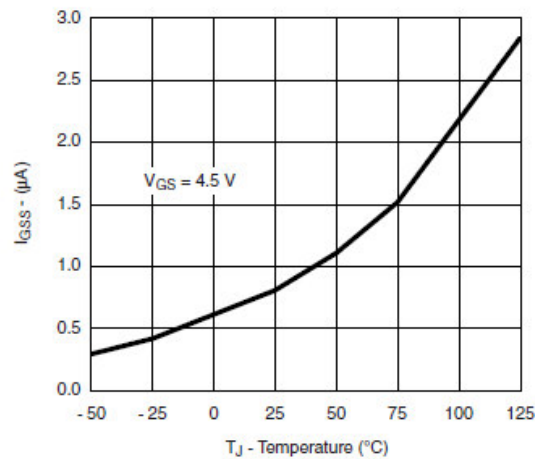
Source-Drain Diode Forward Voltage



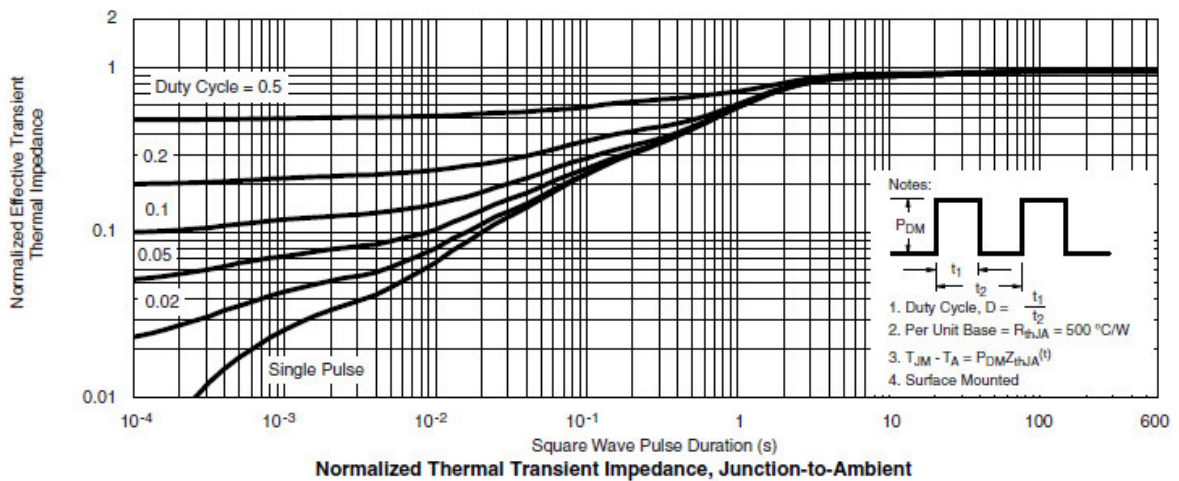
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage Variance vs. Temperature



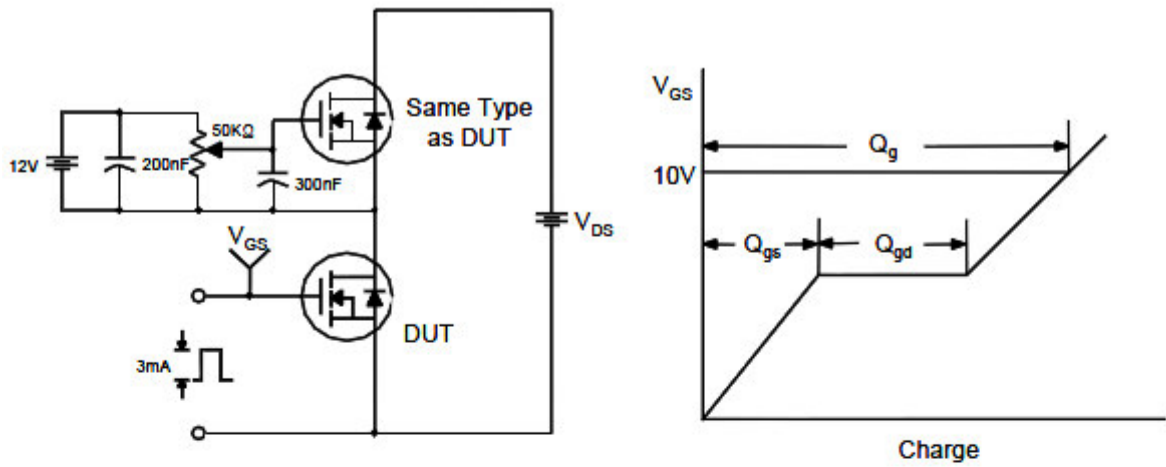
$I_{GSS}$  vs. Temperature



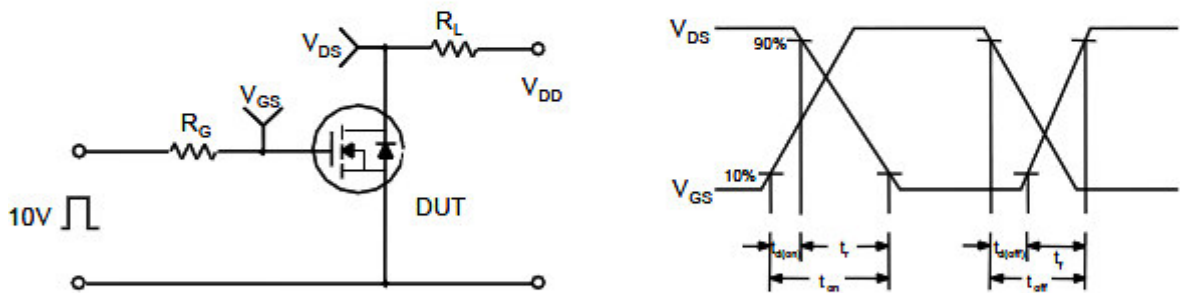
Normalized Thermal Transient Impedance, Junction-to-Ambient

## Typical Characteristics (N-Channel)

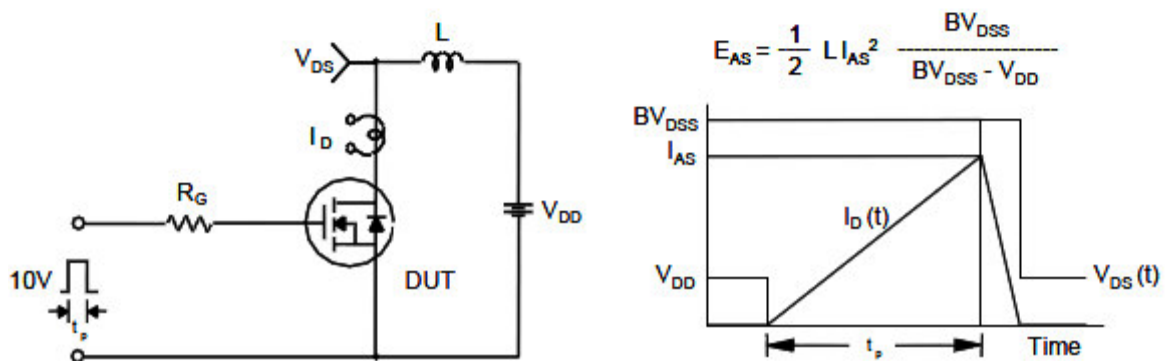
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



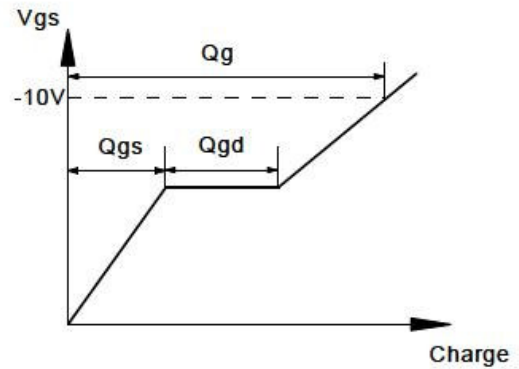
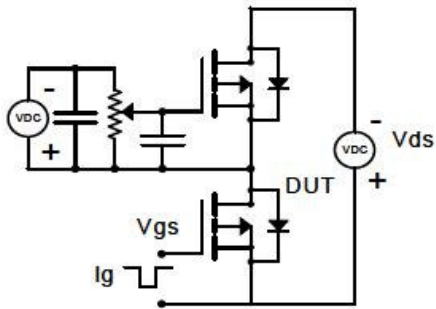
Unclamped Inductive Switching Test Circuit & Waveforms



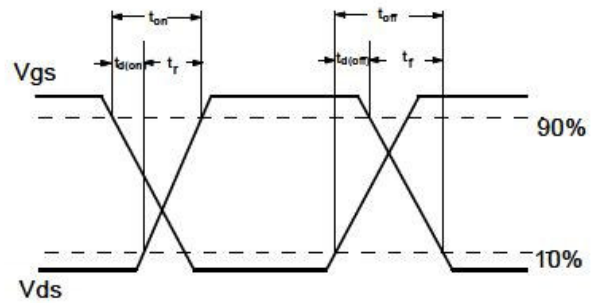
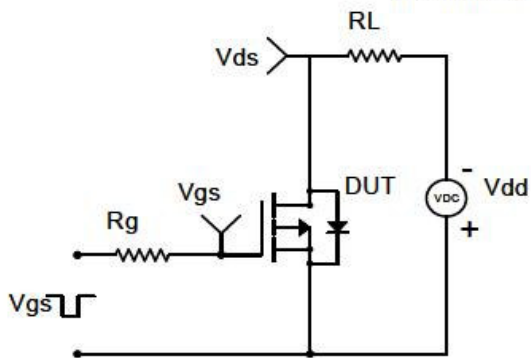


## Typical Characteristics (P-Channel)

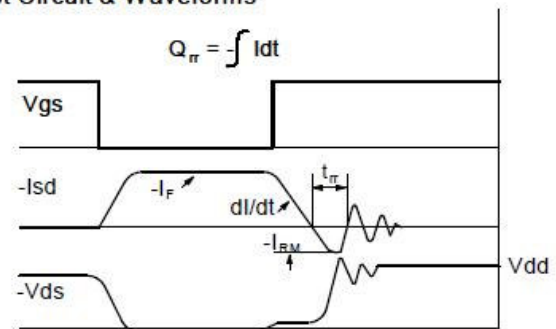
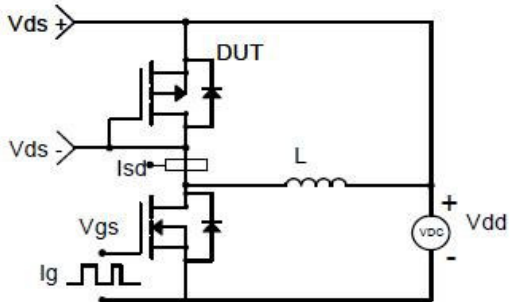
### Gate Charge Test Circuit & Waveform



### Resistive Switching Test Circuit & Waveforms

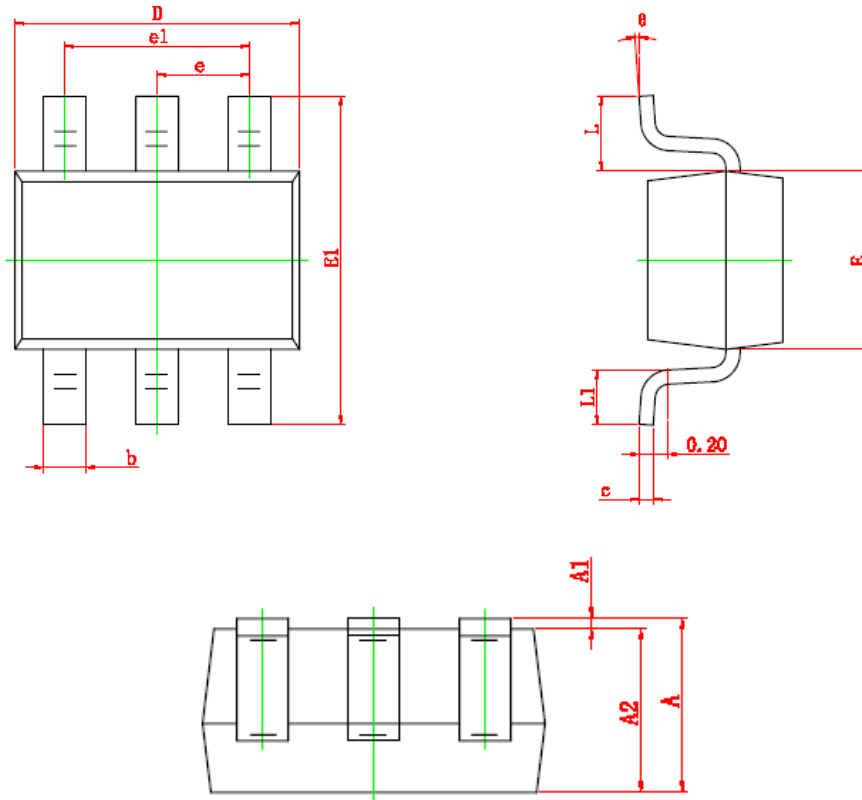


### Diode Recovery Test Circuit & Waveforms



## Package Dimension

# SOT-363







Dimensions				
Symbol	Millimeters		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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