



### ■ ABSOLUTE MAXIMUM RATINGS (T<sub>c</sub>=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V <sub>DSS</sub>	-100	V
Gate-Source Voltage		V <sub>GSS</sub>	±20	V
Continuous Drain Current	Continuous	I <sub>D</sub>	-50	A
Pulsed Drain Current	Pulsed (Note 2)	I <sub>DM</sub>	-120	A
Avalanche energy	Single Pulsed (Note 3)	E <sub>AS</sub>	180	mJ
Power Dissipation	TO-220	P <sub>D</sub>	110	W
	TO-220F/TO-220F1		34	W
	TO-220F2			
	TO-252D		50	W
Junction Temperature		T <sub>J</sub>	+150	°C
Storage Temperature Range		T <sub>STG</sub>	-55 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating: Pulse width limited by maximum junction temperature.

3. L=0.1mH, I<sub>AS</sub>=-60A, V<sub>DD</sub>=-50V, R<sub>G</sub>=25Ω, Starting T<sub>J</sub> = 25°C.

4. I<sub>SD</sub> ≤ 30A, di/dt ≤ 200A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> = 25°C.

### ■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F	θ <sub>JA</sub>	62.5	°C/W
	TO-220F1/TO-220F2			
	TO-252D			
Junction to Case	TO-220	θ <sub>JC</sub>	1.13	°C/W
	TO-220F/TO-220F1		3.68	°C/W
	TO-220F2			
	TO-252D			

### ■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub> =25°C, unless otherwise specified)

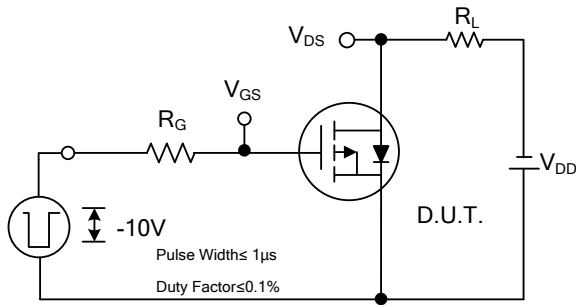
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	-100			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =-100V, V <sub>GS</sub> =0V			-1	μA
Gate-Source Leakage Current	Forward	I <sub>GSS</sub>			+100	nA
	Reverse				-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA	-1.2		-2.5	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-15A		36	43	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-10A		40	48	mΩ
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =-25V, f=1.0MHz		6315	9000	pF
Output Capacitance	C <sub>OSS</sub>			220	330	pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			50	100	pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge (Note 1)	Q <sub>G</sub>	V <sub>DS</sub> =-50V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-10A		98	150	nC
Gate to Source Charge	Q <sub>GS</sub>			16.2	30	nC
Gate to Drain Charge	Q <sub>GD</sub>			13.8	26	nC
Turn-on Delay Time (Note 1)	t <sub>D(ON)</sub>	V <sub>DD</sub> =-50V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-5.0A, R <sub>G</sub> =25Ω		58	105	ns
Rise Time	t <sub>R</sub>			24	50	ns
Turn-off Delay Time	t <sub>D(OFF)</sub>			215	450	ns
Fall-Time	t <sub>F</sub>			94	180	ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Pulsed Current	I <sub>S</sub>				-50	A
Drain-Source Diode Forward Voltage (Note 1)	I <sub>SM</sub>				-100	A
Maximum Body-Diode Continuous Current	V <sub>SD</sub>	I <sub>S</sub> =-1.0A, V <sub>GS</sub> =0V			-1.0	V

Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.

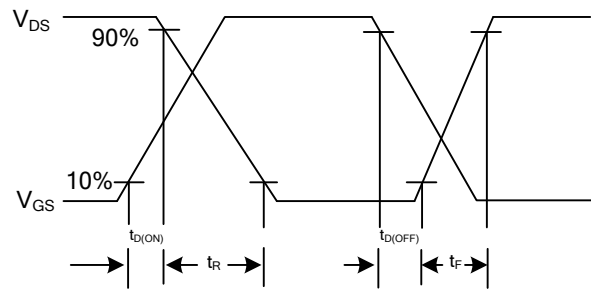
2. Essentially independent of operating temperature.



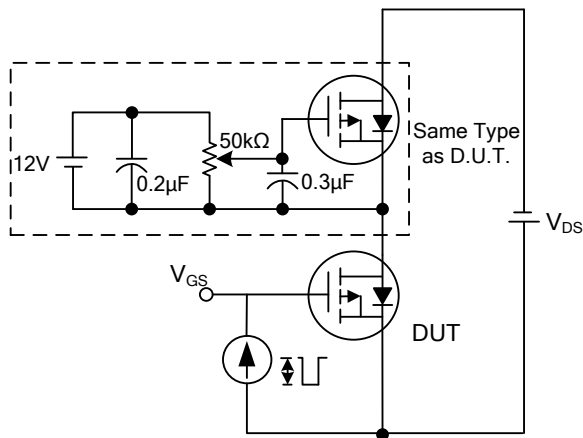
## TEST CIRCUITS AND WAVEFORMS



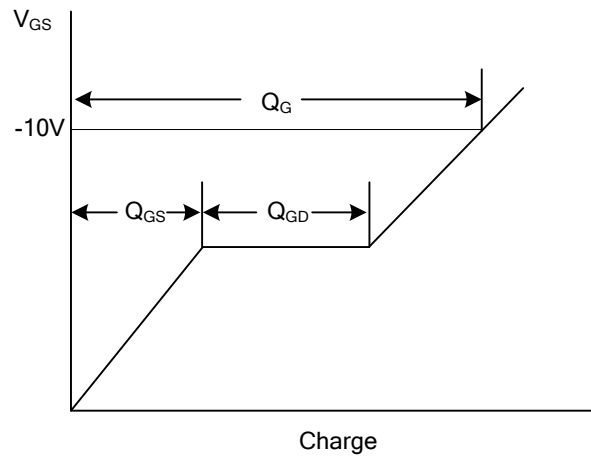
Switching Test Circuit



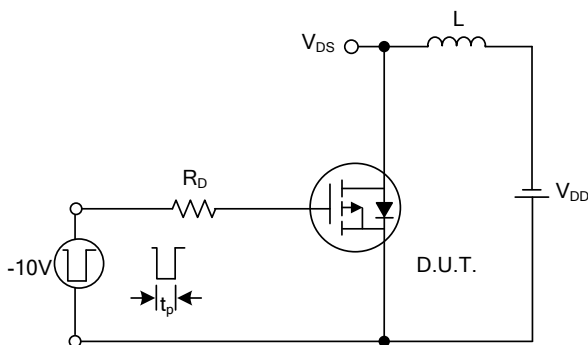
Switching Waveforms



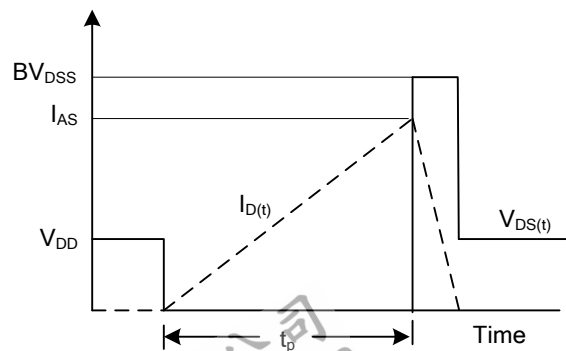
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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