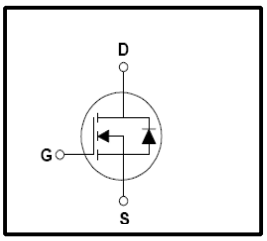
Silicon N-Channel MOSFET

Features



- 28A, 200v, R_{DS}(on)=0.085Ω @V_{GS}=10V
- Low gate charge (typical 95 nC)
- Low crss (typical 75 pF)
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

General Description

These N-Channel enhancement mode power field effect transistors are produced using Winsemi's proprietary , planar,DMOS technology.

This advanced technology has been especially tailored to minimize on-state resistance , provide superior switching Performance , and with stand high energy pulse in the avalanche and commutation mode.These devices are well suited for high efficiency switching DC/DC converters, Switch mode power supplies, DC-AC converters for uninterrupted power supply and motor control.

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	200	V
I_D	Drain Current -Continuous(T_C=25℃)	28	A
	-Continuous(T_C=100℃)	17.7	A
I_{DM}	Drain Current -Pulsed (Note 1)	112	A
V_{GSS}	Gate-Source Voltage	±30	V
E_{AS}	Single Pulse Avalanche Energy (Note 2)	600	mJ
I_{AR}	Avalanche Current (Note 1)	28	A
E_{AR}	Repetitive Avalanche Energy (Note 1)	15.6	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	5.5	V/ns
P_D	Power Dissipation(T_C=25℃)	156	W
	-Derate above25℃	1.25	W/℃
T_J,T_{STG}	Operating and Storage Temperature Range	-55~150	℃
T_L	Maximum lead temperature for soldering purposes, 1/8"from case for 5 seconds	300	℃

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min	Typ	Max	
$R_{\theta JC}$	Thermal Resistance,Junction-to-Case	-	-	0.8	℃/W
$R_{\theta CS}$	Thermal Resistance,Case-to-Sink	-	0.5	-	℃/W
$R_{\theta JA}$	Thermal Resistance,Junction-Ambient	-	-	62.5	℃/W

Electrical Characteristics T_C=25℃

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=250μA	200	--	--	V
Breakdown Voltage Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	I_D=250μA,Referenced to 25℃	--	0.2	--	V/℃
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=200V,V_{GS}=0V	--	--	10	μA
		V_{DS}=160V,T_C=125℃	--	--	100	μA
Gate-Body Leakage Current ,Forward	I_{GSSF}	V_{GS}=30V,V_{DS}=0V	--	--	100	nA
Gate-Body Leakage Current ,Reverse	I_{GSSR}	V_{GS}=-30V,V_{DS}=0V	--	--	-100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	2.0	--	4.0	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=14A	--	0.071	0.085	Ω
Forward Transconductance	g_{FS}	V_{DS}=40V,I_D=14A (Note4)	--	25	--	S
Input Capacitance	C_{iss}	V_{DS}=25V,V_{GS}=0V, f=1.0MHz	--	2600	3400	pF
Output Capacitance	C_{oss}		--	330	430	pF
Reverse Transfer Capacitance	C_{rss}		--	75	100	pF
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=100V,I_D=32A,R_G=25Ω (Note4,5)	--	30	70	ns
Turn-On Rise Time	t_r		--	240	490	ns
Turn-Off Delay Time	$T_{d(off)}$		--	295	600	ns
Turn-Off Fall Time	t_f		--	195	400	ns
Total Gate Charge	Q_g	V_{DS}=160V,I_D=32A,V_{GS}=10V (Note4,5)	--	95	123	nC
Gate-Source Charge	Q_{gs}		--	13	--	nC
Gate-Drain Charge	Q_{gd}		--	43	--	nC

Source-Drain Ratings and Characteristlcs

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Units
Maximum Continuous Drain-Source Diode Forward Current	I_S	--	--	--	28	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}	--	--	--	112	A
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=28A	--	--	1.5	V
Reverse Recovery Time	t_{rr}	V_{GS}=0V,I_S=32A, dI_F/dt=100A/μs (Note4)	--	220	--	ns
Reverse Recovery Charge	Q_{rr}		--	1.89	--	μC

Notes:

1. Repetitive Rating:Pulse Width limited by maximum junction temperature
2. L=1.15mH,I_{AS}=28A,V_{DD}=50V,R_G=25Ω,Starting T_J=25℃
3. I_{SD}≤32A,di/dt≤300A/μs,V_{DD}≤BV_{DSS},Starting T_J=25℃
4. Pulse Test:Pulse width≤300μs,Duty cycle≤2%
5. Essentially independent of operating temperature

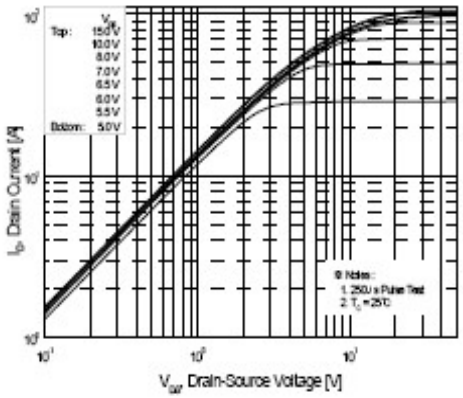


Figure 1. On-Region Characteristics

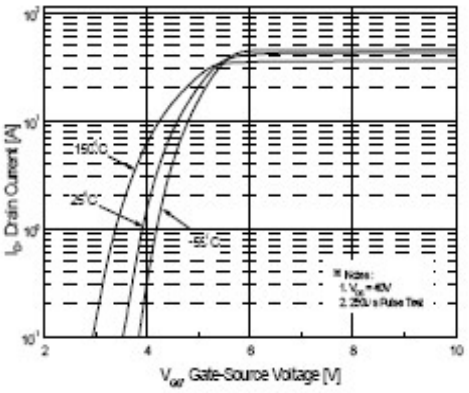


Figure 2. Transfer Characteristics

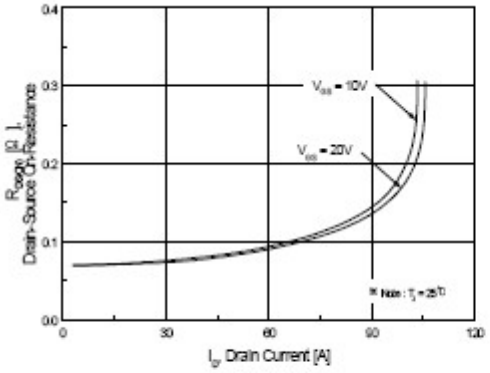


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

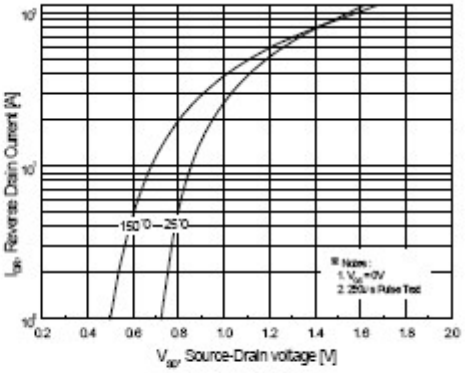


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

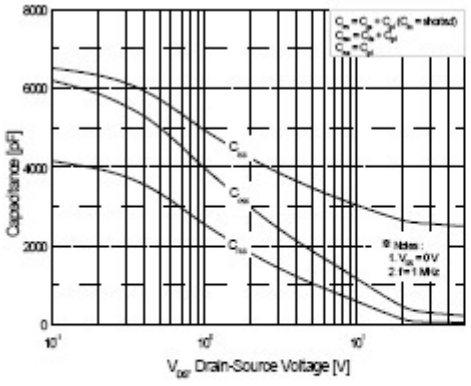


Figure 5. Capacitance Characteristics

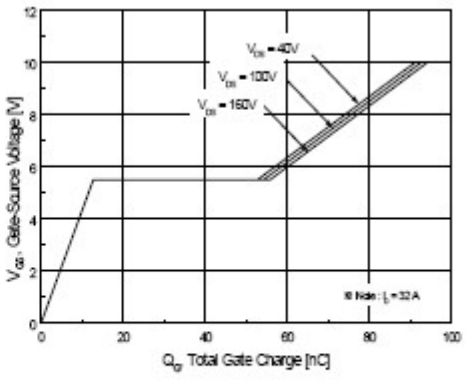


Figure 6. Gate Charge Characteristics

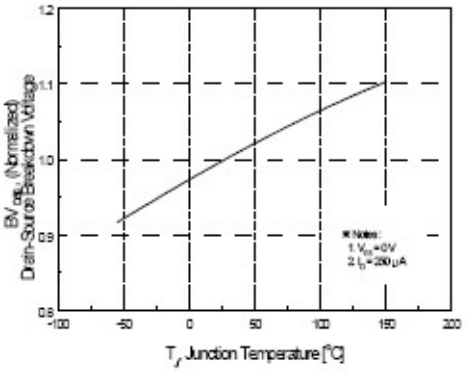


Figure 7. Breakdown Voltage Variation vs Temperature

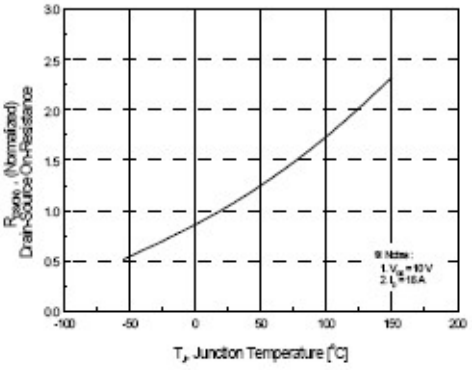


Figure 8. On-Resistance Variation vs Temperature

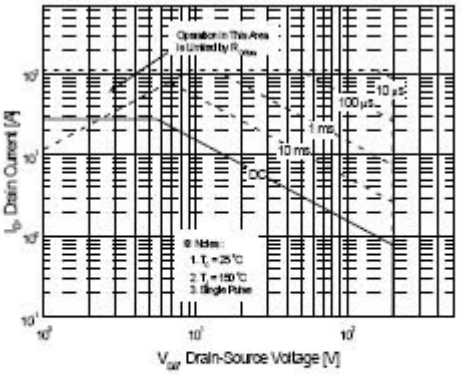


Figure 9 . Maximum Safe Operating Area

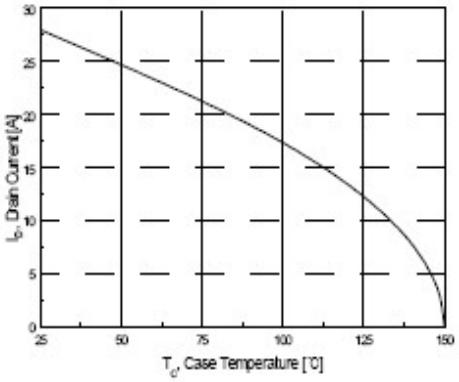


Figure 10. Maximum Drain Current vs Case Temperature

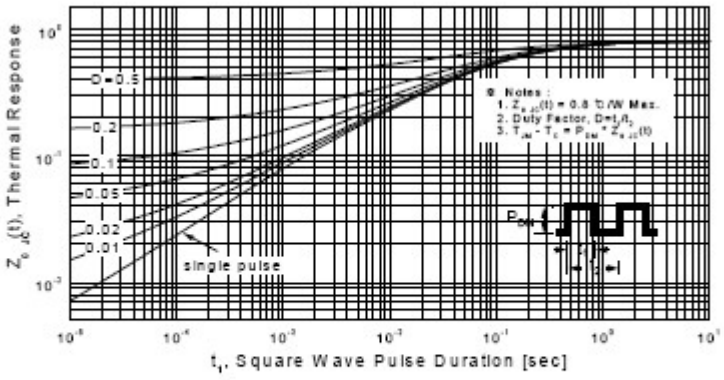
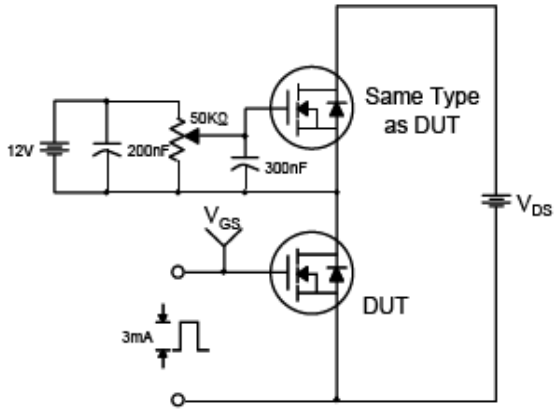
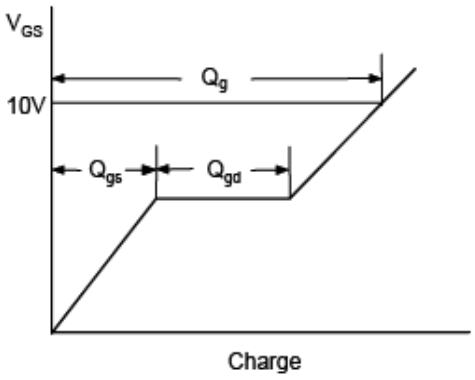


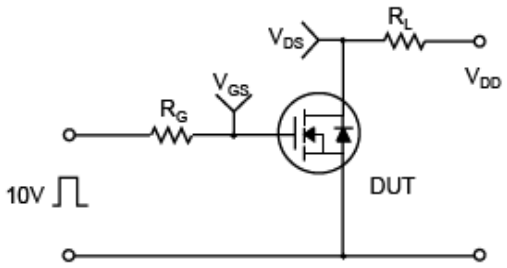
Figure 11. Transient Thermal Response Curve

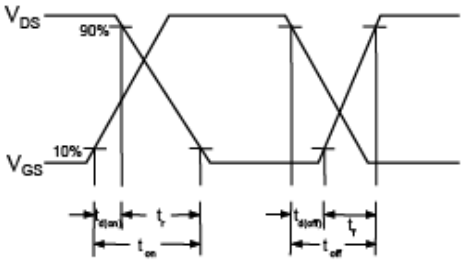
Gate Charge Test Circuit & Waveform



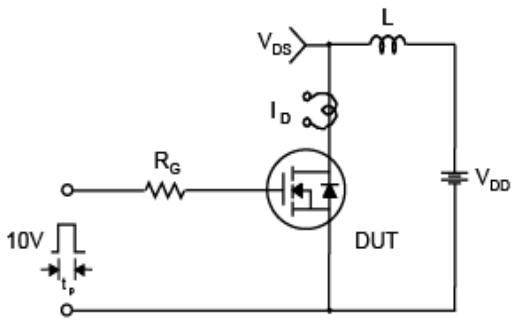


Resistive Switching Test Circuit & Waveforms

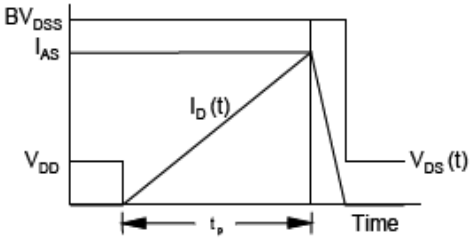




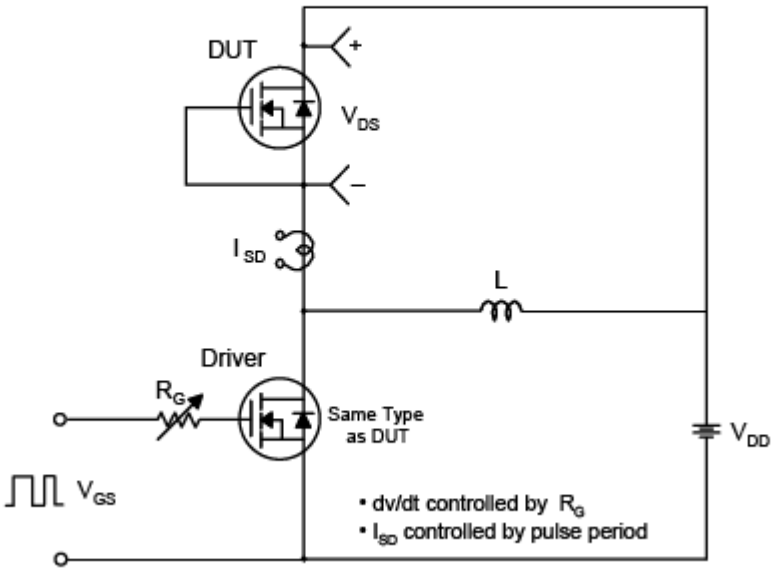
Unclamped Inductive Switching Test Circuit & Waveforms

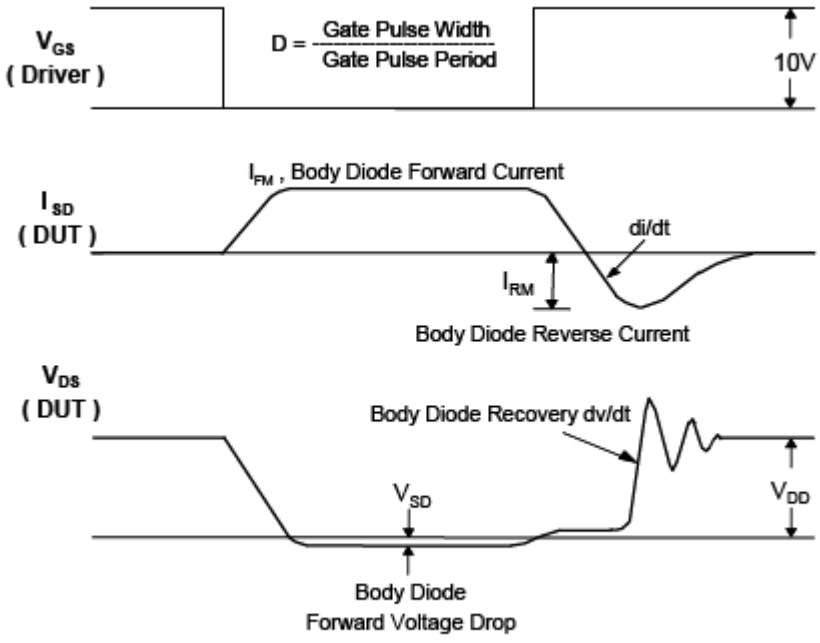


$$E_{AS} = \frac{1}{2} L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



Peak Diode Recovery dv/dt Test Circuit & Waveforms





To-220 Package Dimension