

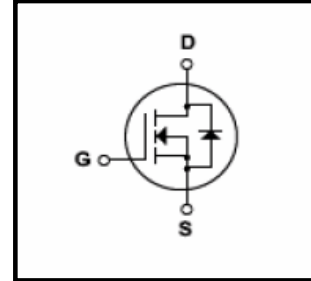
Super-junction N-Channel Power MOSFET
Features

- 12A,650V, $R_{DS(on)}$ (Max0.30 Ω)@ $V_{GS}=10V$
- Ultra-low Gate charge(Typical 84.4nC)
- High EAS energy
- 100%Avalanche Tested
- RoHS Compliant
- Maximum Junction Temperature Range(150 $^{\circ}C$)

General Description

This Super-junction Power MOSFET is produced using Winsemi's employs a deep trench filling process that differentiates it from preceding multi-epi based technologies. By utilizing this advanced technology and precise process control, Supre-junction MOSFET provides world class Rsp, superior switching performance and ruggedness.

This Supre-junction Power MOSFET fits the industry's AC-DC SMPS requirements for PFC, server/telecom power, FPD TV power, ATX power, and industrial power applications.


Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{DSS}	Drain Source Voltage	650	V
I_D	Continuous Drain Current(@ $T_c=25^{\circ}C$)	12	A
I_{DM}	Drain Current Pulsed (Duration is limited by T_{jmax} .)	50	A
V_{GSS}	Gate to Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy	800	mJ
I_{AR}	Single Pulse Avalanche Current	20	A
E_{AR}	Repetitive Avalanche Energy (Frequency is limited by T_{jmax} .)	1	mJ
P_D	Total Power Dissipation(@ $T_c=25^{\circ}C$)	208	W
T_J	Junction Temperature	150	$^{\circ}C$
T_{stg}	Storage Temperature	-55~150	$^{\circ}C$

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min	Typ	Max	
R_{QJC}	Thermal Resistance , Junction -to -Case	-	-	0.6	$^{\circ}C/W$
R_{QJA}	Thermal Resistance , Junction -to -Ambient	-	-	60	$^{\circ}C/W$

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Electrical Characteristics($T_C=25^\circ\text{C}$)

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	-	-	± 100	nA
Gate-source breakdown voltage	$V_{(BR)GSS}$	$I_G=\pm 10 \mu A, V_{DS}=0V$	± 30	-	-	V
Drain cut -off current	I_{DSS}	$V_{DS}=600V, V_{GS}=0V$	-	-	1	μA
		$V_{DS}=600V, T_J=150^\circ\text{C}$	-	-	100	μA
Drain -source breakdown voltage	$V_{(BR)DSS}$	$I_D=250\mu A, V_{GS}=0V$	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.5	3	3.5	V
Drain -source ON resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=13.1A$	-	0.16	0.30	Ω
Forward Transconductance	g_{fs}	$V_{DS}\geq 30V, I_D=20A$	-	10	-	S
Input capacitance	C_{iss}	$V_{DS}=70V,$ $V_{GS}=0V,$ $f=1\text{MHz}$	-	1140		pF
Reverse transfer capacitance	C_{rfs}		-	6		
Output capacitance	C_{oss}		-	215		
Total gate charge(gate-source plus gate-drain)	Q_g	$V_{DS}=480V,$ $V_{GS}=10V,$ $I_D=20.7A$	-	32	-	nC
Gate-source charge	Q_{gs}		-	10	-	
Gate-drain("miller") Charge	Q_{gd}		-	10	-	

Source-Drain Ratings and Characteristics($T_a=25^\circ\text{C}$)

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I_S	$T_C=25^\circ\text{C}$	-	-	20	A
Pulse Diode Forward Current	I_{SM}				60	
Body Diode Voltage	V_{DSF}	$T_J=25^\circ\text{C}, I_{SD}=20A, V_{GS}=0V$	-	0.96	1.2	V

Typical Characteristics $T_j = 25^\circ\text{C}$, unless otherwise noted

Figure1. Output Characteristics

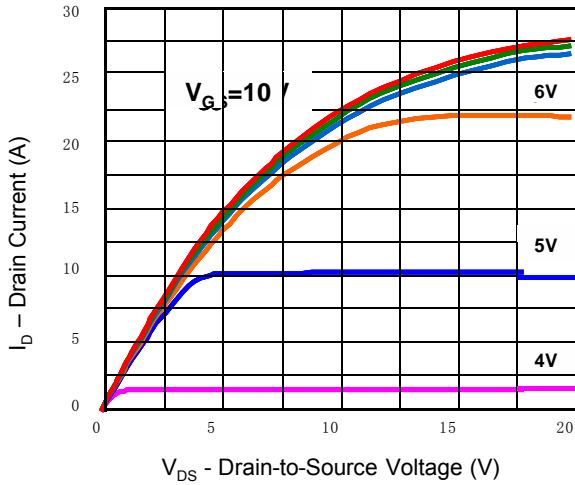


Figure2. Transfer Characteristics

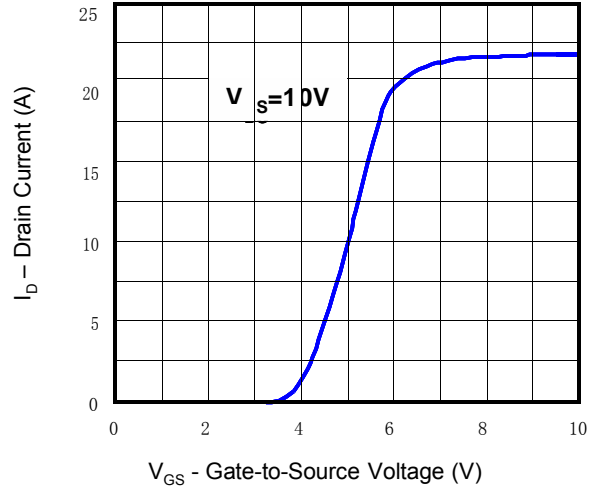


Figure3. On-Resistance vs. Drain Current

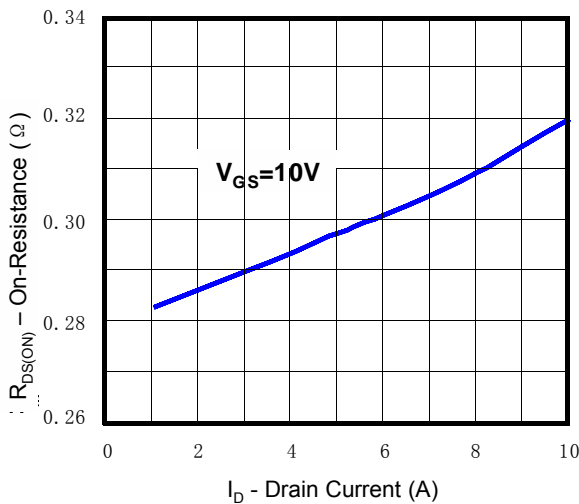


Figure4. Capacitance

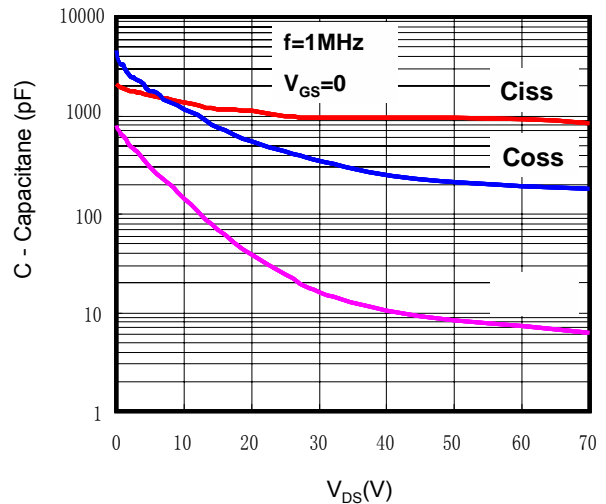


Figure5. Gate Charge

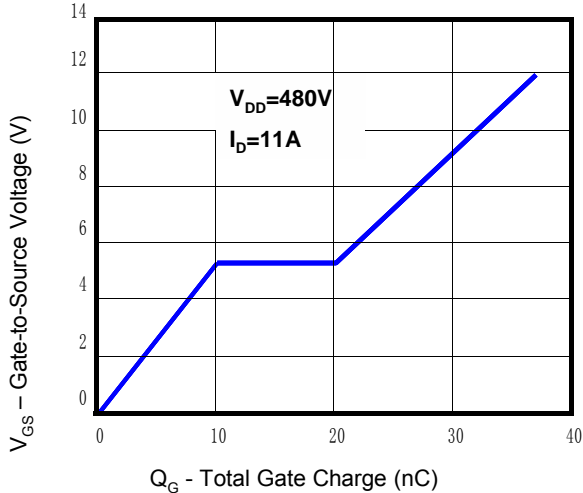


Figure6. Source-Drain Diode Forward Voltage

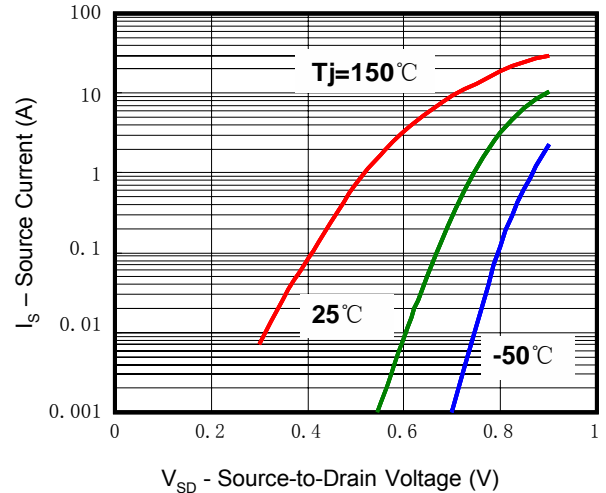


Figure7. On-Resistance vs. Junction Temperature

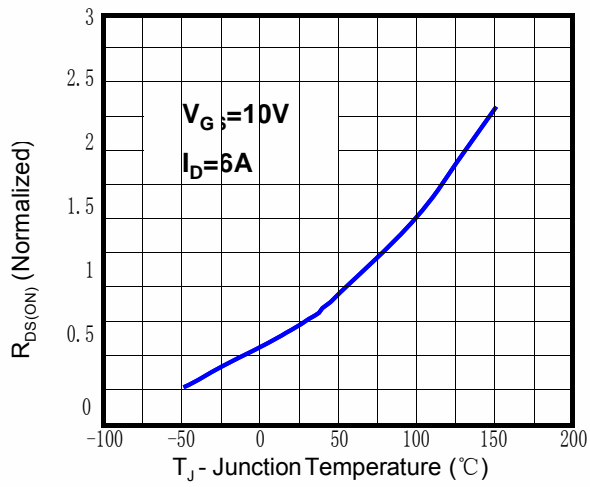
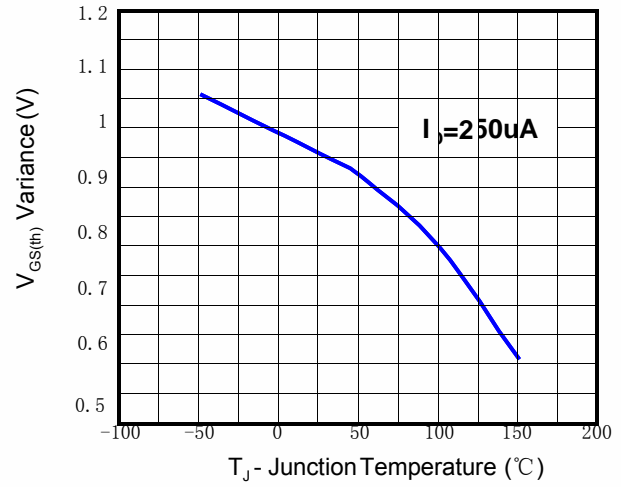


Figure8. Threshold Voltage vs. Junction Temperature



TO-220 Package Dimension

