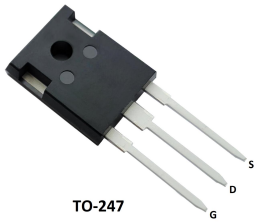
MS12N150HGC0

Planar Process N-Channel MOS

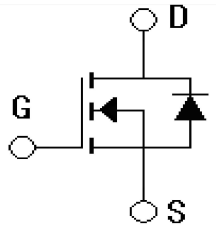
Features

- V_{DS}=1500V,I_D=12A
  $R_{DS(on)}$<1.8Ω @ V_{GS}=10V
- High density cell design for ultra low R_{dson}
- Low gate charge
- Improved dv/dt capability
- RoHS product



Applications

- High Voltage Switched-mode and resonant-mode power supplies
- High Voltage Pulse Power Applications
- High Voltage Discharge circuits in Lasers Pulsers, Spark Igniters, RF Generators
- High Voltage DC-DC converters
- High Voltage DC-AC inverters



Absolute Ratings (Tc=25℃)

Parameter	Symbol		Limit	Unit
Drain-Source Voltage	V_{DSS}		1500	V
Transient Gate-Source Voltage	V_{GSM}		±30	V
Continuous Gate-Source Voltage	V_{GSS}		±20	V
Drain Current-continuous	I_D	T_C=25℃	12	A
		T_C=100℃	8	
Drain Current-pulse(note1)*	I_{DM}		22	A
Single Pulsed Avalanche Energy (note2)	E_{AS}		607	mJ
Maximum Power Dissipation	P_D	T_C=25℃	694	W
		T_C=100℃	277	W
Operating and Storage Temperature Range	T_J,T_{STG}		-55~+150	℃
Maximum lead Storage Temperature Range Purposes	T_L		300	℃

*Drain current limited by maximum junction temperature

Electrical Characteristics(T_{CASE}=25℃ unless otherwise specified)

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Drain-Source Voltage	BV_{DSS}	I_D=1mA,V_{GS}=0V	1500	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=V_{DSS},V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On-Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	2.0	-	5.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V,I_D=1A (note3)	-	1.3	1.8	Ω
Forward Transconductance	g_{fs}	V_{DS}=20V,I_D=6A (note3)	-	17	-	S
Dynamic Characteristics						
Input capacitance	C_{iss}	V_{DS}=10V,V_{GS}=0V, f=1.0MHz (note4)	-	4874	-	pF
Output capacitance	C_{oss}		-	310	-	pF
Reverse transfer capacitance	C_{rss}		-	20	-	pF
Total Gate Charge	Q_g	V_{DS}=750V,I_D=6A, V_{GS}=10V (note4)		97		nC
Gate-Source Charge	Q_{gs}			34		nC
Gate-Drain Charge	Q_{gd}			35		nC
Switching-Characteristics						
Turn-On delay time	$t_{d(on)}$	V_{DS}=750V,I_D=6A, V_{GS}=10V (note3)	-	118	-	ns
Turn-On rise time	t_r		-	73	-	ns
Turn-Off delay time	$t_{d(Off)}$		-	260	-	ns
Turn-Off rise time	t_f		-	64	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Drain-Source Diode Forward Current	V_{SD}	V_{GS}=0V,I_S=12A (note3)	0.5	-	1.2	V
Diode Forward Current	I_S	TC=25℃	-	-	12	A
Reverse recovery time	T_{rr}	I_S=6A,di_F/dt=100A/μS V_R=100V,V_{GS}=0V	-	0.37	-	uS
Reverse Recovery Charge	Qrr			3.28		uC

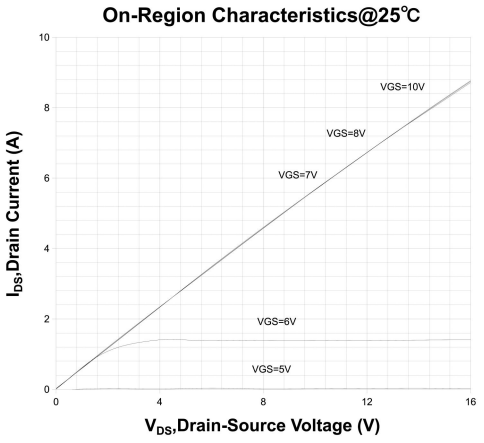
Thermal Characteristics

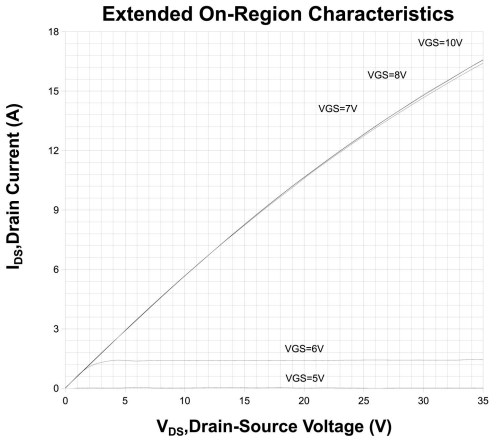
Parameter	Symbol	Value	Unit
Thermal Resistance,junction to Case	R_{th}(j-C)	0.18	℃/W
Thermal Resistance,junction to ambient	Rth(j-A)	36	℃/W

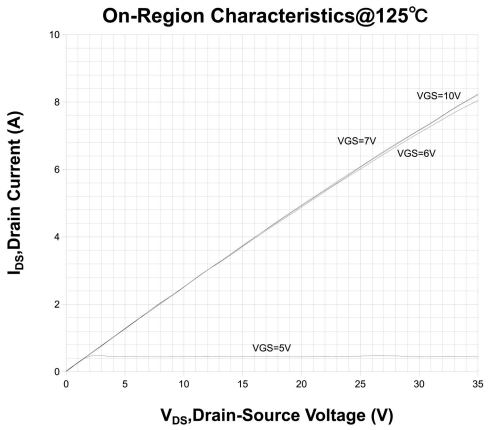
Notes:

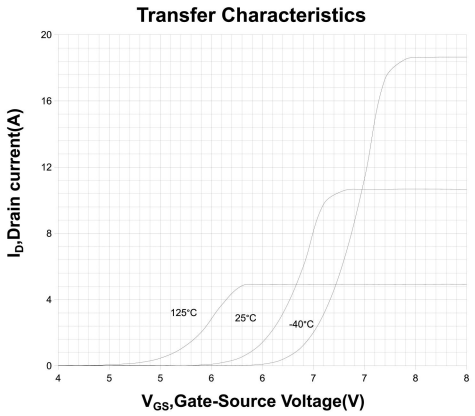
1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 15 mH, I_{AS} = 9 A, V_{DD} = 50V, RG = 25 Ω, Starting T_J = 25°C
3. Pulse Test : Pulse width ≤ 300us, Duty cycle ≤ 2%
4. Essentially independent of operating temperature

Electrical Characteristics

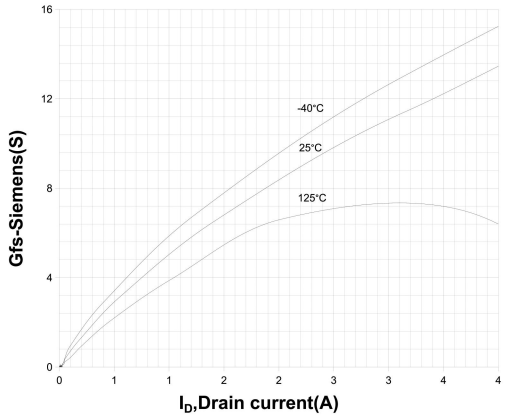




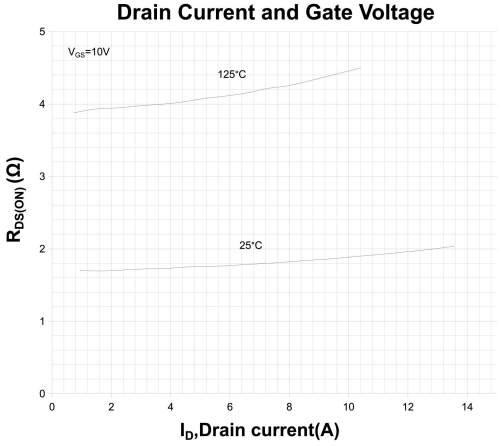




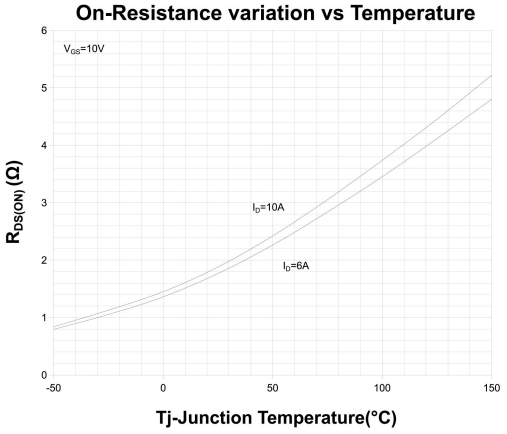
Transconductance



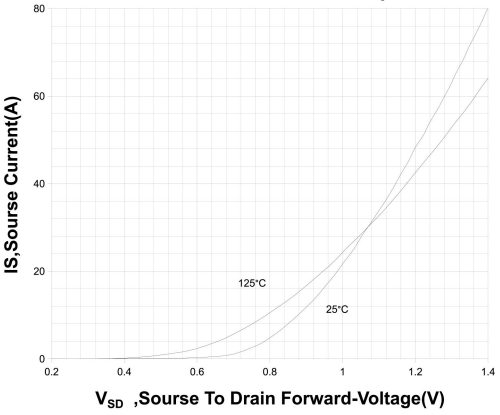
On-Resistance Variation vs Drain Current and Gate Voltage



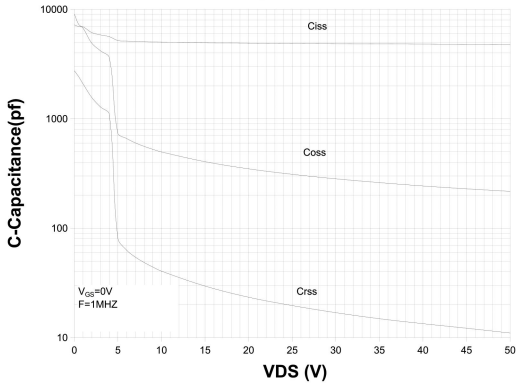
On-Resistance variation vs Temperature



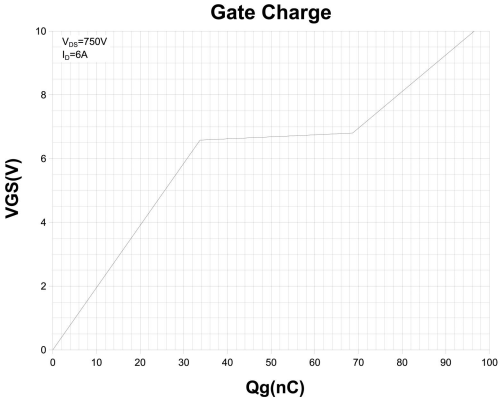
Body Diode Forward Voltage Variation with Source Current and Temperature

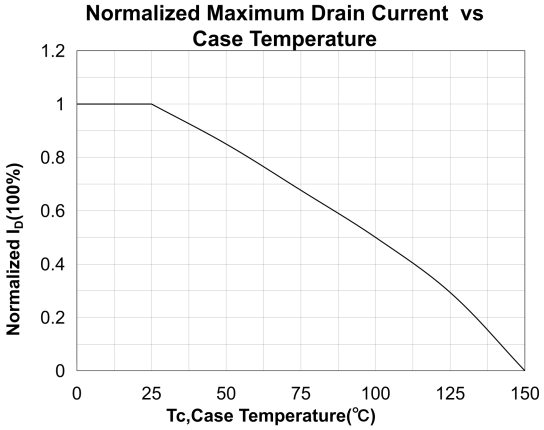


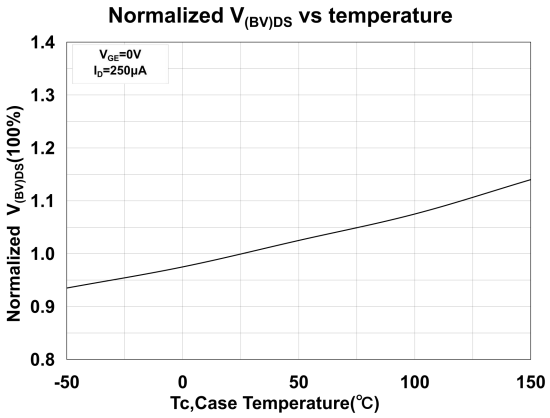
Capacitance

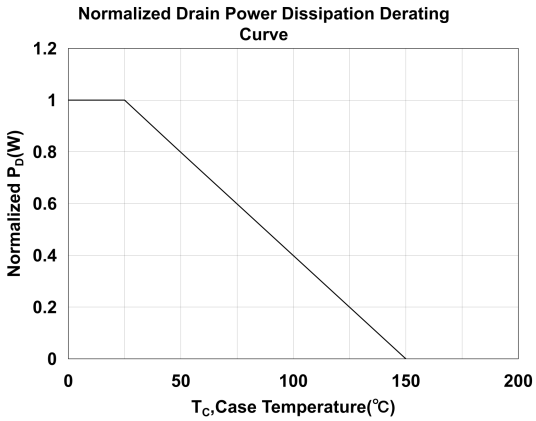


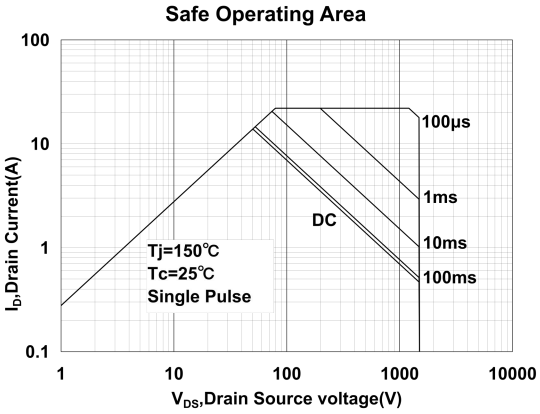
Gate Charge

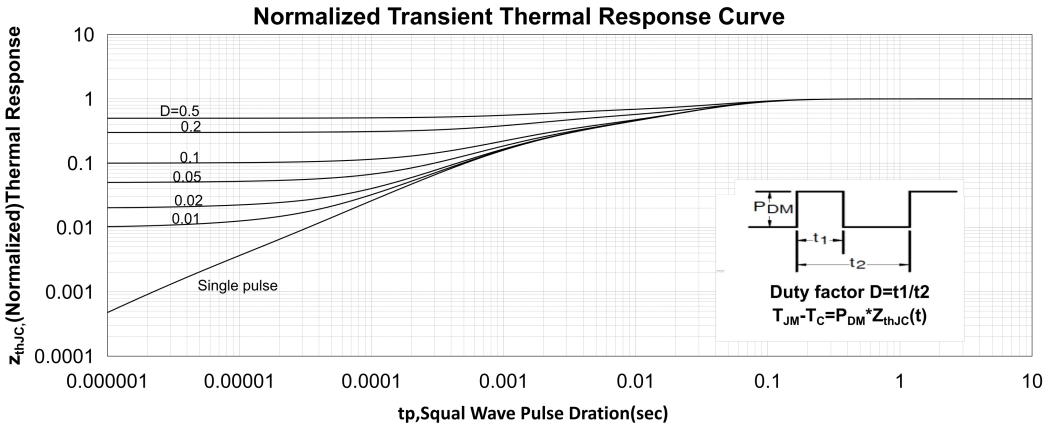



Normalized Maximum Drain Current vs Case Temperature
Normalized I_D(100%)
1.2
1
0.8
0.6
0.4
0.2
0
0
25
50
75
100
125
150
Tc,Case Temperature(℃)

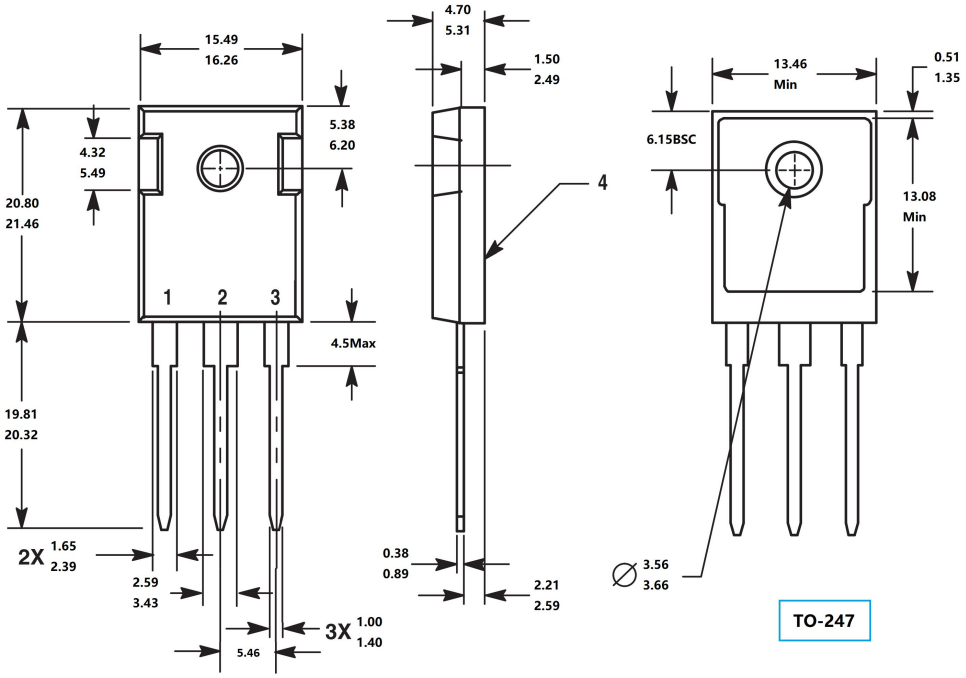

Normalized $V_{(BV)DS}$ vs temperature
V_{GE}=0V
I_D=250μA
Normalized $V_{(BV)DS}$(100%)
1.4
1.3
1.2
1.1
1.0
0.9
0.8
-50
0
50
100
150
Tc,Case Temperature(℃)


Normalized Drain Power Dissipation Derating Curve
Normalized P_D(W)
1.2
1
0.8
0.6
0.4
0.2
0
0
50
100
150
200
T_C,Case Temperature(℃)


Safe Operating Area
I_D,Drain Current(A)
100
10
1
0.1
1
10
100
1000
10000
V_{DS},Drain Source voltage(V)
100μs
1ms
DC
10ms
100ms
Tj=150℃
Tc=25℃
Single Pulse


Normalized Transient Thermal Response Curve
Z_{thJC}(Normalized)Thermal Response
10
1
0.1
0.01
0.001
0.0001
D=0.5
0.2
0.1
0.05
0.02
0.01
Single pulse
P_{DM}
t_1
t_2
Duty factor D=t1/t2
T_{JM}-T_C=P_{DM}*Z_{thJC}(t)
0.000001
0.00001
0.0001
0.001
0.01
0.1
1
10
tp,Squal Wave Pulse Dration(sec)

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MS3N100HGD1 MS8N120FC MS4N1350B MSG40T65HNC0 MS5N100S MSG30T65HHT1
MS10N100HGC0 MS6N120FS MS8N100FE MSG15T120FPE MS12N100FC MSG40T65HPC0