RoHS Compliant
HALOGEN-FREE

Magnachip

AMDD14N25CRH

N-Channel MOSFET 250V, 10.2A, 0.28Ω

General Description

This N-channel MOSFET is produced using advanced Magnachip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent quality.

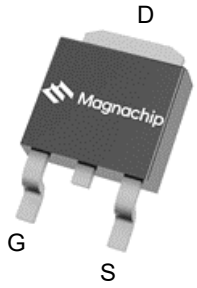
This device is suitable for SMPS, high speed switching and automotive or industrial purpose applications.

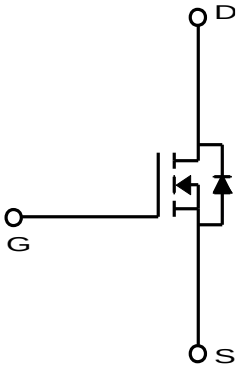
Features

- V_{DS} = 250V
- I_D = 10.2A
- $R_{DS(ON)} \leq 0.28\Omega$ @V_{GS} = 10V
- AEC-Q101 qualified
- Pb-free plating, halogen-free

Applications

- Power supply
- Motor control
- Car inverter
- High current, high speed switching





Absolute maximum ratings (T_C = 25°C unless otherwise specified)

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	250	V
Gate-source voltage		V_{GSS}	±30	V
Continuous drain current	T_C=25°C	I_D	10.2	A
	T_C=100°C		7.2	A
Pulsed drain current(1)		I_{DM}	40.8	A
Power dissipation	T_C=25°C	P_D	144	W
	Derate above 25°C		0.96	W/°C
Peak diode recovery dv/dt(3)		dv/dt	4.5	V/ns
Repetitive avalanche energy(1)		E_{AR}	6.94	mJ
Avalanche current(1)		I_{AR}	10.2	A
Single pulse avalanche energy(4)		E_{AS}	550	mJ
Junction and storage temperature range		T_j, T_{stg}	-55~175	°C

Thermal characteristics

Characteristics	Symbol	Rating	Unit
Thermal resistance, junction-to-ambient(1)	$R_{\theta JA}$	41.9	°C/W
Thermal resistance, junction-to-case(1)	$R_{\theta JC}$	1.04	

Ordering information

Part Name	Marking	Temp. Range	Package	Packing	RoHS Status
AMDD14N25CRH	14N25C	-55~175ºC	TO-252(DPAK)	Reel and tape	Compliant

Electrical characteristics (T_C = 25ºC unless otherwise specified)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	I_D = 250μA, V_{GS} = 0V	250	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.0	-	4.0	
Drain cut-off current	I_{DSS}	V_{DS} = 250V, V_{GS} = 0V	-	-	1	μA
Gate leakage current	I_{GSS}	V_{GS} = ±30V, V_{DS} = 0V	-	-	100	nA
Drain-source on-resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 5.1A	-	0.22	0.28	Ω
Forward transconductance	g_{fs}	V_{DS} = 30V, I_D = 5.1A	-	8.5	-	S
Dynamic characteristics						
Total gate charge	Q_g	V_{DS} = 200V, I_D = 14.0A, V_{GS} = 10V	-	20.0	-	nC
Gate-source charge	Q_{gs}		-	4.5	-	
Gate-drain charge	Q_{gd}		-	8.9	-	
Input capacitance	C_{iss}	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	-	741	-	pF
Reverse transfer capacitance	C_{rss}		-	15	-	
Output capacitance	C_{oss}		-	142	-	
Turn-on delay time	$t_{d(on)}$	V_{GS} = 10V, V_{DS} = 125V, I_D = 14.0A, R_G = 25Ω(3)	-	13	-	ns
Rise time	t_r		-	42	-	
Turn-off delay time	$t_{d(off)}$		-	44	-	
Fall time	t_f		-	28	-	
Drain-source body diode characteristics						
Maximum continuous drain to source diode forward current	I_S		-	-	10.2	A
Source-drain diode forward voltage	V_{SD}	I_S = 10.2A, V_{GS} = 0V	-	-	1.4	V
Body diode reverse recovery time	t_{rr}	I_F = 14.0A, di/dt = 100A/μs(3)	-	174	-	ns
Body diode reverse recovery charge	Q_{rr}		-	1.0	-	μC

Note :

1. Pulse width is based on $R_{\theta JC}$ & $R_{\theta JA}$ and the maximum allowed junction temperature of 175°C
2. Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%, pulse width limited by junction temperature $T_{j,\,max}$=175°C
3. I_{SD} ≤ 10.2A, di/dt ≤ 300A/us, V_{DD} ≤ BV_{DSS}, R_g = 25Ω, Starting T_j=25°C
4. L = 8.5mH, I_{AS} = 10.2A, V_{DD} = 50V, R_g = 26Ω, Starting T_j = 25ºC

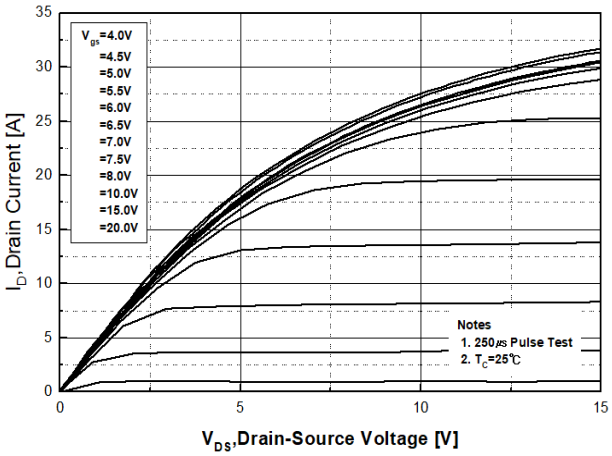


Fig.1 On-region Characteristics

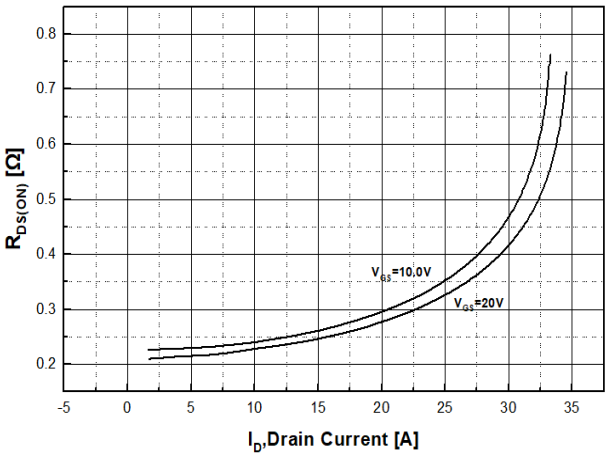


Fig.2 On-resistance variation with drain current and gate Voltage

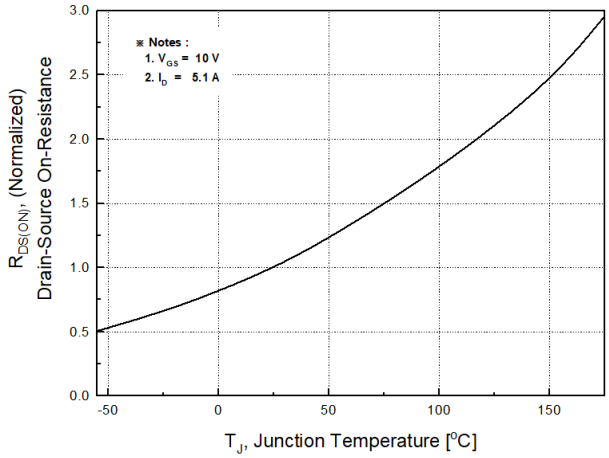


Fig.3 On-resistance vs. temperature

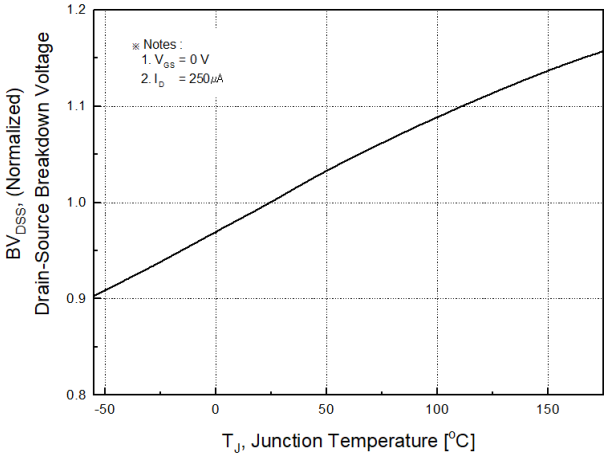


Fig.4 Breakdown voltage vs. temperature

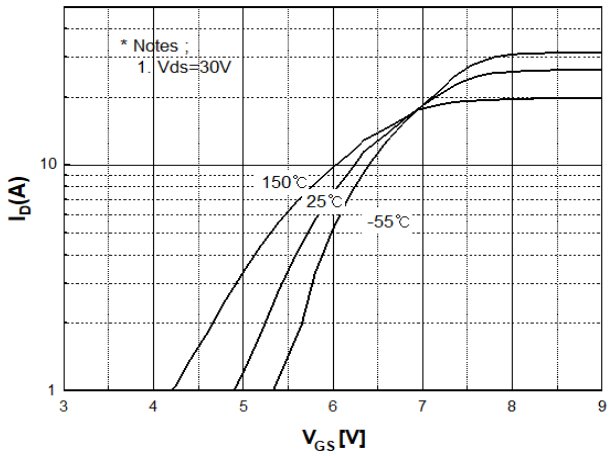


Fig.5 Transfer characteristics

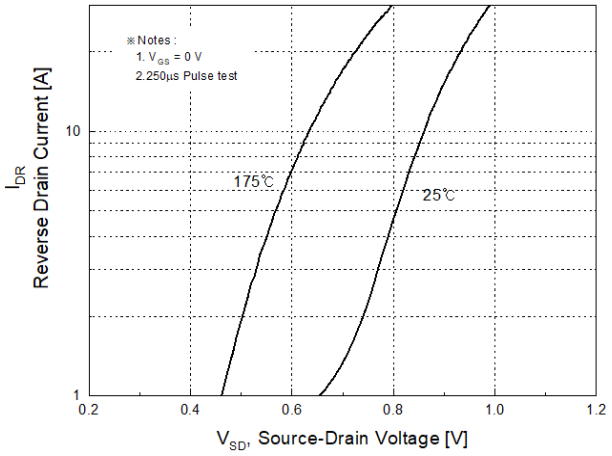


Fig.6 Body diode forward voltage variation with source current and temperature

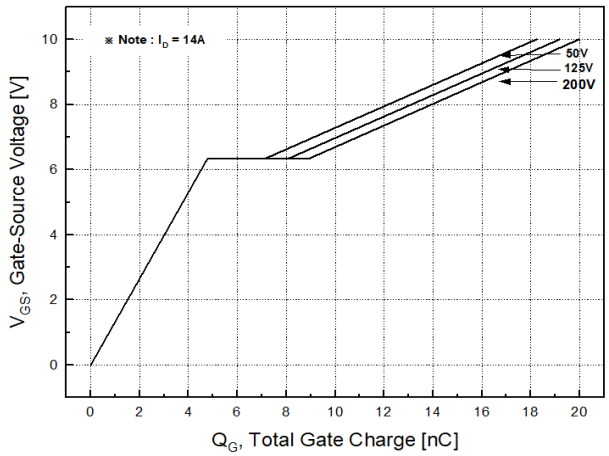


Fig.7 Gate charge characteristics

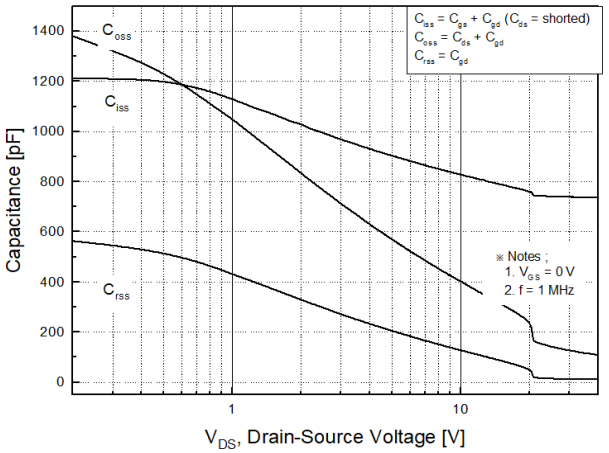


Fig.8 Capacitance characteristics

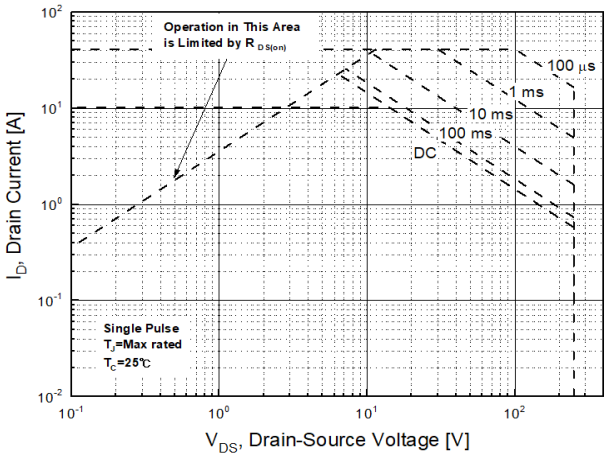


Fig.9 Maximum safe operating area

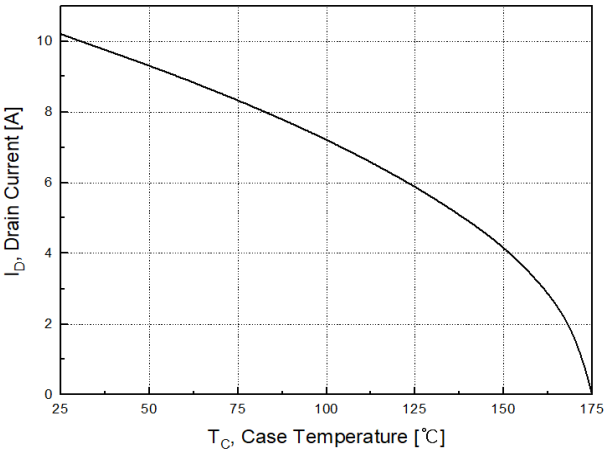


Fig.10 Maximum drain current vs. case temperature

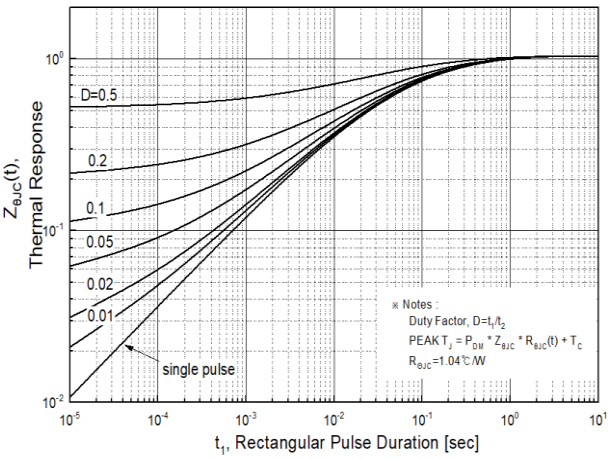


Fig.11 Transient thermal response curve

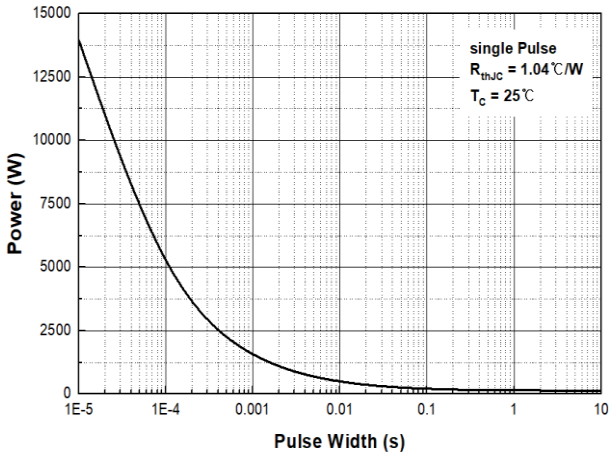
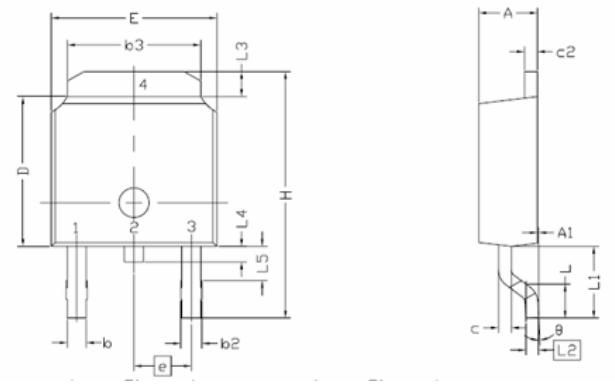


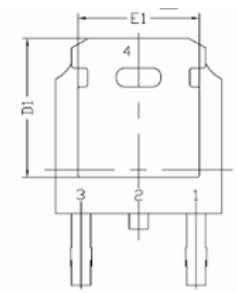
Fig.12 Single pulse maximum power dissipation

Physical dimension

TO-252

Dimensions are in millimeters, unless otherwise specified





Symbol	Min.	Nom.	Max.
E	6,35	-	6,73
L	1,40	1,52	1,78
L1		2,74 REF	
L2		0,508 BCS	
L3	0,89	-	1,27
L4	-	-	1,02
L5	1,14	-	1,52
D	5,97	6,10	6,22
H	9,40	-	10,41
b	0,64	-	0,89
b2	0,76	-	1,14
b3	4,95	-	5,46
e		2,286 BSC	
A	2,18	-	2,39
A1	-	-	0,13
c	0,46	-	0,61
c2	0,46	-	0,89
D1	5,21	-	-
E1	4,32	-	-
⊖	0,00	-	10,00

DISCLAIMER:

The Products are not designed for use in hostile environments, including, without limitation, aircraft, nuclear power generation, medical appliances, and devices or systems in which malfunction of any Product can reasonably be expected to result in a personal injury. Seller's customers using or selling Seller's products for use in such applications do so at their own risk and agree to fully defend and indemnify Seller.