

General Description

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

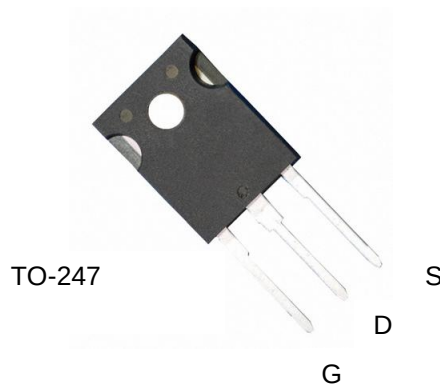
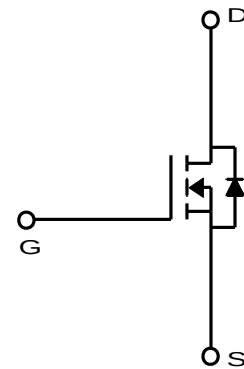
These devices are suitable device for SMPS, high Speed switching and general purpose applications.

Features

- $V_{DS} = 500V$
- $I_D = 16.5A$ @ $V_{GS} = 10V$
- $R_{DS(ON)} \leq 0.35\Omega$ @ $V_{GS} = 10V$

Applications

- Power Supply
- HID
- Lighting



Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	500	V
Gate-Source Voltage		V_{GSS}	±30	V
Continuous Drain Current	$T_C = 25^\circ C$	I_D	16.5	A
	$T_C = 100^\circ C$		10.4	A
Pulsed Drain Current ⁽¹⁾		I_{DM}	66	A
Power Dissipation	$T_C = 25^\circ C$	P_D	215	W
	Derate above 25 °C		1.64	W/°C
Repetitive Avalanche Energy ⁽¹⁾		E_{AR}	21.5	mJ
Peak Diode Recovery dv/dt ⁽³⁾		dv/dt	4.5	V/ns
Single Pulse Avalanche Energy ⁽⁴⁾		E_{AS}	780	mJ
Junction and Storage Temperature Range		T_J, T_{stg}	-55~150	°C

* I_D limited by maximum junction temperature

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient ⁽¹⁾	$R_{\theta JA}$	40	°C/W
Thermal Resistance, Junction-to-Case ⁽¹⁾	$R_{\theta JC}$	0.58	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDQ16N50GTP	-55~150°C	TO-247	Tube	Pb Free
MDQ16N50GTH	-55~150°C	TO-247	Tube	Halogen Free

Electrical Characteristics (Ta =25°C)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D = 250\mu A, V_{GS} = 0V$	500	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	3.0	-	5.0	V
Drain Cut-Off Current	I_{DSS}	$V_{DS} = 500V, V_{GS} = 0V$	-	-	1	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 30V, V_{DS} = 0V$	-	-	100	nA
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 8.3A$		0.30	0.35	Ω
Forward Transconductance	g_{fs}	$V_{DS} = 30V, I_D = 8.3A$	-	14.8	-	S
Dynamic Characteristics						
Total Gate Charge	Q_g	$V_{DS} = 400V, I_D = 16A, V_{GS} = 10V^{(3)}$	-	34.9	-	nC
Gate-Source Charge	Q_{gs}		-	12.4	-	
Gate-Drain Charge	Q_{gd}		-	14.2	-	
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz$	-	1724	-	pF
Reverse Transfer Capacitance	C_{rss}		-	8.3	-	
Output Capacitance	C_{oss}		-	226	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 250V, I_D = 16A, R_G = 25\Omega^{(3)}$	-	46	-	ns
Rise Time	t_r		-	88.5	-	
Turn-Off Delay Time	$t_{d(off)}$		-	96.5	-	
Fall Time	t_f		-	41	-	
Drain-Source Body Diode Characteristics						
Maximum Continuous Drain to Source Diode Forward Current	I_S	-	-	-	16.5	A
Source-Drain Diode Forward Voltage	V_{SD}	$I_S = 16.5A, V_{GS} = 0V$	-	-	1.4	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 16A, di/dt = 100A/\mu s^{(3)}$	-	325	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	3.34	-	μC

Notes :

1. Pulse width is based on $R_{\theta JC}$ & $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C.
2. Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ C$.
3. $I_{SD} \leq 16.0A$, $di/dt \leq 200A/\mu s$, $V_{DD} \leq BV_{DSS}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ C$
4. $L = 5.16mH$, $I_{AS} = 16.5A$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting $T_J = 25^\circ C$

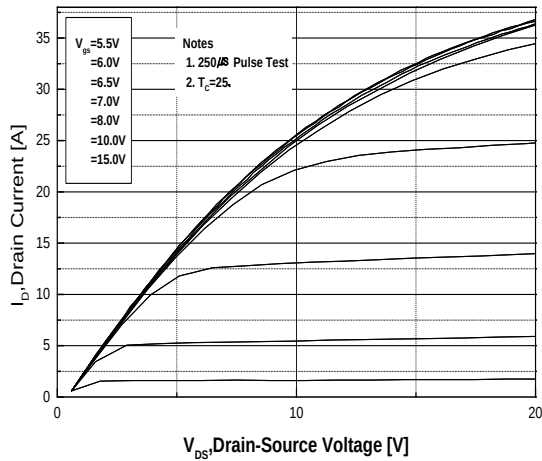


Fig.1 On-Region Characteristics

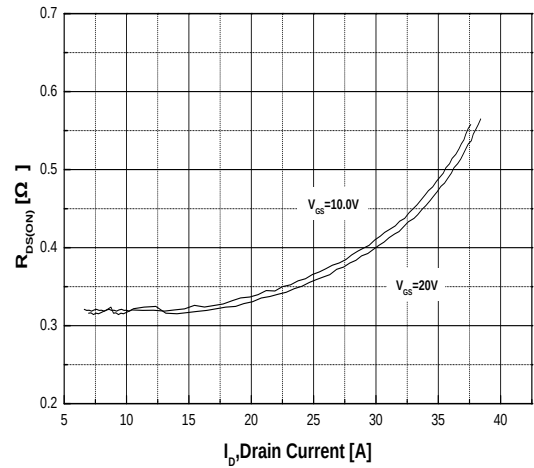


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

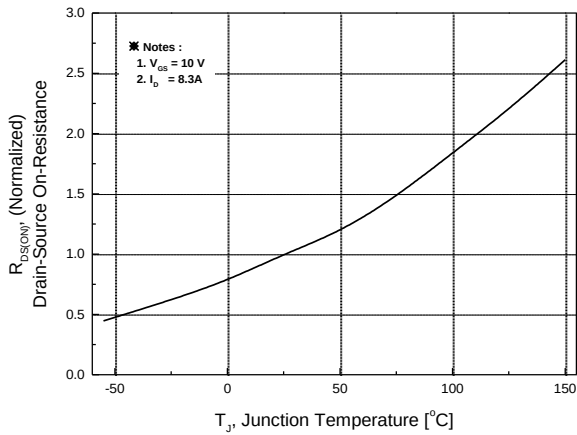


Fig.3 On-Resistance Variation with Temperature

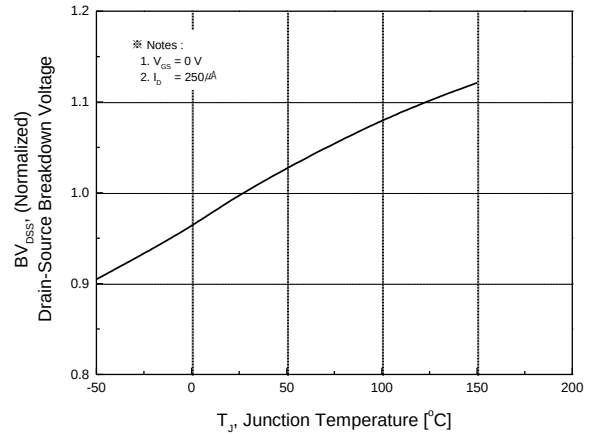


Fig.4 Breakdown Voltage Variation vs. Temperature

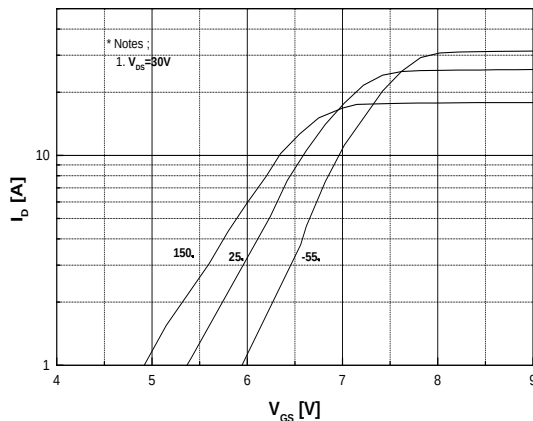


Fig.5 Transfer Characteristics

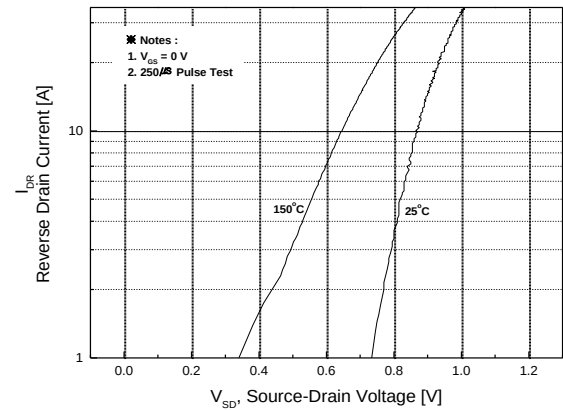
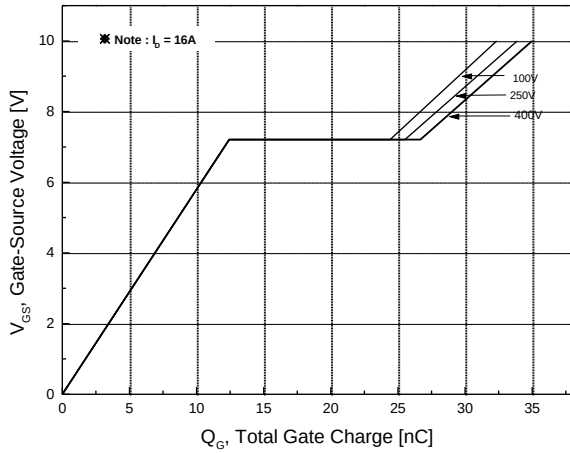
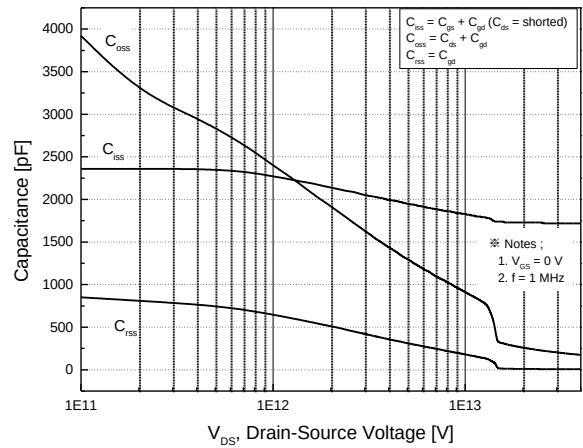
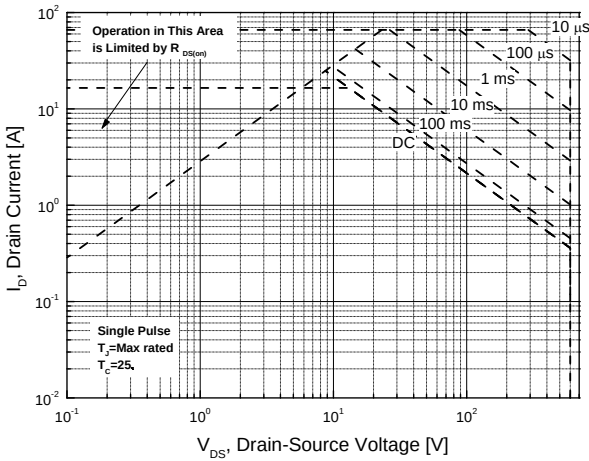
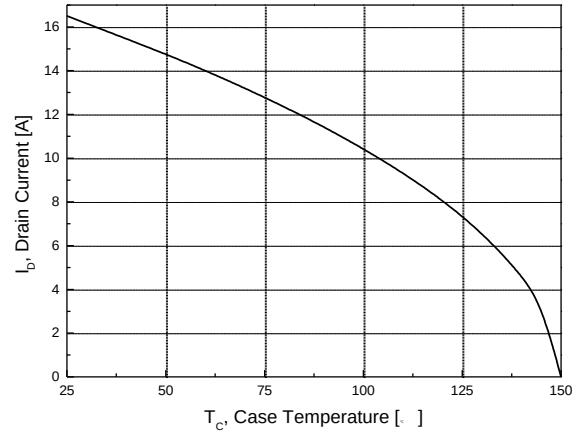
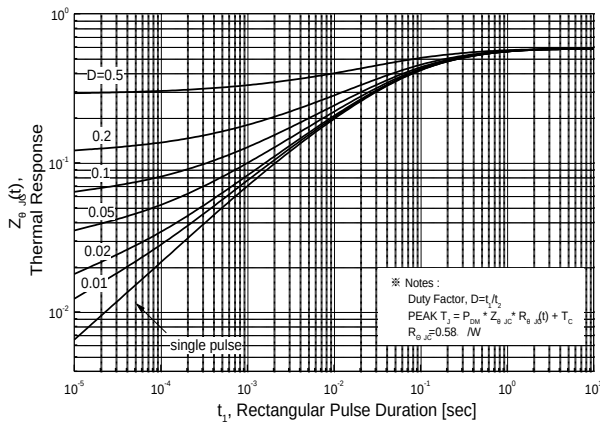
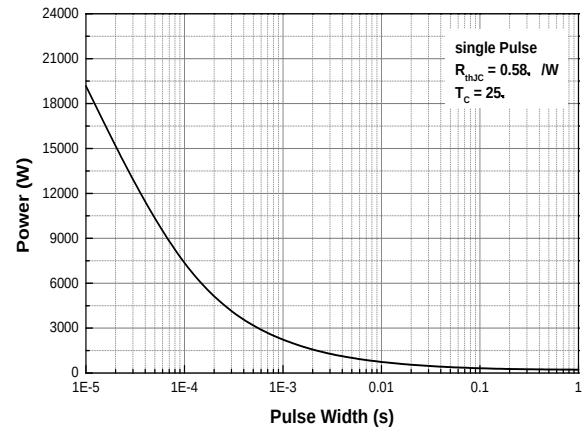


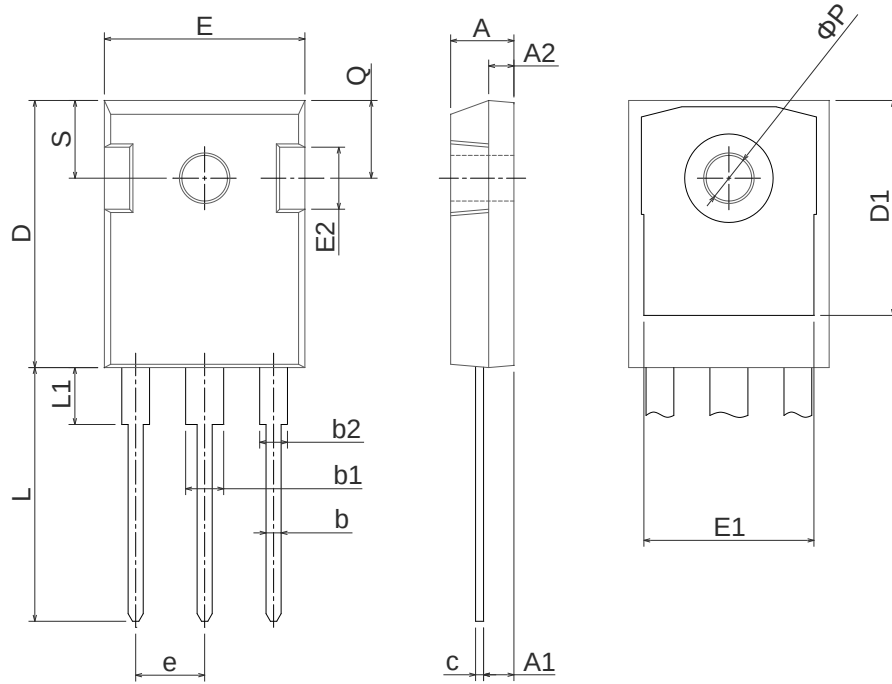
Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature



Physical Dimension

TO-247

Dimensions are in millimeters, unless otherwise specified



Dimension	Min(mm)	Max(mm)
A	4.70	5.31
A1	2.20	2.60
A2	1.50	2.49
b	0.99	1.40
b1	2.59	3.43
b2	1.65	2.39
c	0.38	0.89
D	20.30	21.46
D1	13.08	-
E	15.45	16.26
E1	13.06	14.02
E2	4.32	5.49
e	5.45BSC	
L	19.81	20.57
L1	-	4.50
ΦP	3.50	3.70
Q	5.38	6.20
S	6.15BSC	

DISCLAIMER:

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