

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.

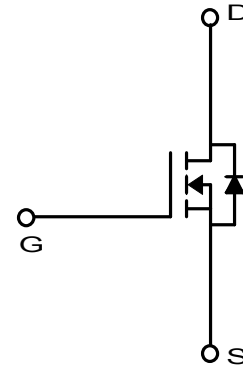
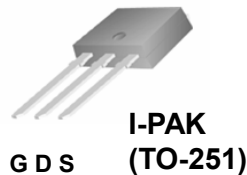
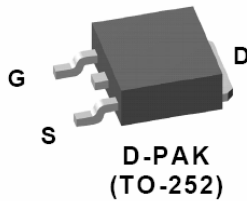
These devices are suitable device for SMPS, high Speed switching and general purpose applications.

Features

- $V_{DS} = 600V$
- $I_D = 1.9A$ @ $V_{GS} = 10V$
- $R_{DS(ON)} \leq 4.5\Omega$ @ $V_{GS} = 10V$

Applications

- Power Supply
- PFC
- High Current, High Speed Switching



Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit	
Drain-Source Voltage	V_{DSS}	600	V	
Gate-Source Voltage	V_{GSS}	±30	V	
Continuous Drain Current	I_D	$T_C=25^\circ C$	1.9	A
		$T_C=100^\circ C$	1.2	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	7.6	A	
Power Dissipation	P_D	$T_C=25^\circ C$	42	W
		Derate above 25 °C	0.34	W/°C
Repetitive Avalanche Energy ⁽¹⁾	E_{AR}	4.2	mJ	
Peak Diode Recovery dv/dt ⁽³⁾	dv/dt	4.5	V/ns	
Single Pulse Avalanche Energy ⁽⁴⁾	E_{AS}	115	mJ	
Junction and Storage Temperature Range	T_J, T_{stg}	-55~150	°C	

* Id limited by maximum junction temperature

Thermal Characteristics

Characteristics	Symbol	MDD2N60/MDI2N60	Unit
Thermal Resistance, Junction-to-Ambient ⁽¹⁾	$R_{\theta JA}$	110	°C/W
Thermal Resistance, Junction-to-Case ⁽¹⁾	$R_{\theta JC}$	2.98	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDD2N60RH	-55~150°C	D-pak	Reel	Halogen Free
MDI2N60TH	-55~150°C	I-pak	Tube	Halogen Free

Electrical Characteristics (Ta =25°C)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D = 250\mu A, V_{GS} = 0V$	600	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	3.0	-	5.0	
Drain Cut-Off Current	I_{DSS}	$V_{DS} = 600V, V_{GS} = 0V$	-	-	1	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 30V, V_{DS} = 0V$	-	-	100	nA
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 0.95A$		3.6	4.5	Ω
Forward Transconductance	g_{fs}	$V_{DS} = 30V, I_D = 1.0A$	-	0.5	-	S
Dynamic Characteristics						
Total Gate Charge	Q_g	$V_{DS} = 480V, I_D = 2.0A, V_{GS} = 10V^{(3)}$	-	6.7		nC
Gate-Source Charge	Q_{gs}		-	2.2		
Gate-Drain Charge	Q_{gd}		-	2.5		
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz$	-	275	360	pF
Reverse Transfer Capacitance	C_{rss}		-	1.4	2	
Output Capacitance	C_{oss}		-	32	40	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 300V, I_D = 2.0A, R_G = 25\Omega^{(3)}$	-	10.6		ns
Rise Time	t_r		-	29.6		
Turn-Off Delay Time	$t_{d(off)}$		-	40.4		
Fall Time	t_f		-	38.4		
Drain-Source Body Diode Characteristics						
Maximum Continuous Drain to Source Diode Forward Current	I_S		-	4.6	-	A
Source-Drain Diode Forward Voltage	V_{SD}	$I_S = 1.9A, V_{GS} = 0V$	-		1.4	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 2.0A, di/dt = 100A/\mu s^{(3)}$	-	206		ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	0.76		μC

Note :

- Pulse width is based on $R_{\theta JC}$ & $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C.
- Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ C$.
- $I_{SD} \leq 2.0A$, $di/dt \leq 200A/\mu s$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting $T_J = 25^\circ C$
- $L = 53mH$, $I_{AS} = 2.0A$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting $T_J = 25^\circ C$,

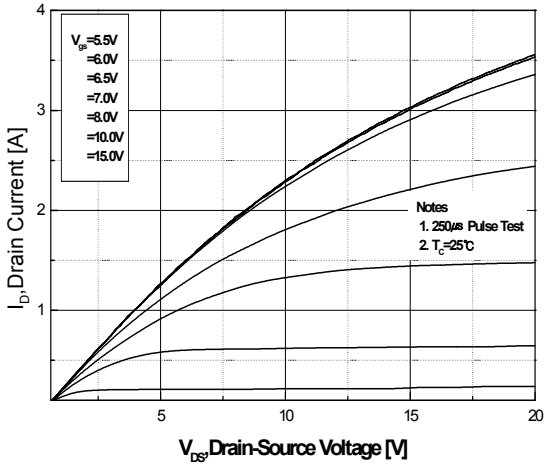


Fig.1 On-Region Characteristics

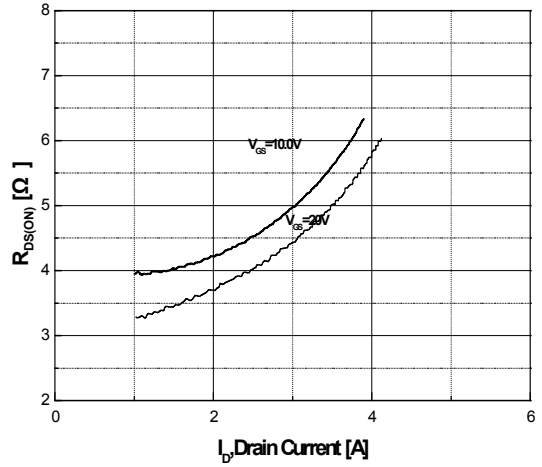


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

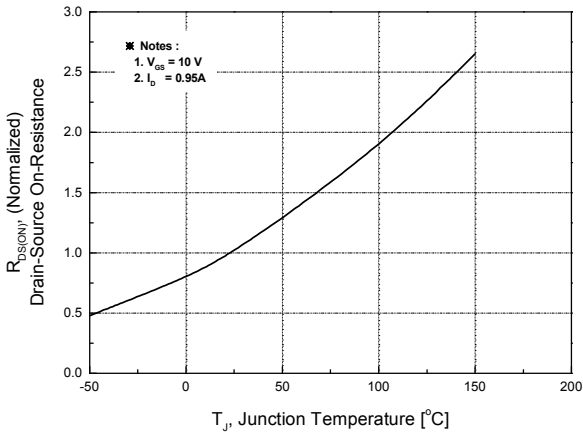


Fig.3 On-Resistance Variation with Temperature

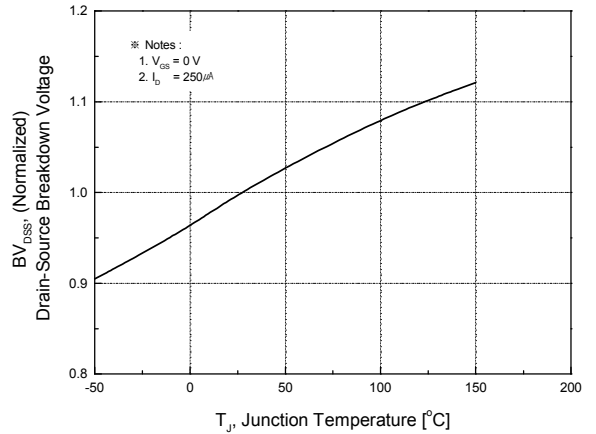


Fig.4 Breakdown Voltage Variation vs. Temperature

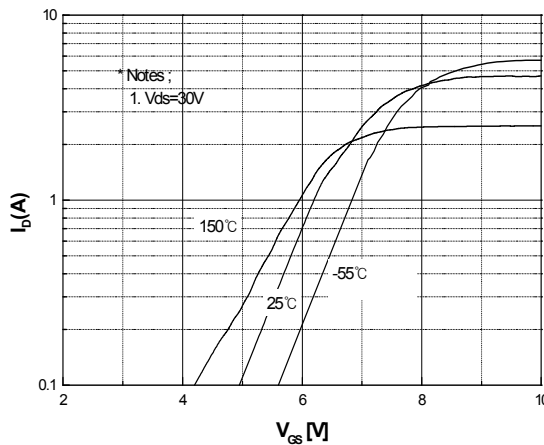


Fig.5 Transfer Characteristics

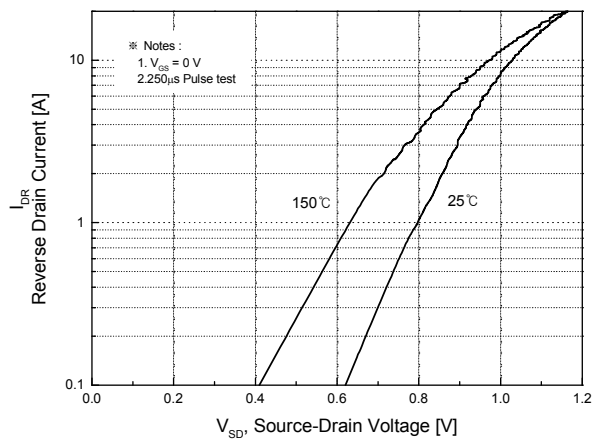
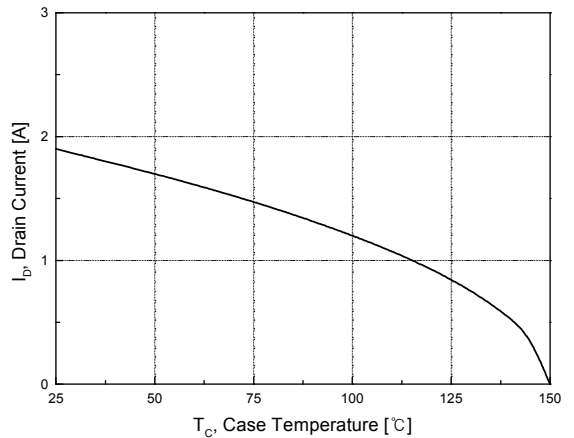
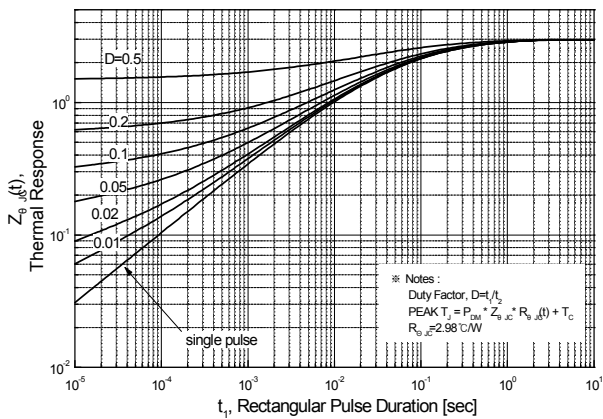
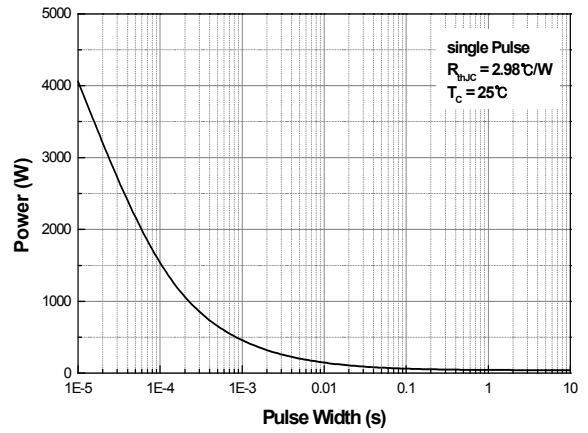
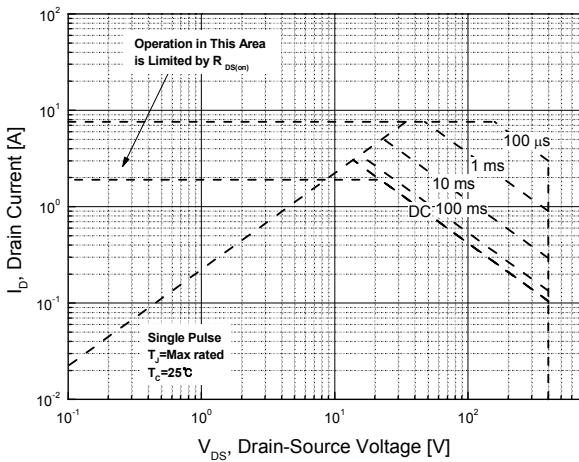
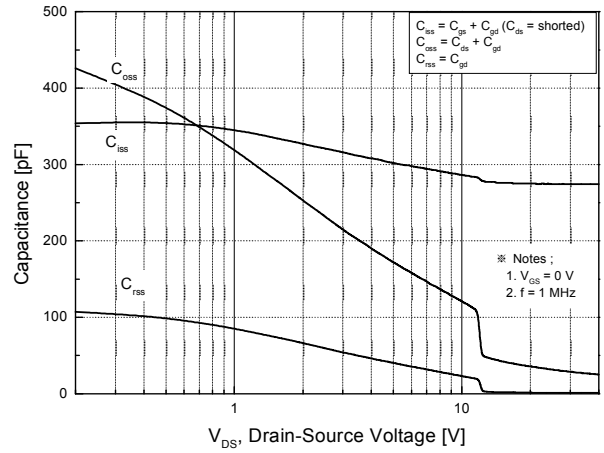
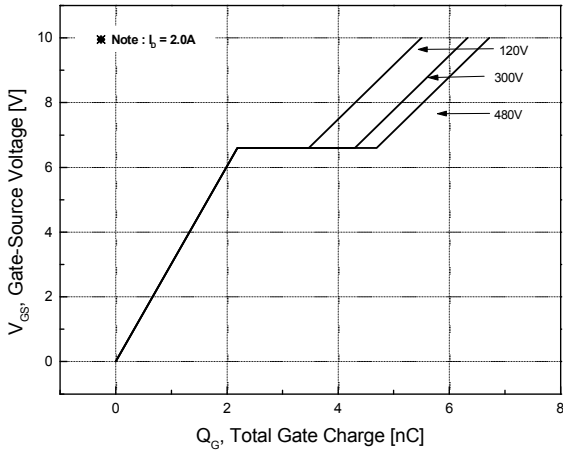


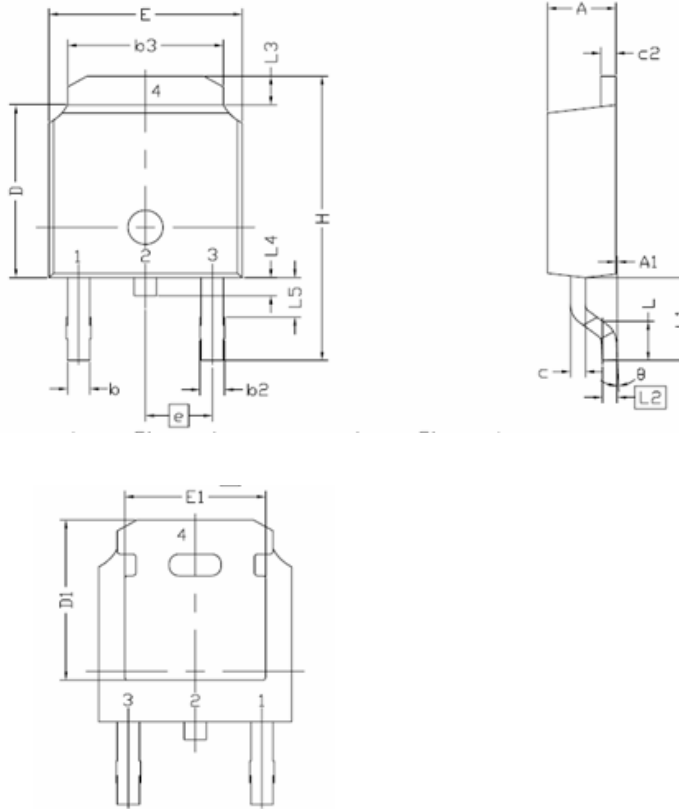
Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature



Physical Dimension

TO-252 (DPAK)

Dimensions are in millimeters, unless otherwise specified

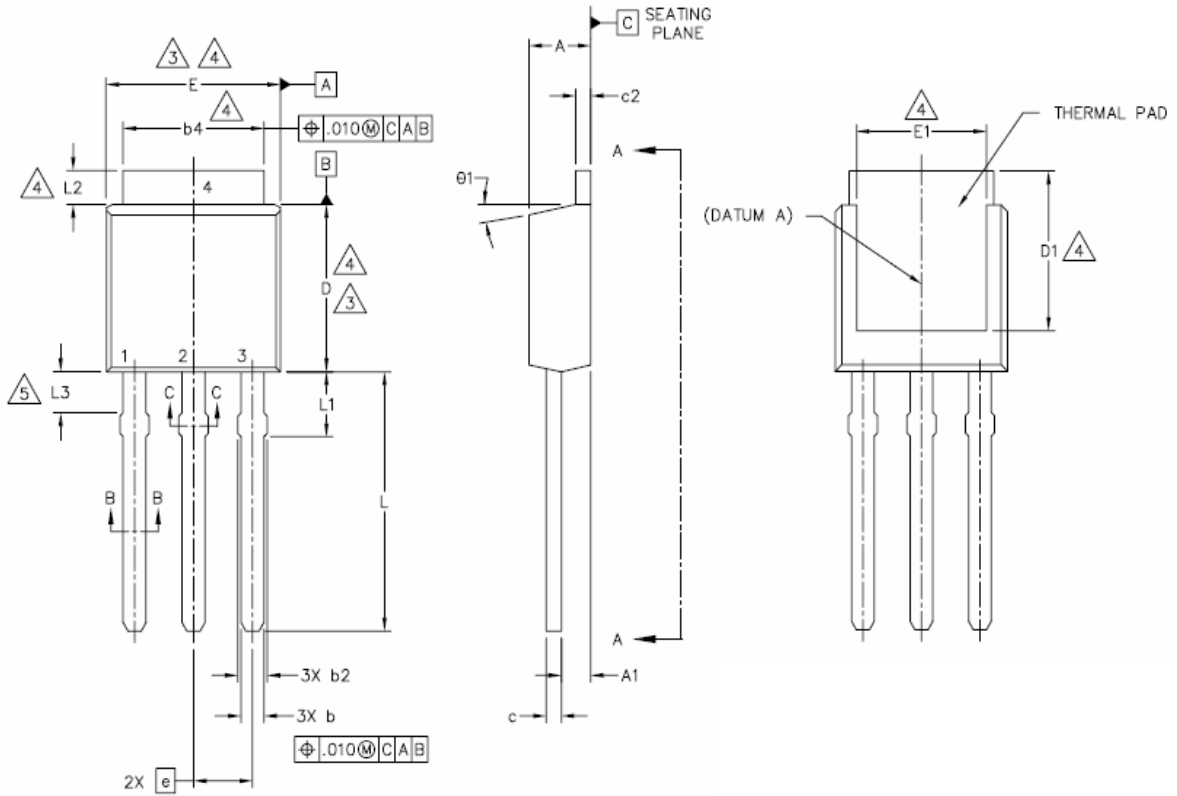


Symbol	Min.	Nom.	Max.
E	6.35	-	6.73
L	1.40	1.52	1.78
L1	2.74 REF		
L2	0.508 BCS		
L3	0.89	-	1.27
L4	-	-	1.02
L5	1.14	-	1.52
D	5.97	6.10	6.22
H	9.40	-	10.41
b	0.64	-	0.89
b2	0.76	-	1.14
b3	4.95	-	5.46
e	2.286 BSC		
A	2.18	-	2.39
A1	-	-	0.13
c	0.46	-	0.61
c2	0.46	-	0.89
D1	5.21	-	-
E1	4.32	-	-
⌀	0.00	-	10.00

Physical Dimension

TO251 (IPAK)

Dimensions are in millimeters, unless otherwise specified



SYMBOL	MIN	NOM	MAX
A	2.18	-	2.39
A1	0.89	-	1.14
b	0.64	-	0.89
b1	0.64	0.71	0.79
b2	0.76	-	1.14
b4	4.95	-	5.46
c	0.46	-	0.61
c2	0.46	-	0.89
D	5.97	6.10	6.22
D1	4.75	-	
E	6.35	-	6.73
E1	4.32	-	0.00
e	2.30 BSC		
L	8.89	-	9.65
L1	1.80	-	2.29
L2	0.70	-	1.27
L3	1.14	-	1.52

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