RoHS Compliant
HALOGEN-FREE

MagnaChip

MDI1N60S

N-Channel MOSFET 600V, 1.0A, 8.5Ω

General Description

The MDI1N60S uses advanced MagnaChip's MOSFET technology, which provides low on-state resistance, high switching performance and excellent quality.

MDI1N60S is suitable device for SMPS, compact ballast, battery charger and general purpose applications.

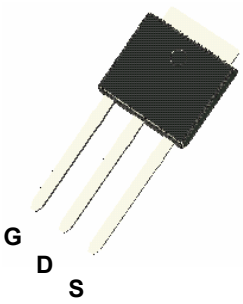
Features

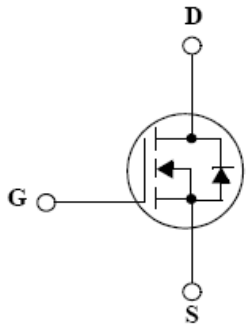
- V_{DS} = 600V
- I_D = 1.0A @V_{GS} = 10V
- $R_{DS(ON)}$ ≤ 8.5Ω @V_{GS} = 10V

Applications

- Power supply
- Battery charger
- Ballast

IPAK (Short lead)





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	T_C=25°C	I_D	1.0	A
	T_C=100°C		0.6	A
Pulsed Drain Current[1]		I_{DM}	4.0	A
Power Dissipation	T_C=25°C	P_D	28	W
	Derate above 25 °C		0.225	W/ °C
Peak Diode Recovery dv/dt[3]		Dv/dt	4.5	V/ns
Single Pulse Avalanche Energy[4]		E_{AS}	30	mJ
Junction and Storage Temperature Range		T_J, T_{stg}	-55~150	°C

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient[1]	$R_{\theta JA}$	110	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	4.45	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDI1N60STH	-55~150°C	I-Pak Short lead	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 = 250μA, V_{GS} = 0V	600	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	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} = ±30V, V_{DS} = 0V	-	-	100	nA
Drain-Source ON Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 0.5A		7.0	8.5	Ω
Forward Transconductance	g_{fs}	V_{DS} = 30V, I_D = 0.5A	-	0.75	-	S
Dynamic Characteristics						
Total Gate Charge	Q_g	V_{DS} = 600V, I_D = 1.0A, V_{GS} = 10V(3)	-	3.5		nC
Gate-Source Charge	Q_{gs}		-	1.4		
Gate-Drain Charge	Q_{gd}		-	1.4		
Input Capacitance	C_{iss}	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	-	130		pF
Reverse Transfer Capacitance	C_{rss}		-	18.5		
Output Capacitance	C_{oss}		-	1.0		
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = 10V, V_{DS} = 300V, I_D = 1.0A, R_G = 25Ω(3)	-	7.5		ns
Rise Time	t_r		-	17		
Turn-Off Delay Time	$t_{d(off)}$		-	8.5		
Fall Time	t_f		-	22		
Drain-Source Body Diode Characteristics						
Maximum Continuous Drain to Source Diode Forward Current	I_S		-	0.4	-	A
Source-Drain Diode Forward Voltage	V_{SD}	I_S = 1.0A, V_{GS} = 0V	-		1.4	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = 1.0A, dI/dt = 100A/μs(3)	-	200		ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	480		μC

Note :

1. $R_{\theta JL}$ point is the drain lead.
2. Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%, pulse width limited by junction temperature T_J(MAX) = 150°C
3. I_{SD} ≤ 1.0A, di/dt ≤ 200A/us, V_{DD} = 50V, R_g = 25Ω, Starting T_J = 25°C
4. L = 55mH, I_{AS} = 1.0A, V_{DD} = 50V, R_g = 25Ω, Starting T_J = 25°C

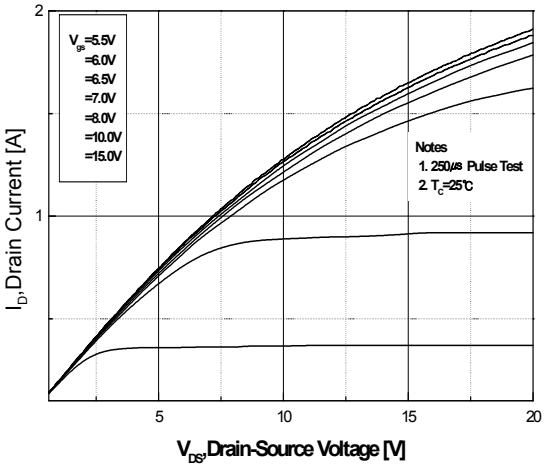


Fig.1 On-Region Characteristics

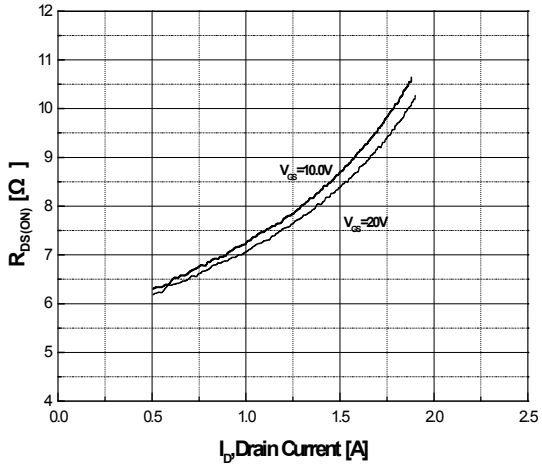


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

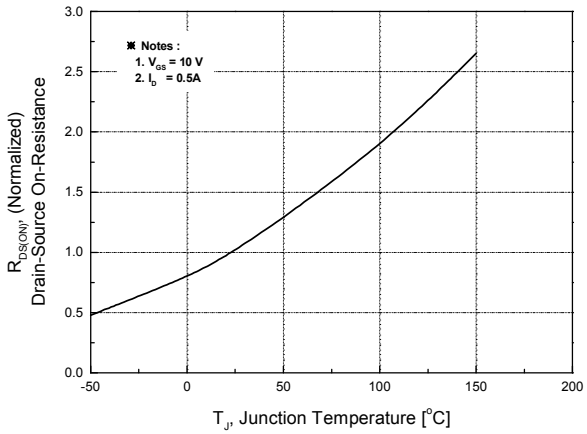


Fig.3 On-Resistance Variation with Temperature

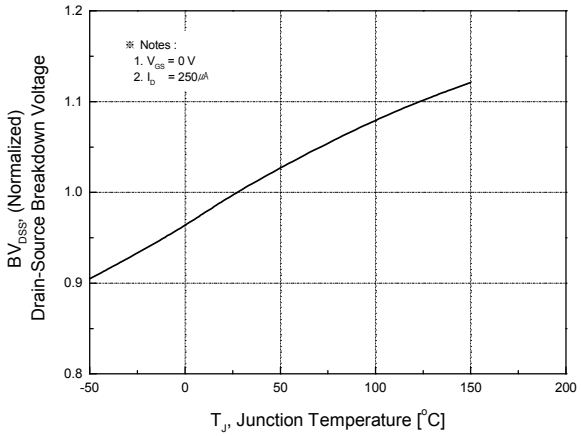


Fig.4 Breakdown Voltage Variation vs. Temperature

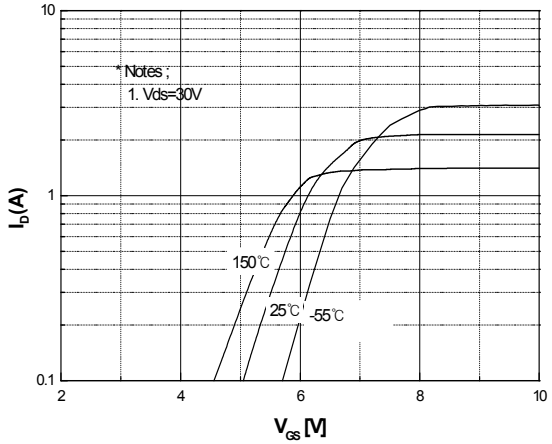


Fig.5 Transfer Characteristics

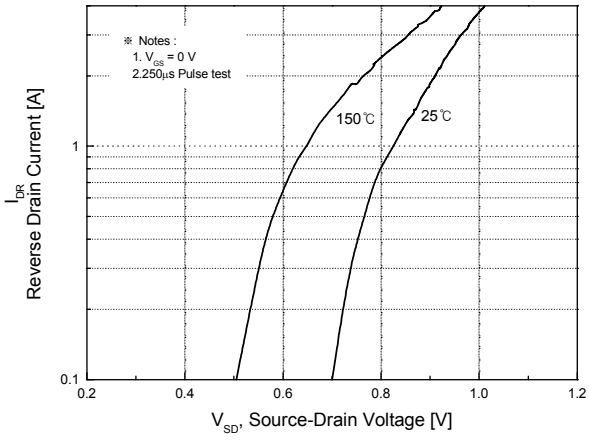


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

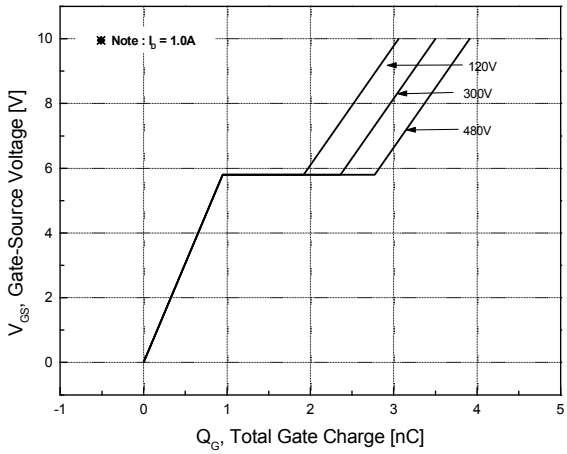


Fig.7 Gate Charge Characteristics

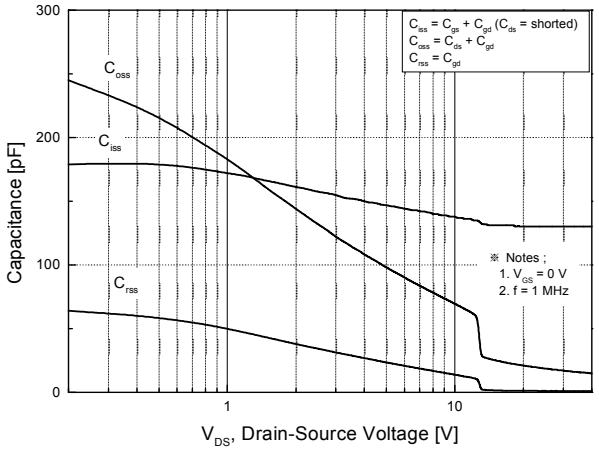


Fig.8 Capacitance Characteristics

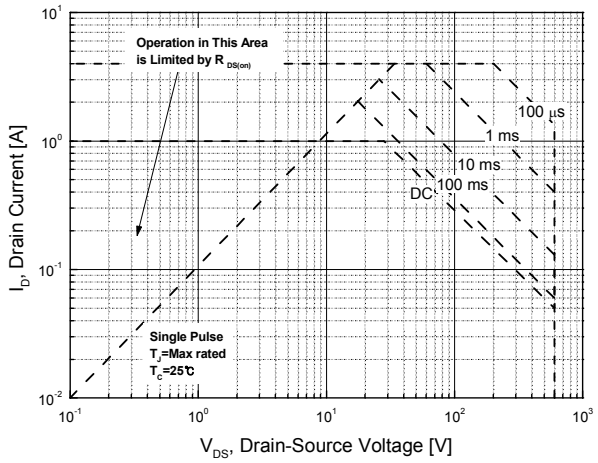


Fig.9 Maximum Safe Operating Area

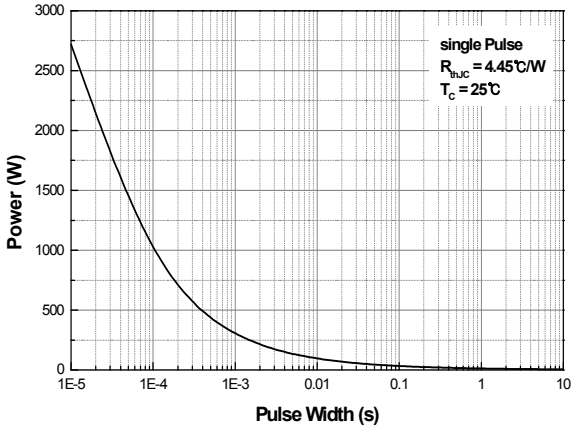


Fig.10 Single Pulse Maximum Power Dissipation

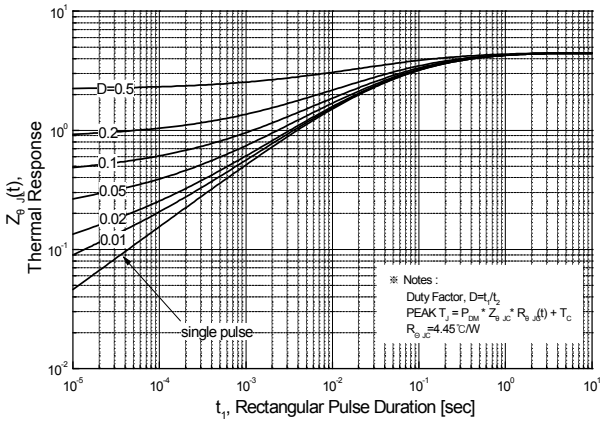


Fig.11 Transient Thermal Response Curve

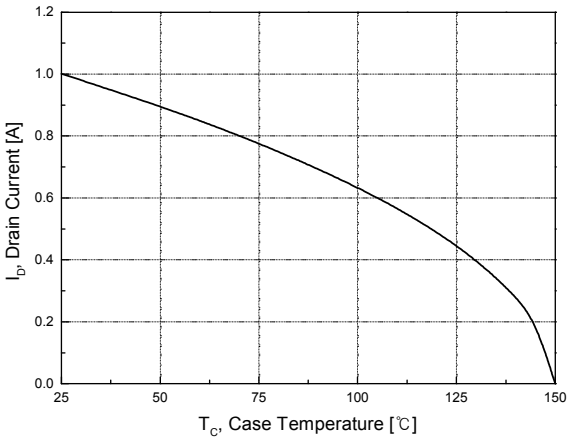
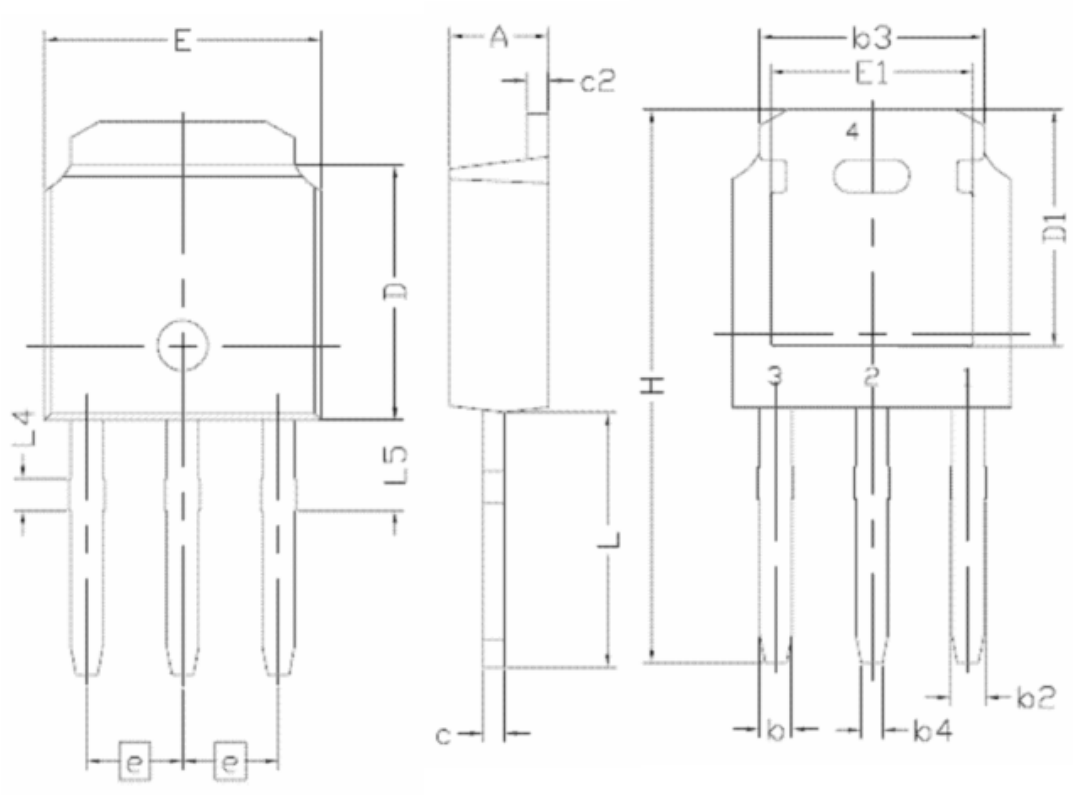


Fig.12 Maximum Drain Current vs. Case Temperature

Physical Dimensions

IPAK (Short Lead)

Dimensions are in millimeters unless otherwise specified



SYMBOL	DIMENSIONAL REQMTS		
	MIN	NOM	MAX
E	6.40	6.60	6.731
L	5.88	6.08	6.28
L4	0.66	0.76	0.86
L5	1.96	2.16	2.36
D	6.00	6.10	6.223
H	12.90	13.20	13.50
b	0.64	0.76	0.88
b2	0.77	0.84	1.14
b3	5.21	5.34	5.46
b4	0.41	0.51	0.61
e	2.286 BSC		
A	2.20	2.30	2.38
c	0.40	0.50	0.60
c2	0.40	0.50	0.60
D1	5.30	--	--
E1	4.40	--	--

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