RoHS Compliant

MagnaChip

MDV1523

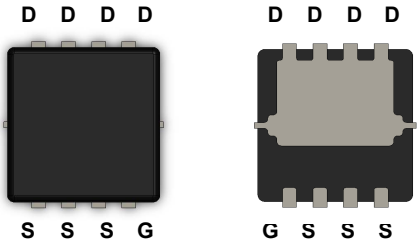
Single N-channel Trench MOSFET 30V, 24A, 6.1mΩ

General Description

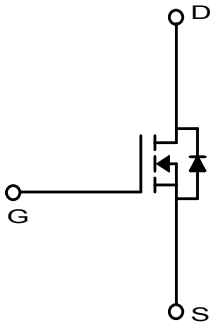
The MDV1523 uses advanced MagnaChip's MOSFET Technology, which provides high performance in on-state resistance, fast switching performance and excellent quality. MDV1523 is suitable for DC/DC converter and general purpose applications.

Features

- V_{DS} = 30V
- I_D = 24A @V_{GS} = 10V
- $R_{DS(ON)}$
  < 6.1mΩ @V_{GS} = 10V
  < 8.4mΩ @V_{GS} = 4.5V
- 100% UIL Tested
- 100% Rg Tested



PDFN33



Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current [1]	T_C=25°C (Silicon limited)	I_D	50.3	A
	T_C=25°C (Package limited)		24	
	T_C=70°C		24	
	T_A=25°C		17.8[3]	
	T_A=70°C		14.3[3]	
Pulsed Drain Current		I_{DM}	60	A
Power Dissipation	T_C=25°C	P_D	27.1	W
	T_C=70°C		17.3	
	T_A=25°C		3.4[3]	
	T_A=70°C		2.2[3]	
Single Pulse Avalanche Energy [2]		E_{AS}	112	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]	$R_{\theta JA}$	36	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	4.6	

Ordering Information

Part Number	Temp. Range	Package	Packing	Quantity	Rohs Status
MDV1523URH	-55~150°C	PowerDFN33	Tape & Reel	5000 units	Halogen Free

Electrical Characteristics (T_J = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D = 250μA, V_{GS} = 0V	30	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.3	1.8	2.7	
Drain Cut-Off Current	I_{DSS}	V_{DS} = 30V, V_{GS} = 0V	-	-	1	μA
		T_J=55°C	-	-	5	
Gate Leakage Current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V	-	-	±0.1	
Drain-Source ON Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 14A	-	5.3	6.1	mΩ
		T_J=125°C	-	7.7	8.8	
		V_{GS} = 4.5V, I_D = 12A	-	7.0	8.4	
Forward Transconductance	g_{fs}	V_{DS} = 5V, I_D = 14A	-	28.1	-	S
Dynamic Characteristics						
Total Gate Charge	$Q_{g(10V)}$	V_{DS} = 15.0V, I_D = 14A, V_{GS} = 10V	17.9	25.5	33.2	nC
Total Gate Charge	$Q_{g(4.5V)}$		8.4	12.1	15.7	
Gate-Source Charge	Q_{gs}		-	4.7	-	
Gate-Drain Charge	Q_{gd}		-	3.6	-	
Input Capacitance	C_{iss}	V_{DS} = 15.0V, V_{GS} = 0V, f = 1.0MHz	1109	1584	2059	pF
Reverse Transfer Capacitance	C_{rss}		110	157	204	
Output Capacitance	C_{oss}		219	312	406	
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = 10V, V_{DS} = 15.0V, I_D = 14A, R_G = 3.0Ω	-	8.8	-	ns
Rise Time	t_r		-	11.9	-	
Turn-Off Delay Time	$t_{d(off)}$		-	35.8	-	
Fall Time	t_f		-	9.8	-	
Gate Resistance	R_g	f=1 MHz	0.5	1.3	3.0	Ω
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V_{SD}	I_S = 14A, V_{GS} = 0V	-	0.81	1.1	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = 14A, dI/dt = 100A/μs	-	27.3	41.0	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	18.1	27.1	nC

Note :

1. Surface mounted FR-4 board by JEDEC (jesd51-7)
2. E_{AS} is tested at starting Tj = 25℃, L = 0.1mH, I_{AS} = 26A, V_{DD} = 27V, V_{GS} = 10V
3. T < 10sec

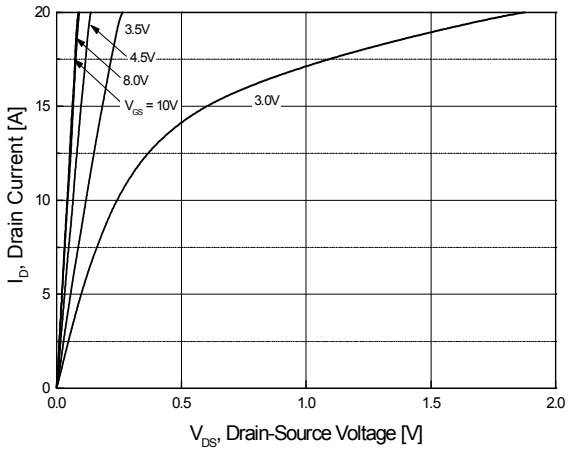


Fig.1 On-Region Characteristics

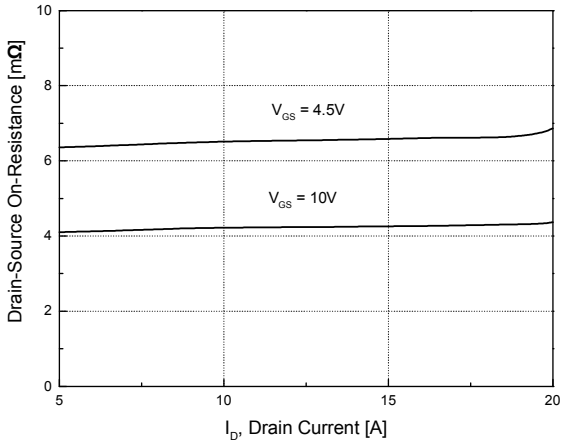


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

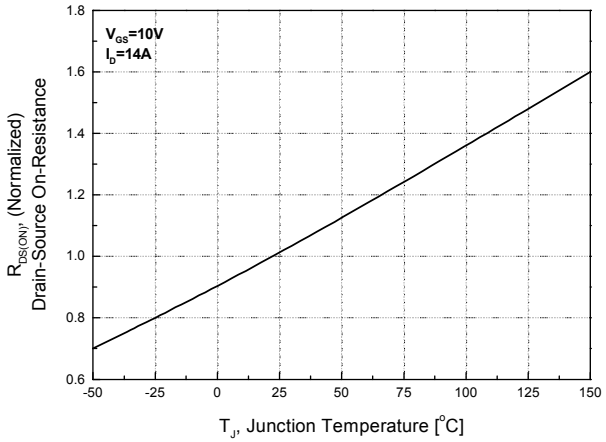


Fig.3 On-Resistance Variation with Temperature

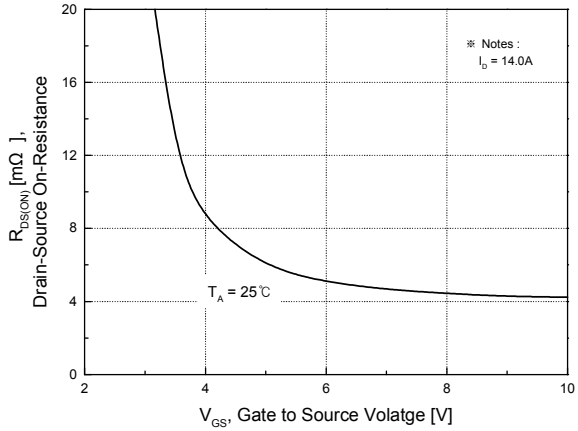


Fig.4 On-Resistance Variation with Gate to Source Voltage

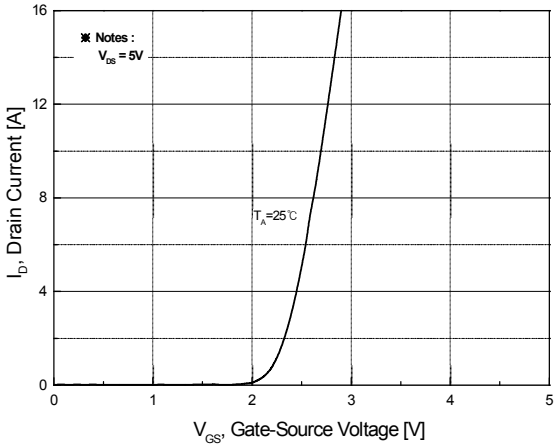


Fig.5 Transfer Characteristics

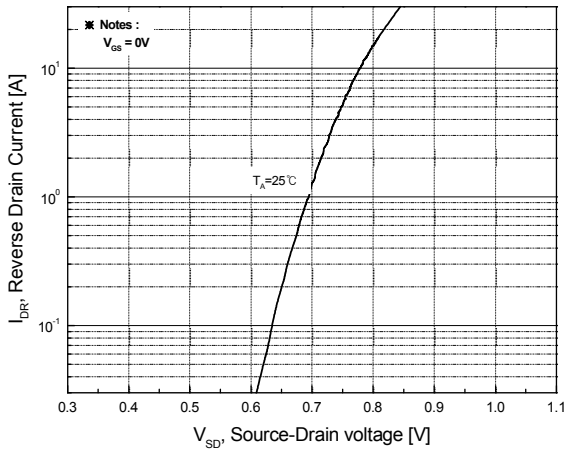


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

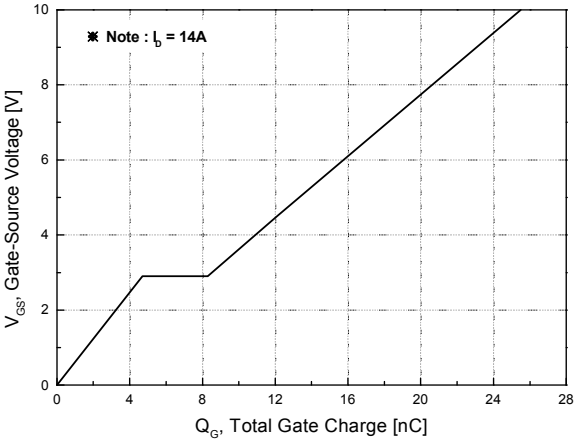


Fig.7 Gate Charge Characteristics

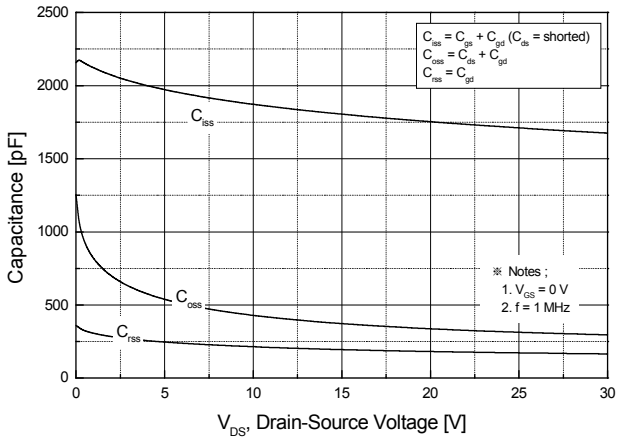


Fig.8 Capacitance Characteristics

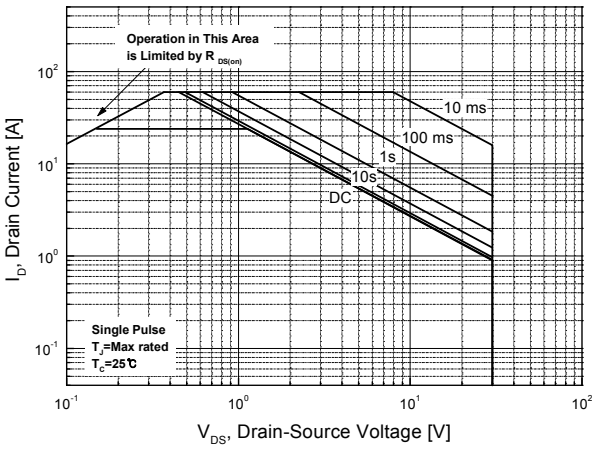


Fig.9 Maximum Safe Operating Area

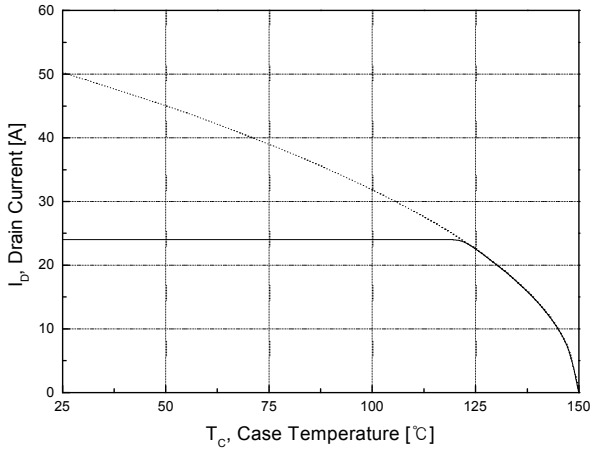


Fig.10 Maximum Drain Current vs. Case Temperature

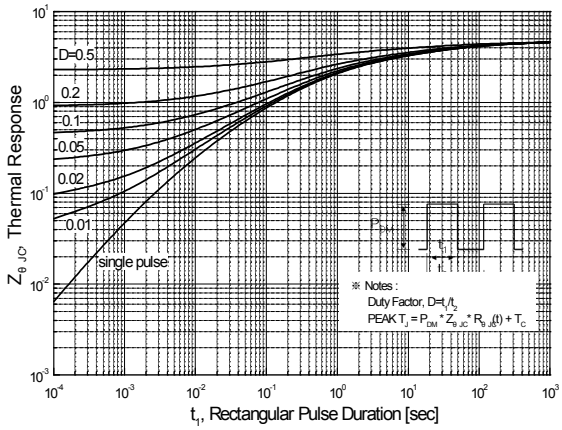
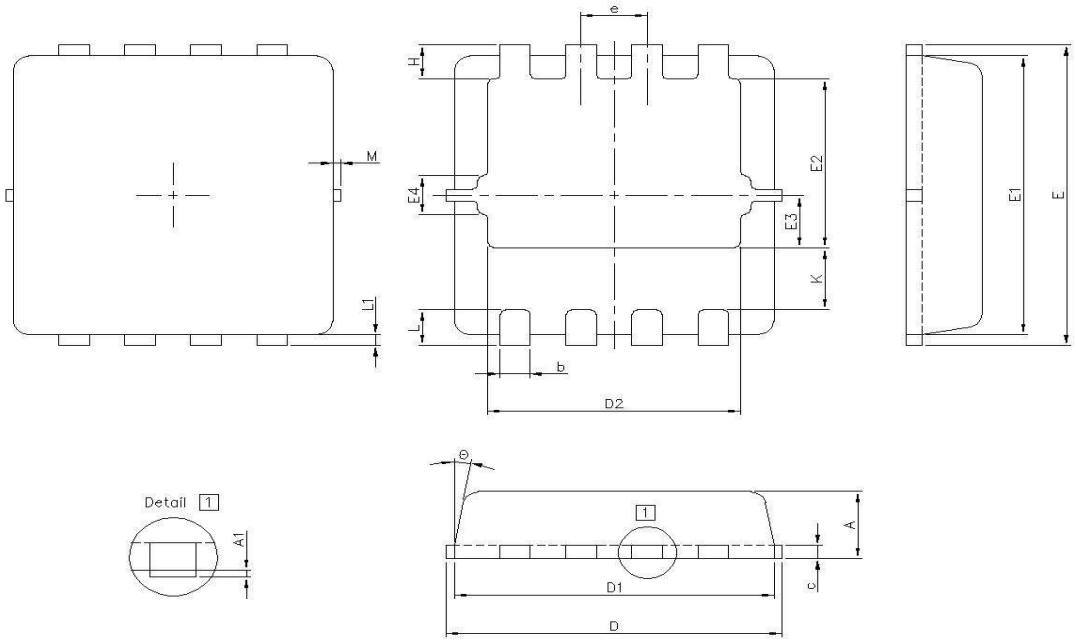


Fig.11 Transient Thermal Response Curve

Package Dimension

PowerDFN33 (3.3x3.3mm)

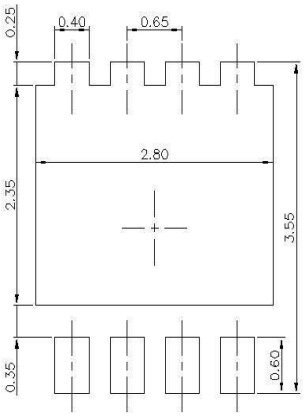
Dimensions are in millimeters, unless otherwise specified



(Unit: mm)

DIM	Min	Max	DIM	Min	Max
A	0.70	0.80	E2	1.78	1.98
A1	0.00	0.05	E3	0.49	0.69
b	0.25	0.35	E4	0.35 TYP.	
c	0.10	0.25	e	0.65 BSC	
D	3.20	3.40	K	0.70 TYP.	
D1	3.00	3.20	L	0.30	0.50
D2	2.39	2.59	L1	0.13 TYP.	
E	3.25	3.45	H	0.27	0.47
E1	3.00	3.20	Θ	0	12

Land Pattern
(Only for Reference)



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