

MDS1652E

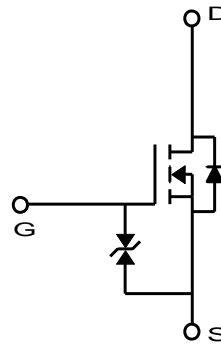
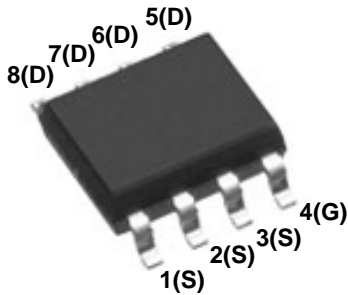
Single N-channel Trench MOSFET 30V, 16A, 5.0mΩ

General Description

The MDS1652E uses advanced MagnaChip's MOSFET Technology, which provides high performance in on-state resistance, fast switching performance and excellent quality. Excellent low $R_{DS(ON)}$, low gate charge and operation for Battery Applications.

Features

- $V_{DS} = 30V$
- $I_D = 16A @ V_{GS} = 10V$
- $R_{DS(ON)(MAX)} < 5.0m\Omega @ V_{GS} = 10V$
- $< 8.5m\Omega @ V_{GS} = 4.5V$



Absolute Maximum Ratings ($T_a = 25^\circ C$)

Characteristics	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	30	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current ⁽¹⁾	I_D	$T_A=25^\circ C$	16
		$T_A=100^\circ C$	10
Pulsed Drain Current	I_{DM}	60	A
Power Dissipation	P_D	$T_A=25^\circ C$	2.5
		$T_A=100^\circ C$	1.0
Single Pulse Avalanche Energy ⁽²⁾	E_{AS}	112	mJ
Junction and Storage Temperature Range	T_J, T_{stg}	-55~150	$^\circ C$

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient ⁽¹⁾	$R_{\theta JA}$	50	$^\circ C/W$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	25	

Ordering Information

Part Number	Temp. Range	Package	Packing	Rohs Status
MDS1652EURH	-55~150°C	SOIC-8	Tape & Reel	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	1.0	2.2	3.0	
Drain Cut-Off Current	I _{DSS}	V _{DS} = 30V, V _{GS} = 0V	-	-	1	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±16V, V _{DS} = 0V	-	-	±10	
Drain-Source ON Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 10A	-	4.2	5.0	mΩ
		T _J =125°C	-	7.0	8.1	
		V _{GS} = 4.5V, I _D = 10A	-	7.2	8.5	
Forward Transconductance	g _{fs}	V _{DS} = 6.5V, I _D = 10A	-	38	-	S
Dynamic Characteristics						
Total Gate Charge	Q _{g(10V)}	V _{DS} = 15V, I _D = 10A, V _{GS} = 10V	21.7	31.0	40.3	nC
	Q _{g(4.5V)}		10.3	14.8	19.2	
Gate-Source Charge	Q _{gs}		-	5.4	-	
Gate-Drain Charge	Q _{gd}		-	5.5	-	
Input Capacitance	C _{iss}	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz	2642	1850	2405	pF
Reverse Transfer Capacitance	C _{rss}		108	155	201	
Output Capacitance	C _{oss}		294	420	546	
Turn-On Delay Time	t _{d(on)}	V _{GS} = 10V, V _{DS} = 15V, I _D = 10A, R _G = 4.7Ω	-	7.1	-	ns
Rise Time	t _r		-	4.2	-	
Turn-Off Delay Time	t _{d(off)}		-	210.8	-	
Fall Time	t _f		-	134.7	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V _{SD}	I _S = 10A, V _{GS} = 0V	-	0.7	1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 10A, di/dt = 100A/μs	-	29.5	44.2	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	21.5	32.2	nC

Note :

- Surface mounted FR-4 board with 2oz. Copper. Continuous current at T_C=25°C is silicon limited
- Testing, T_J = 25°C, L = 1mH, V_{DD} = 15V, V_{GS} = 10V

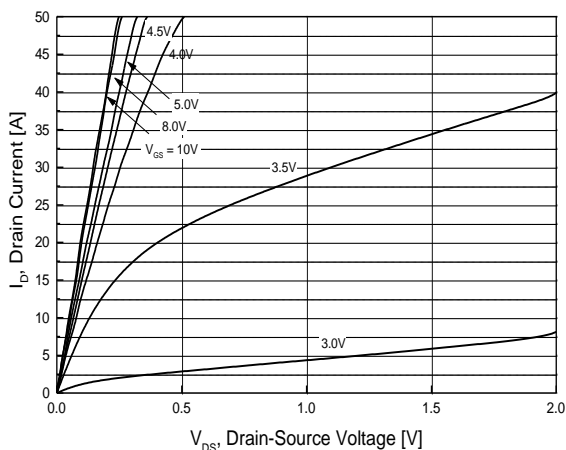


Fig.1 On-Region Characteristics

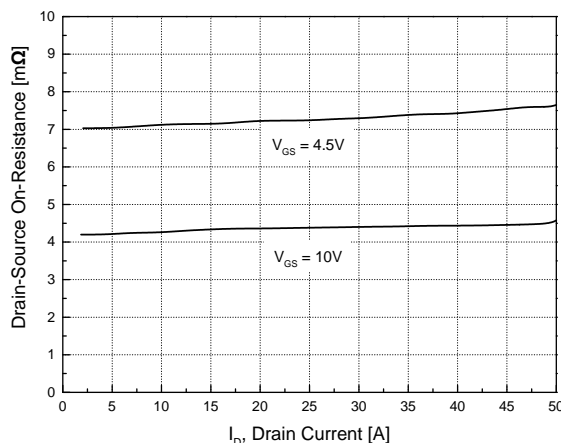


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

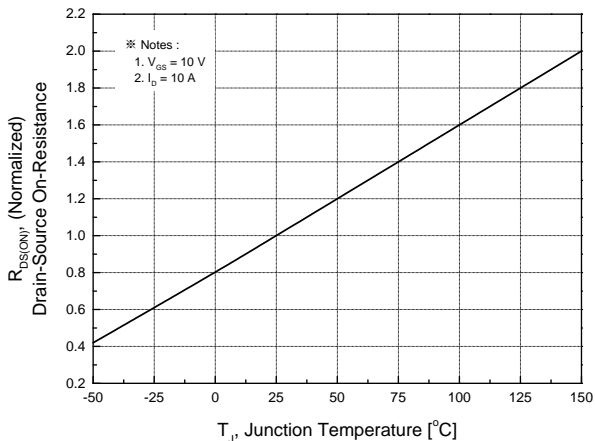


Fig.3 On-Resistance Variation with Temperature

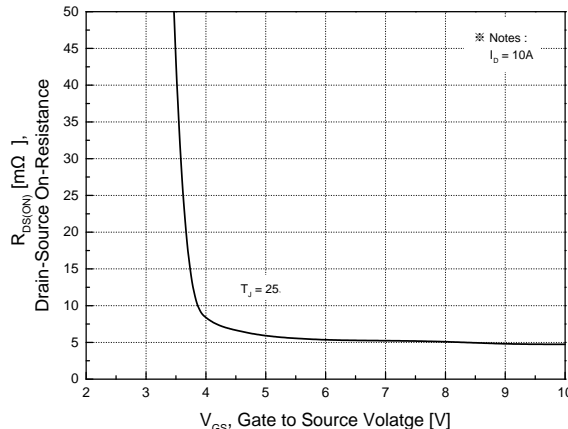


Fig.4 On-Resistance Variation with Gate to Source Voltage

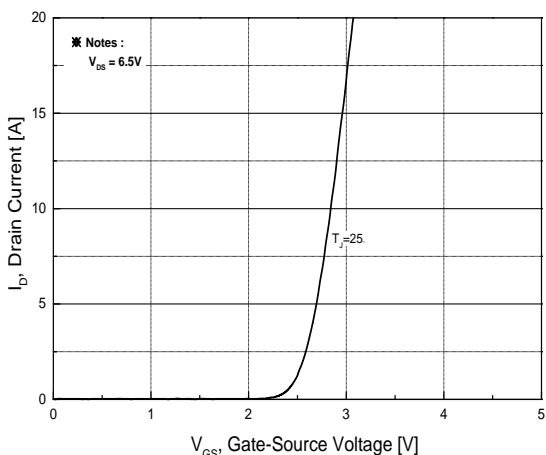


Fig.5 Transfer Characteristics

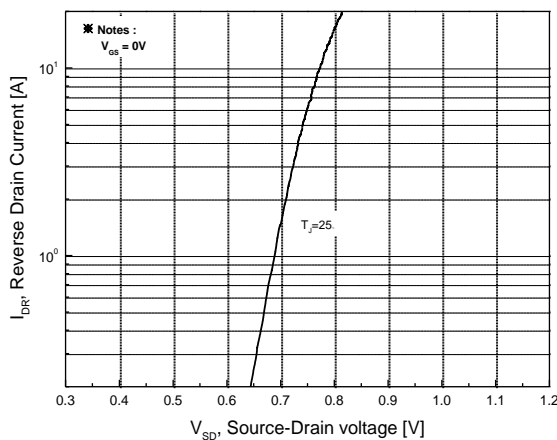


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

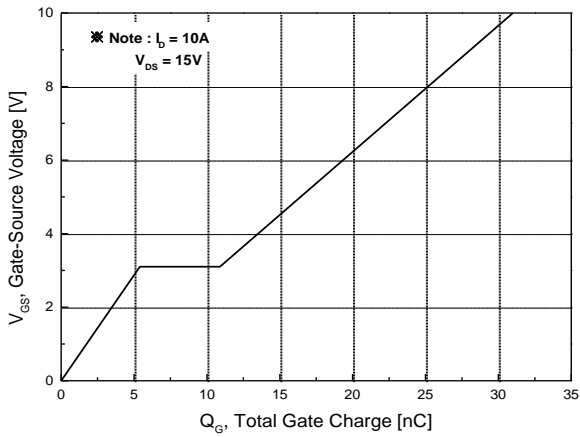


Fig.7 Gate Charge Characteristics

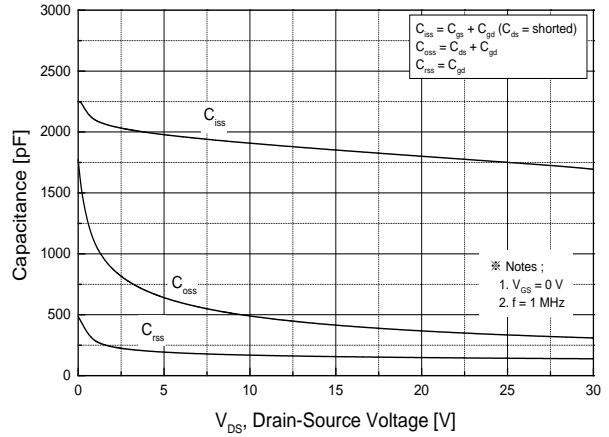


Fig.8 Capacitance Characteristics

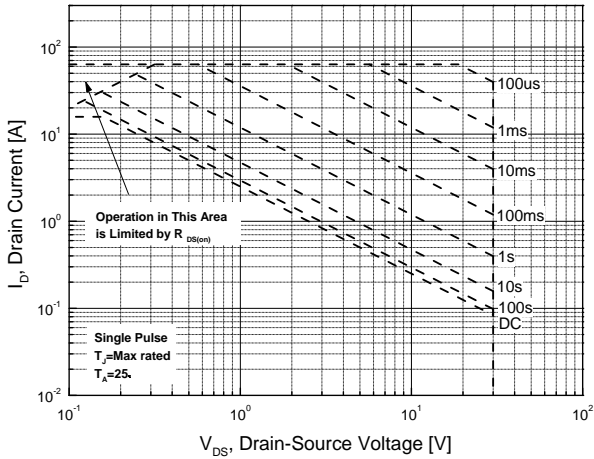


Fig.9 Maximum Safe Operating Area

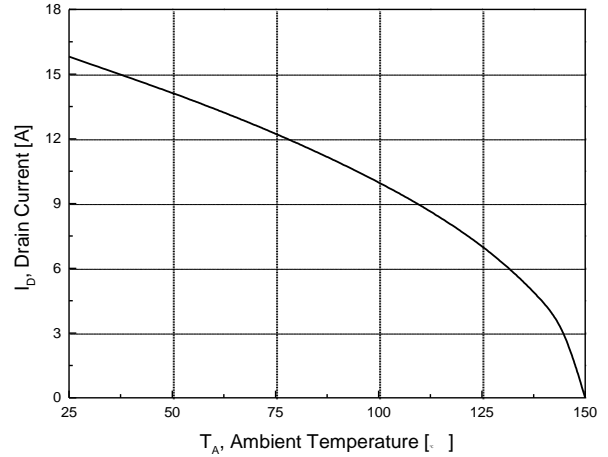


Fig.10 Maximum Drain Current vs. Ambient Temperature

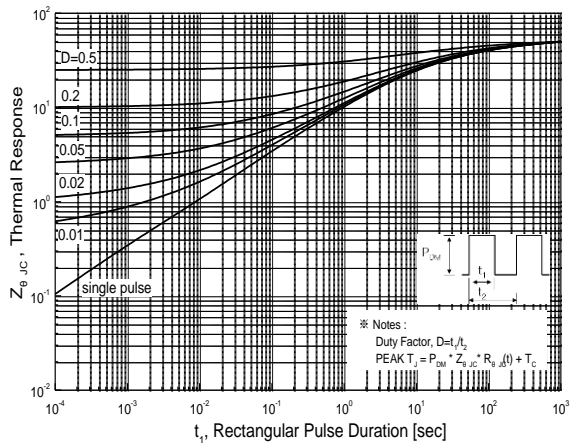
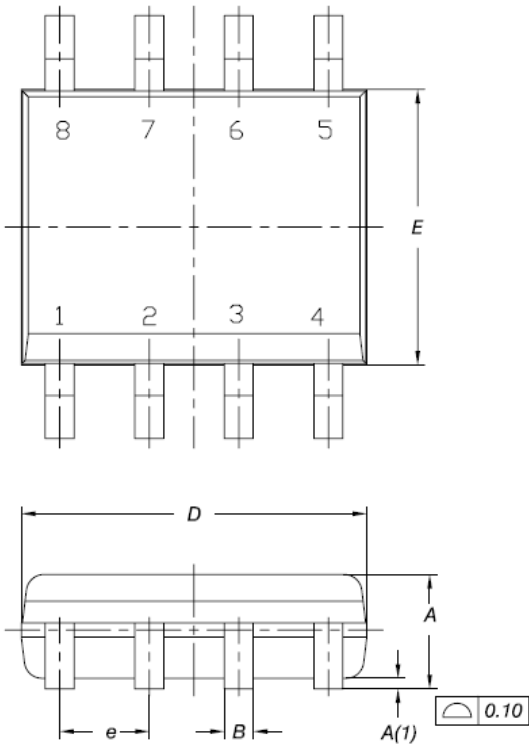


Fig.11 Transient Thermal Response Curve

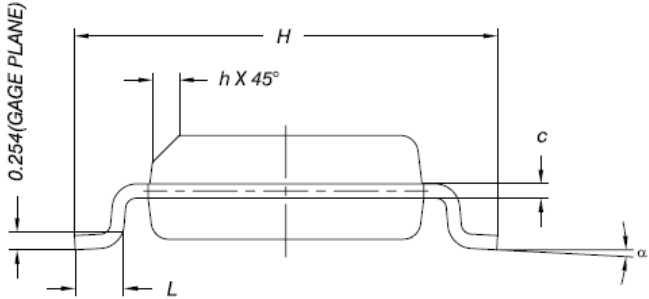
Package Dimension

8 Leads, SOIC

Dimensions are in millimeters, unless otherwise specified



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	1.35	1.55	1.75
A(1)	0.10	0.175	0.25
B	0.38	0.445	0.51
C	0.19	0.22	0.25
D	4.80	4.90	5.00
E	3.80	3.90	4.00
e	1.27 BSC		
H	5.80	6.00	6.20
L	0.50	0.715	0.93
α	0°	4°	8°
h	0.25	0.375	0.50



DISCLAIMER:

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