

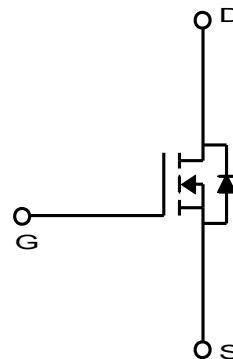
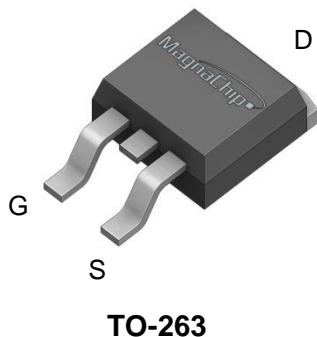
## General Description

The MDE1991 uses advanced MagnaChip's MV MOSFET Technology, which provides high performance in on-state resistance, fast switching performance, and excellent quality.

These devices can also be utilized in industrial applications such as Low Power Drives of E-bike (E-Vehicles), DC/DC converter, and general purpose applications.

## Features

- $V_{DS} = 80V$
- $I_D = 120A @ V_{GS} = 10V$
- $R_{DS(ON)} < 3.4 \text{ m}\Omega @ V_{GS} = 10V$
- 100% UIL Tested



## Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DSS}$	80	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current <sup>(1)</sup>	$I_D$	175	A
$T_C=25^\circ\text{C}$ (Silicon Limited)		120	
$T_C=100^\circ\text{C}$		110	
Pulsed Drain Current	$I_{DM}$	480	
Power Dissipation	$P_D$	209	W
$T_C=100^\circ\text{C}$		84	
Single Pulse Avalanche Energy <sup>(2)</sup>	$E_{AS}$	312.5	mJ
Junction and Storage Temperature Range	$T_J, T_{stg}$	-55~150	°C

## Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient <sup>(1)</sup>	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.6	

## Ordering Information

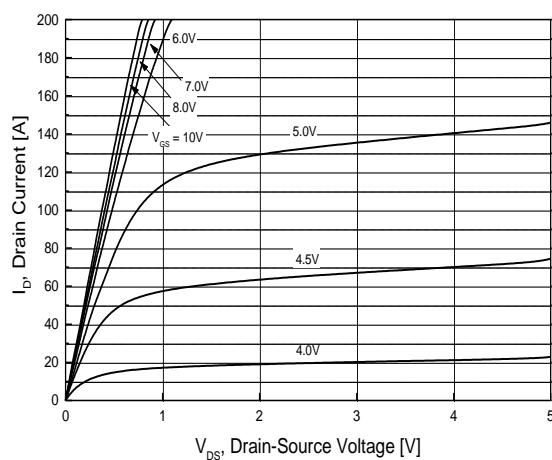
Part Number	Temp. Range	Package	Packing	RoHS Status
MDE1932RH	-55~150°C	TO-263	Reel	Halogen Free

## Electrical Characteristics ( $T_J = 25^\circ\text{C}$ )

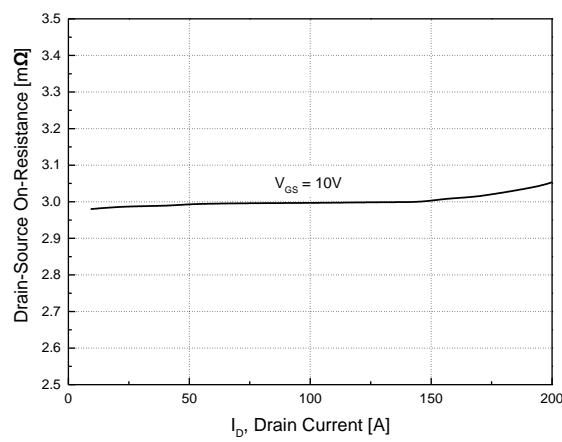
Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$\text{BV}_{\text{DSS}}$	$I_D = 250\mu\text{A}, V_{\text{GS}} = 0\text{V}$	80	-	-	V
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}} = V_{\text{GS}}, I_D = 250\mu\text{A}$	2.0	-	4.0	
Drain Cut-Off Current	$I_{\text{DSS}}$	$V_{\text{DS}} = 64\text{V}, V_{\text{GS}} = 0\text{V}$	-	-	1.0	$\mu\text{A}$
Gate Leakage Current	$I_{\text{GSS}}$	$V_{\text{GS}} = \pm 20\text{V}, V_{\text{DS}} = 0\text{V}$	-	-	$\pm 0.1$	
Drain-Source ON Resistance	$R_{\text{DS(ON)}}$	$V_{\text{GS}} = 10\text{V}, I_D = 50\text{A}$	-	3.0	3.4	$\text{m}\Omega$
Forward Transconductance	$g_{\text{fs}}$	$V_{\text{DS}} = 10\text{V}, I_D = 50\text{A}$	-	90	-	S
<b>Dynamic Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{\text{DS}} = 40\text{V}, I_D = 50\text{A}, V_{\text{GS}} = 10\text{V}$	-	116	-	nC
Gate-Source Charge	$Q_{\text{gs}}$		-	27	-	
Gate-Drain Charge	$Q_{\text{gd}}$		-	33	-	
Input Capacitance	$C_{\text{iss}}$	$V_{\text{DS}} = 40\text{V}, V_{\text{GS}} = 0\text{V}, f = 1.0\text{MHz}$	-	7,200	-	pF
Reverse Transfer Capacitance	$C_{\text{rss}}$		-	50	-	
Output Capacitance	$C_{\text{oss}}$		-	1,540	-	
Turn-On Delay Time	$t_{\text{d(on)}}$	$V_{\text{GS}} = 10\text{V}, V_{\text{DS}} = 40\text{V}, I_D = 50\text{A}, R_G = 3.0\Omega$	-	31	-	ns
Rise Time	$t_r$		-	27	-	
Turn-Off Delay Time	$t_{\text{d(off)}}$		-	91	-	
Fall Time	$t_f$		-	51	-	
Gate Resistance	$R_g$	$f=1\text{ MHz}$	-	3.0	-	$\Omega$
<b>Drain-Source Body Diode Characteristics</b>						
Source-Drain Diode Forward Voltage	$V_{\text{SD}}$	$I_S = 50\text{A}, V_{\text{GS}} = 0\text{V}$	-	0.9	1.2	V
Body Diode Reverse Recovery Time	$t_{\text{rr}}$	$I_F = 50\text{A}, dI/dt = 100\text{A}/\mu\text{s}$	-	73	-	ns
Body Diode Reverse Recovery Charge	$Q_{\text{rr}}$		-	161	-	nC

Note :

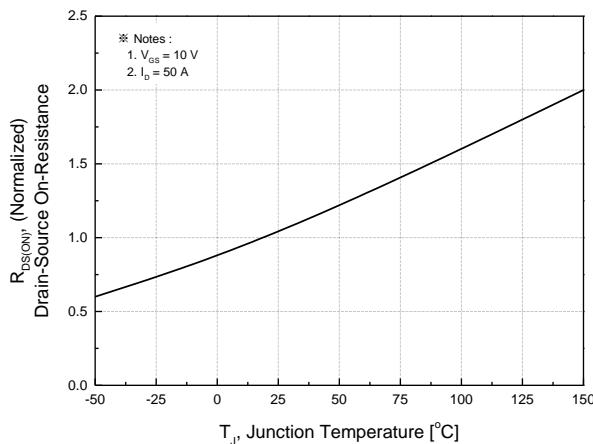
1. Surface mounted FR-4 board by JEDEC (jesd51-7). Continuous current at  $T_c=25^\circ\text{C}$  is silicon limited
2.  $E_{\text{AS}}$  is tested at starting  $T_j = 25^\circ\text{C}$ ,  $L = 1.0\text{mH}$ ,  $I_{\text{AS}} = 25.0\text{A}$ ,  $V_{\text{GS}} = 10\text{V}$ .



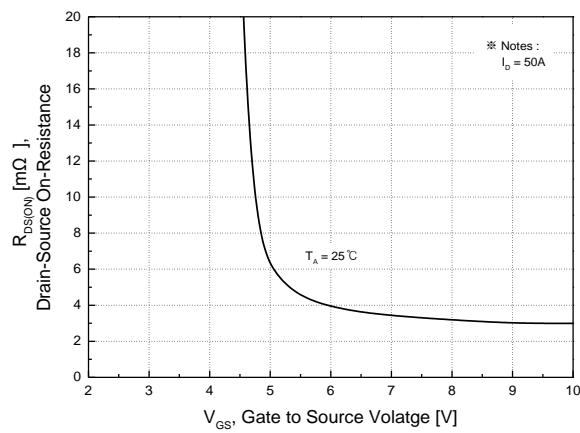
**Fig.1 On-Region Characteristics**



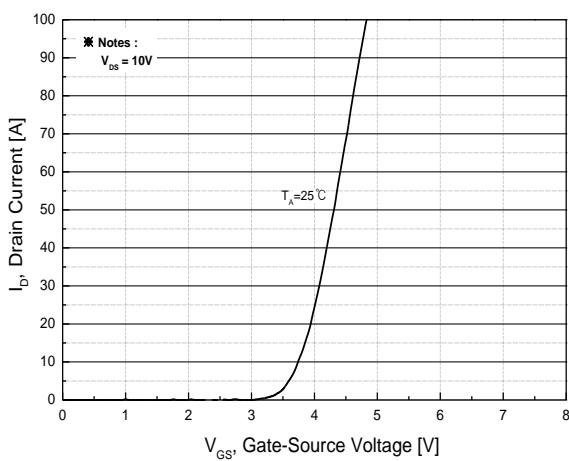
**Fig.2 On-Resistance Variation with Drain Current and Gate Voltage**



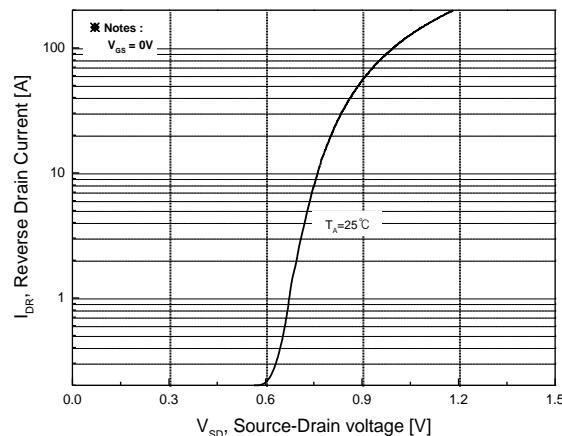
**Fig.3 On-Resistance Variation with Temperature**



**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**

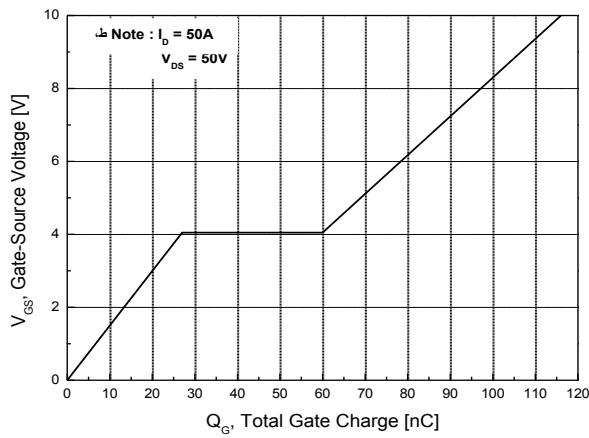


Fig.7 Gate Charge Characteristics

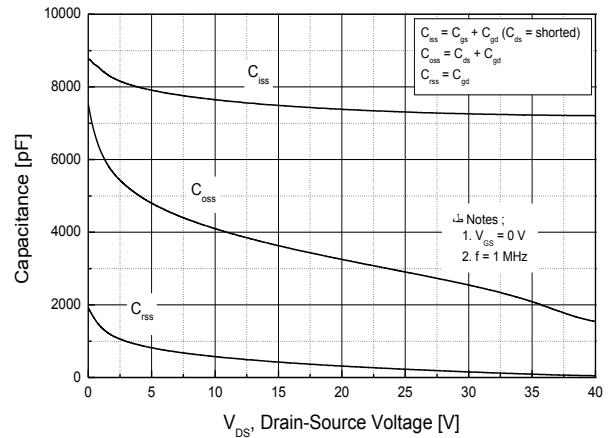


Fig.8 Capacitance Characteristics

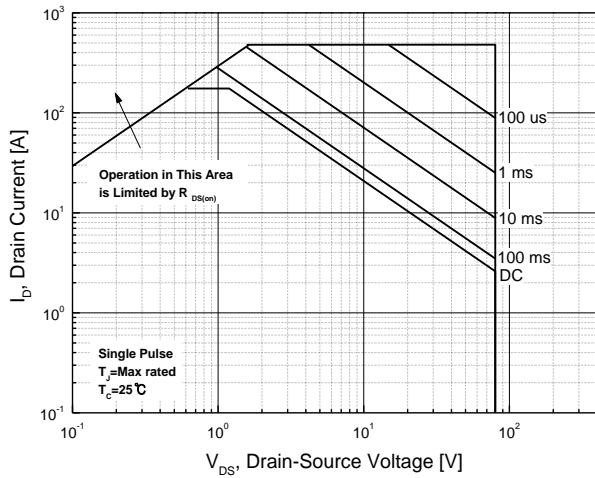


Fig.9 Maximum Safe Operating Area

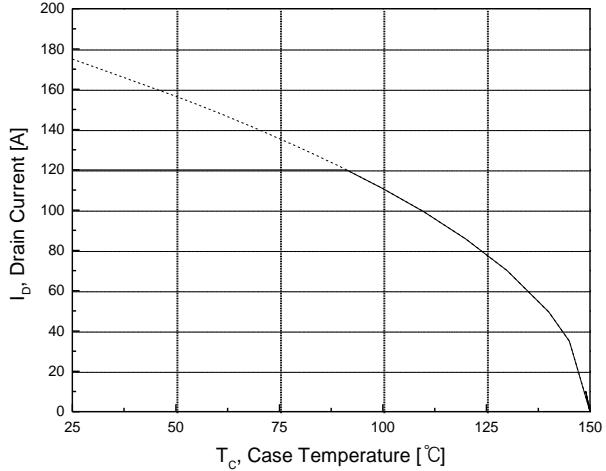


Fig.10 Maximum Drain Current vs. Case Temperature

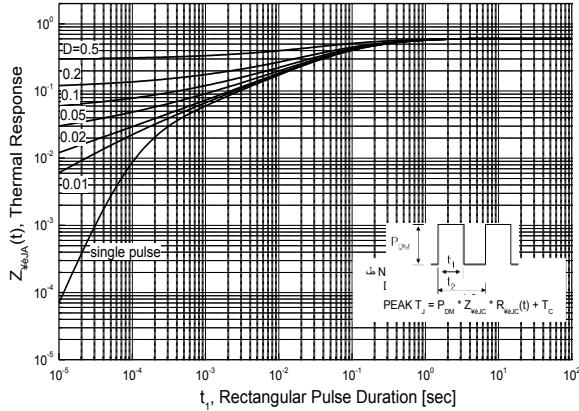
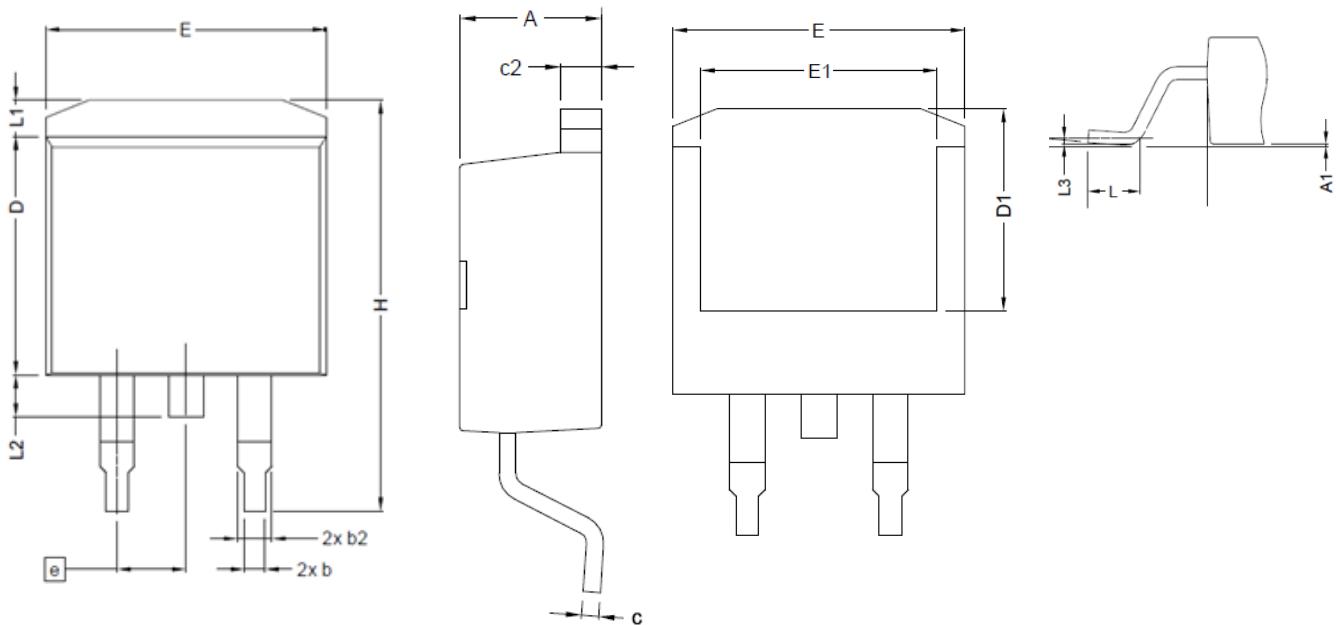


Fig.11 Transient Thermal Response Curve

## Package Dimension

### 3 Leads, TO-263

Dimensions are in millimeters unless otherwise specified



Symbol	Millimeters(mm)	
	Min	Max
A	4.064	4.826
A1	-	0.254
b	0.508	0.99
b2	1.140	1.778
c	0.310	0.736
c2	1.140	1.650
D	8.382	9.652
D1	6.6	-
E	9.652	10.668
E1	6.223	-
e	BSC 2.54	
H	14.605	15.875
L	1.778	2.794
L1	-	1.676
L2	-	1.778
L3	BSC 0.254	

**DISCLAIMER:**

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