



MDES15N056PTRH

Single N-channel Trench MOSFET 150V 5.6mΩ 182A

FEATURES

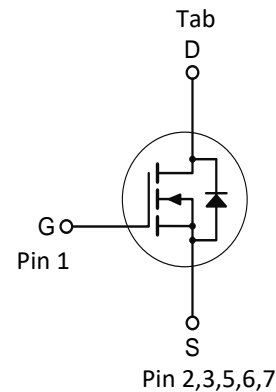
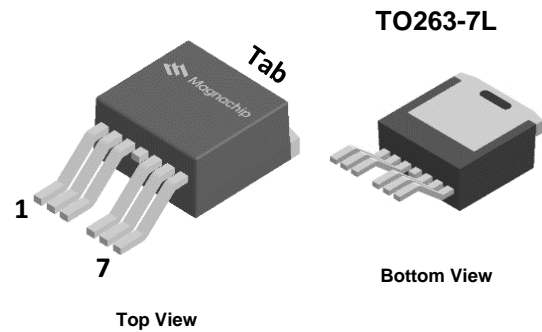
- Trench power MOSFET technology
- N-channel, normal level
- Enhanced avalanche ruggedness
- 100% UIS and Rg tested
- Maximum 175°C junction temperature

APPLICATIONS

- DC/DC and AC/DC converters
- BLDC motor drive systems
- Battery powered systems

KEY PERFORMANCE PARAMETERS

V_{DS}	150	V
$R_{DS(on), typ.}$	0.00483	Ω
I_D	182	A
$Q_G, typ.$	90	nC
Junction temperature, $_{max.}$	175	$^{\circ}C$



ORDERING INFORMATION

Type / Ordering Code	Package	Marking	Packing	RoHS Status
MDES15N056PTRH	TO263-7L	MDES15N056	Tape & Reel	Halogen Free

<http://www.magnachip.com/>

ABSOLUTE MAXIMUM RATINGS, at $T_j = 25^\circ\text{C}$, unless otherwise specified

PARAMETER	SYMBOL	RATING	UNIT	
Drain-source Voltage	V_{DS}	150	V	
Gate-source Voltage	V_{GS}	± 20	V	
Drain current	I_D	$T_C=25^\circ\text{C}$	182	A
		$T_C=100^\circ\text{C}$	128	A
¹⁾ Pulsed drain current	I_{DM}	726	A	
Total power dissipation	P_{tot}	$T_C=25^\circ\text{C}$	484	W
		$T_C=100^\circ\text{C}$	242	W
²⁾ Avalanche energy, single pulse	E_{AS}	392	mJ	
Operating and storage temperature	T_j, T_{stg}	- 55 ~ 175	$^\circ\text{C}$	

THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATING	UNIT
Thermal resistance, junction - case	$R_{\theta JC}$	0.31	$^\circ\text{C}/\text{W}$
³⁾ Thermal resistance, junction - ambient	$R_{\theta JA}$	40	$^\circ\text{C}/\text{W}$

Notes

- Pulse width limited by T_{jmax}
- Starting $T_J=25^\circ\text{C}$, $L=1\text{mH}$, $I_{AS}=28\text{A}$, $V_{DS}=50\text{V}$, $V_{GS}=10\text{V}$
- Surface mounted FR-4 board by JEDEC (jesd51-7)

ELECTRICAL CHARACTERISTICS (T_J = 25°C)**STATIC**

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain-source breakdown voltage	V _{(BR)DSS}	150	-	-	V	V _{GS} =0 V, I _D =250 μA
Gate threshold voltage	V _{GS(th)}	2.40	3.10	3.90	V	V _{DS} =V _{GS} , I _D =250 μA
Zero gate voltage drain current	I _{DSS}	-	-	1	μA	V _{DS} =150 V, V _{GS} =0 V
Gate-source leakage current	I _{GSS}	-	-	± 100	nA	V _{GS} =±20 V, V _{DS} =0 V
Drain-source on-state resistance	R _{DS(on)}	-	4.83	5.60	mΩ	V _{GS} =10 V, I _D =70 A
Gate resistance	R _G	-	2.3	-	Ω	f=1MHz
Transconductance	g _{fs}	-	120	-	S	V _{DS} =20 V, I _D =70 A

DYNAMIC

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Input capacitance	C _{iss}	-	6418	-	pF	V _{GS} =0 V, V _{DS} =75 V, f=1 MHz
Output capacitance	C _{oss}	-	688	-	pF	V _{GS} =0 V, V _{DS} =75 V, f=1 MHz
Reverse transfer capacitance	C _{rss}	-	15	-	pF	V _{GS} =0 V, V _{DS} =75 V, f=1 MHz
Turn-on delay time	t _{d(on)}	-	31	-	ns	V _{DD} =75 V, V _{GS} =10 V, I _D =70 A, R _{G,ext} =3Ω
Rise time	t _r	-	13	-	ns	V _{DD} =75 V, V _{GS} =10 V, I _D =70 A, R _{G,ext} =3Ω
Turn-off delay time	t _{d(off)}	-	80	-	ns	V _{DD} =75 V, V _{GS} =10 V, I _D =70 A, R _{G,ext} =3Ω
Fall time	t _f	-	17	-	ns	V _{DD} =75 V, V _{GS} =10 V, I _D =70 A, R _{G,ext} =3Ω

GATE CHARGE CHARACTERISTICS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Gate to source charge	Q _{gs}	-	31	-	nC	V _{DD} =75 V, I _D =70 A, V _{GS} =0 to 10 V
Gate charge at threshold	Q _{gs(th)}	-	18	-	nC	V _{DD} =75 V, I _D =70 A, V _{GS} =0 to 10 V
Gate to drain charge	Q _{gd}	-	20	-	nC	V _{DD} =75 V, I _D =70 A, V _{GS} =0 to 10 V
Switching charge	Q _{sw}	-	33	-	nC	V _{DD} =75 V, I _D =70 A, V _{GS} =0 to 10 V
Gate charge total	Q _g	-	90	-	nC	V _{DD} =75 V, I _D =70 A, V _{GS} =0 to 10 V
Gate plateau voltage	V _{plateau}	-	5.3	-	V	V _{DD} =75 V, I _D =70 A, V _{GS} =0 to 10 V

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Diode continuous forward current	I _S	-	-	182	A	-
Diode pulse current	I _{S,pulse}	-	-	726	A	pulsed; tp ≤ 10 μs
Diode forward voltage	V _{SD}	-	0.8	1.2	V	V _{GS} =0 V, I _F =70 A
Reverse recovery time	t _{rr}	-	113	-	ns	I _F =70 A, d _I /dt=100 A/μs
Reverse recovery charge	Q _{rr}	-	684	-	nC	I _F =70 A, d _I /dt=100 A/μs

Electrical characteristics diagrams (25 °C, unless otherwise noted)

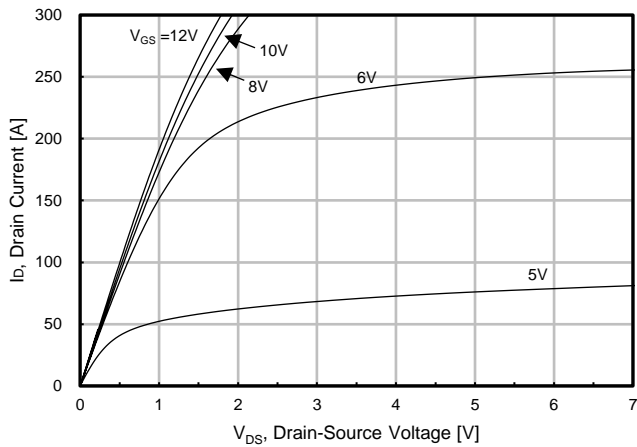


Fig. 1. Output Characteristics (25°C)

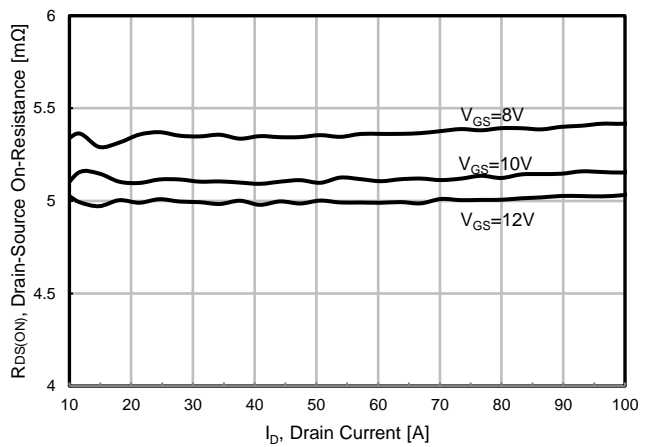


Fig. 2. Static On-Resistance Variation

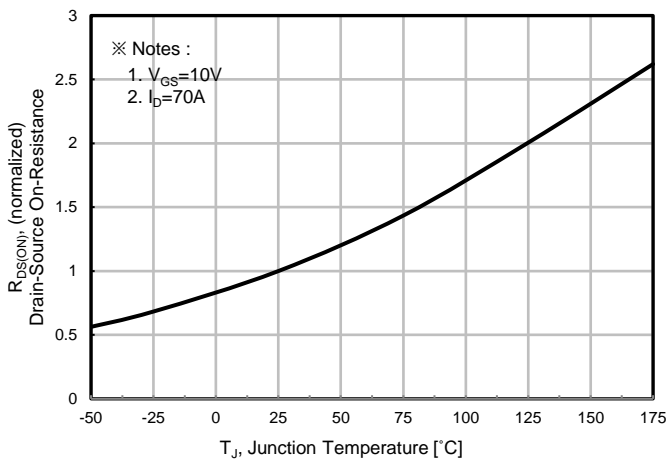


Fig. 3. On-Resistance vs. Junction Temperature

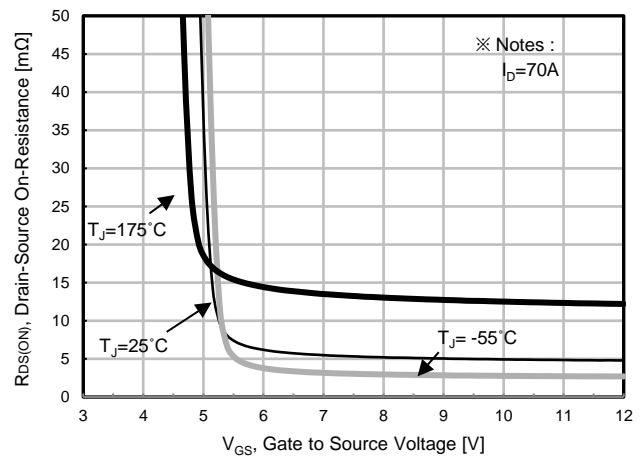


Fig. 4. On-Resistance vs. Gate to source Voltage

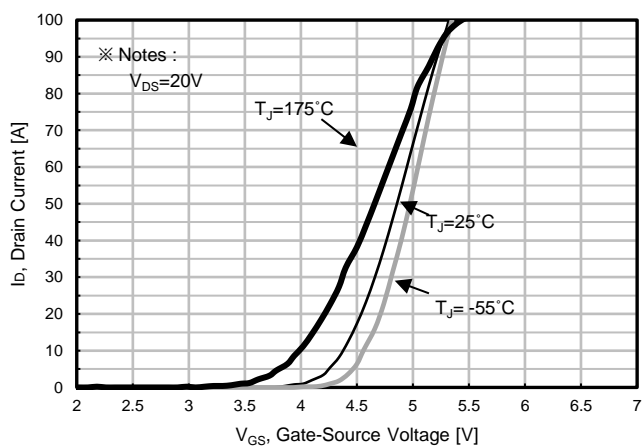


Fig. 5. Transfer Characteristics

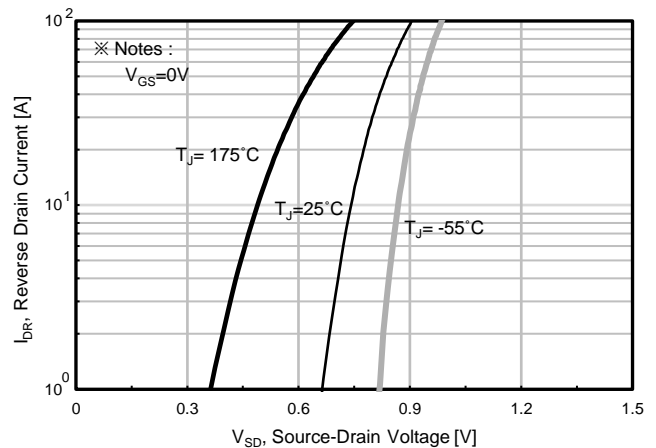
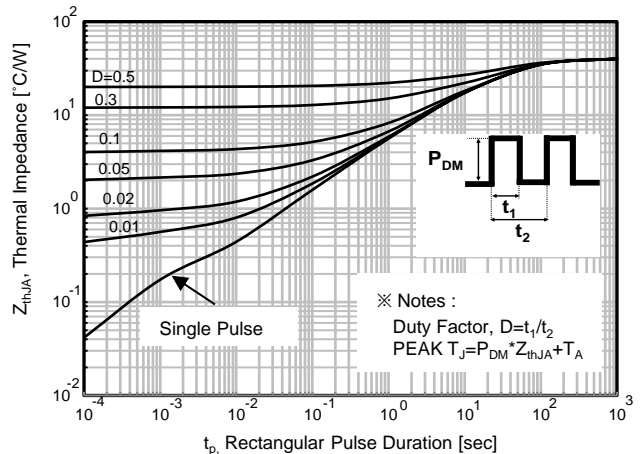
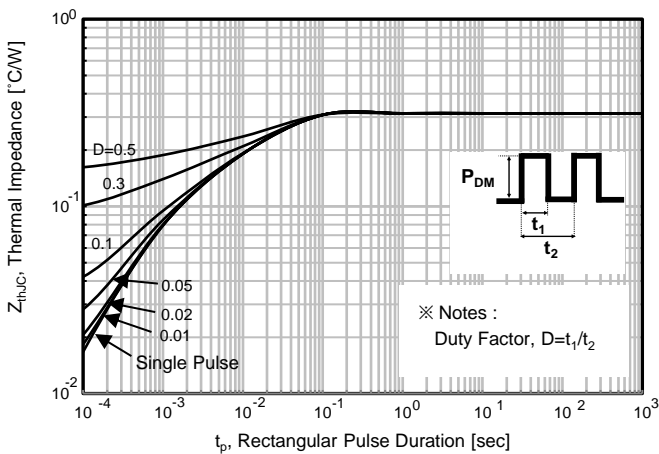
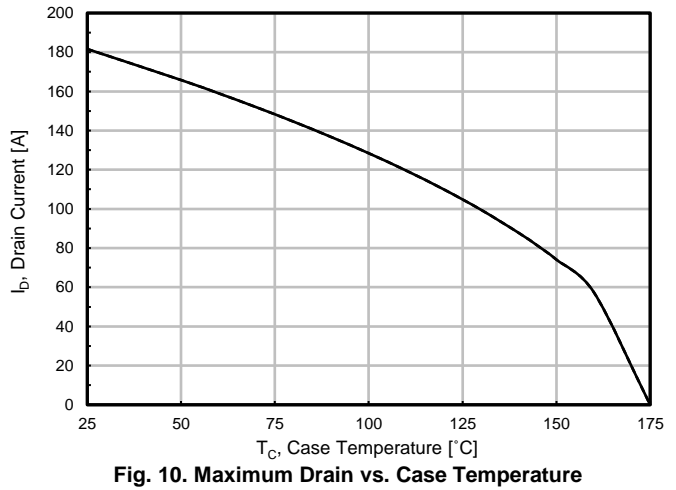
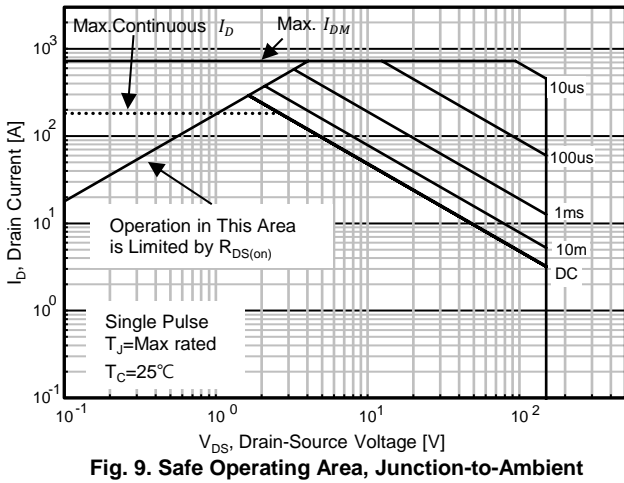
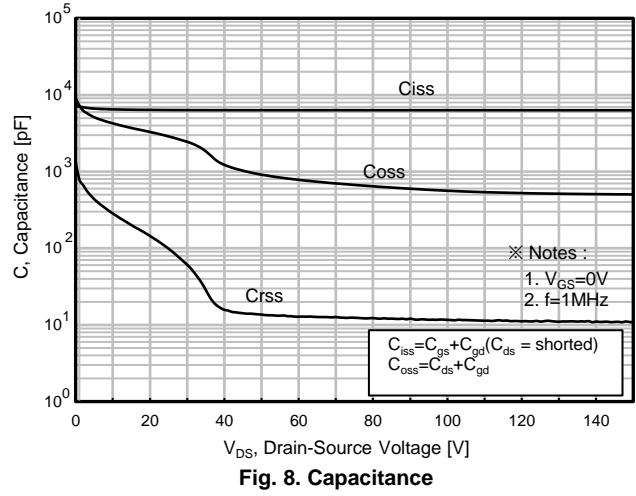
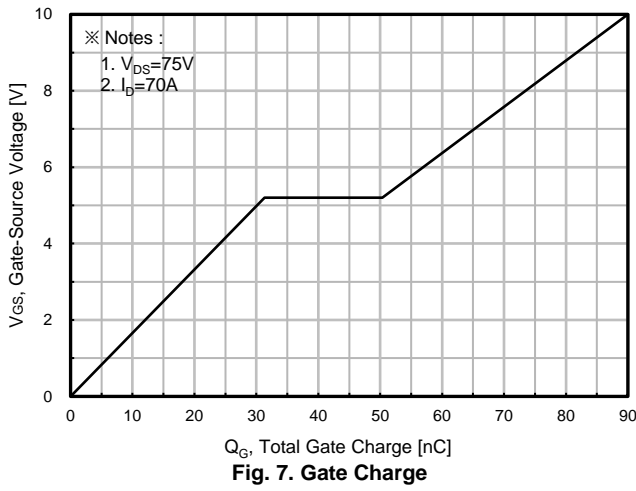


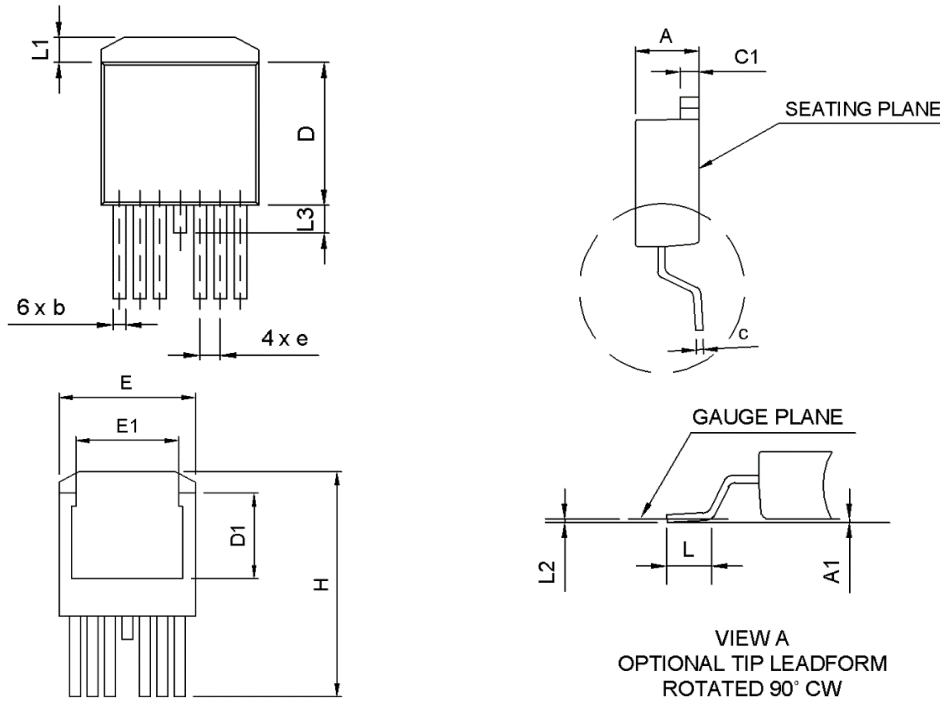
Fig. 6. Body Diode Forward Voltage Variation with Source Current and Temperature

Electrical characteristics diagrams (25 °C, unless otherwise noted)



Package information

TO263-7L




Symbol	Dimension [mm]	
	Min	Max
A	4.30	4.70
A1	-	0.254
b	0.65	0.90
c	0.40	0.60
c1	1.25	1.40
D	9.00	9.40
D1	5.90	6.90
E	9.68	10.20
E1	7.70	8.50
e	1.27BSC	
H	14.61	15.88
L	1.78	2.80
L1	-	1.6
L2	0.254BSC	
L3	-	1.78

Notes

Package body size, length and width do not include mold flash, protrusions and gate burrs.

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