



MDES20N116PTFRH

Single N-channel Trench MOSFET 200V 11.6mΩ 95A

FEATURES

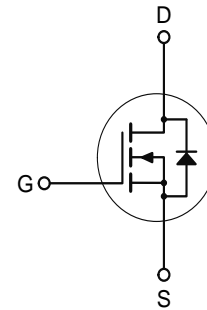
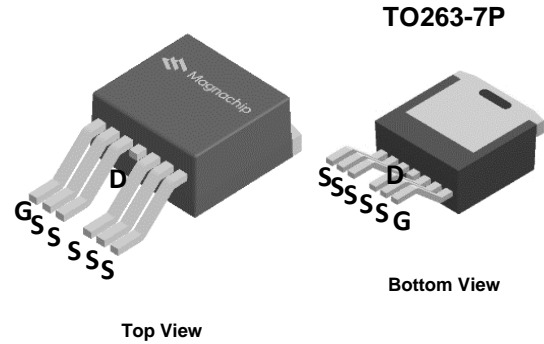
- Trench power MOSFET technology
- N-channel, normal level
- Enhanced avalanche ruggedness
- 100% Avalanche tested
- Maximum 175°C junction temperature
- Improved diode reverse recovery time(trr) for increased efficiency

APPLICATIONS

- DC/DC and AC/DC converters
- Motor drive systems
- Battery powered systems

KEY PERFORMANCE PARAMETERS

V_{DS}	200	V
$R_{DS(on), typ.}$	0.0106	Ω
I_D	95	A
$Q_G, typ.$	80	nC
Junction temperature, max.	175	$^{\circ}C$



ORDERING INFORMATION

Type / Ordering Code	Package	Marking	Packing	RoHS Status
MDES20N116PTFRH	TO263-7P	MDES20N116F	Tape & Reel	Halogen Free

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

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

PARAMETER		SYMBOL	RATING	UNIT
Drain-source Voltage		V_{DS}	200	V
Gate-source Voltage		V_{GS}	± 20	V
Drain current	$T_C=25^\circ\text{C}$	I_D	95	A
	$T_C=100^\circ\text{C}$		67	A
¹⁾ Pulsed drain current	$T_C=25^\circ\text{C}$	I_{DM}	380	A
Total power dissipation	$T_C=25^\circ\text{C}$	P_{tot}	300	W
	$T_C=100^\circ\text{C}$		150	W
²⁾ Avalanche energy, single pulse		E_{AS}	365	mJ
Operating and storage temperature		T_j, T_{stg}	- 55 ~ 175	$^\circ\text{C}$

THERMAL CHARACTERISTICS

PARAMETER		SYMBOL	RATING	UNIT
Thermal resistance, junction - case		$R_{\theta JC}$	0.5	$^\circ\text{C}/\text{W}$
³⁾ Thermal resistance, junction - ambient		$R_{\theta JA}$	40	$^\circ\text{C}/\text{W}$

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

PARAMETER	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
Drain-source breakdown voltage	V _{(BR)DSS}	200	-	-	V	V _{GS} =0 V, I _D =250 μA
Gate threshold voltage	V _{GS(th)}	2.25	3.00	3.75	V	V _{DS} =V _{GS} , I _D =250 μA
Zero gate voltage drain current	I _{DSS}	-	-	10	μA	V _{DS} =200 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)}	-	10.6	11.6	mΩ	V _{GS} =10 V, I _D =50 A
⁴⁾ Gate resistance	R _G	-	2.7	-	Ω	f=1MHz
⁴⁾ Transconductance	g _{fs}	-	94	-	S	V _{DS} =10 V, I _D =50 A

⁴⁾ DYNAMIC CHARACTERISTICS

PARAMETER	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
Input capacitance	C _{iss}	-	6951	-	pF	V _{GS} =0 V, V _{DS} =100 V, f=1 MHz
Output capacitance	C _{oss}	-	428	-	pF	
Reverse transfer capacitance	C _{rss}	-	12	-	pF	
Turn-on delay time	t _{d(on)}	-	30	-	ns	V _{DD} =100 V, V _{GS} =10 V, I _D =50 A, R _{G,ext} =3Ω
Rise time	t _r	-	13	-	ns	
Turn-off delay time	t _{d(off)}	-	64	-	ns	
Fall time	t _f	-	8	-	ns	

⁴⁾ GATE CHARGE CHARACTERISTICS

PARAMETER	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
Gate to source charge	Q _{gs}	-	34	-	nC	V _{DD} =100 V, I _D =50 A, V _{GS} =0 to 10 V
Gate charge at threshold	Q _{gs(th)}	-	19	-	nC	
Gate to drain charge	Q _{gd}	-	9	-	nC	
Switching charge	Q _{sw}	-	24	-	nC	
Gate charge total	Q _g	-	80	-	nC	
Gate plateau voltage	V _{plateau}	-	5.4	-	V	

SOURCE-DRAIN DIODE

PARAMETER	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
⁴⁾ Diode continuous forward current	I _S	-	-	95	A	-
⁴⁾ Diode pulse current	I _{S,pulse}	-	-	380	A	pulsed; t _p ≤ 10 μs
Diode forward voltage	V _{SD}	-	0.86	1.20	V	V _{GS} =0 V, I _F =50 A
⁴⁾ Reverse recovery time	t _{rr}	-	148	-	ns	I _F =50 A, d _I /dt=100 A/μs
⁴⁾ Reverse recovery charge	Q _{rr}	-	785	-	nC	I _F =50 A, d _I /dt=100 A/μs

Notes

- Pulse width limited by T_{Jmax}
- Starting T_J=25°C, L=1mH, I_{AS}=27A, V_{DD}=50V, V_{GS}=10V
- Surface mounted FR-4 board by JEDEC (jesd51-7)
- The parameter is not subject to production testing - guaranteed by design.

ELECTRICAL CHARACTERISTICS DIAGRAMS

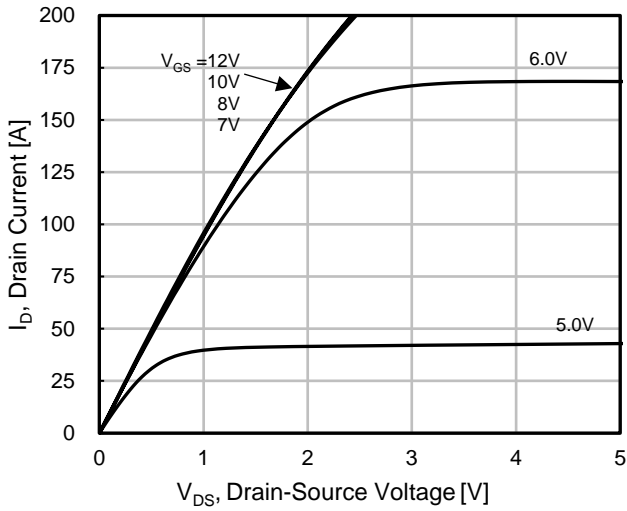


Fig. 1. Typ. Output Characteristics

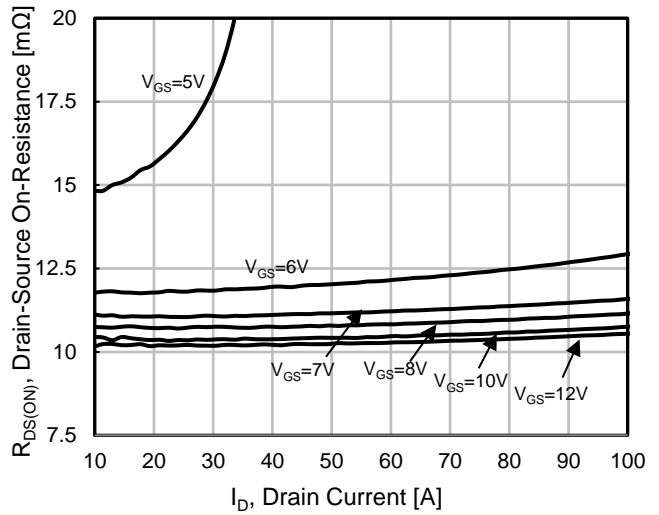


Fig. 2. Typ. Drain to Source On-Resistance

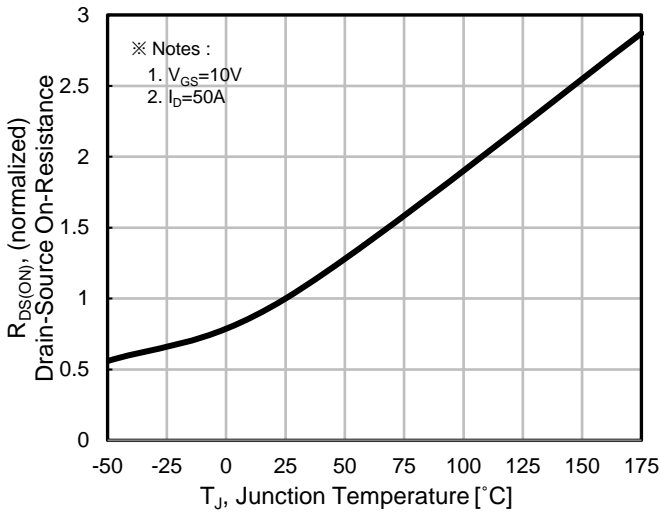


Fig. 3. On-Resistance vs. Junction Temperature

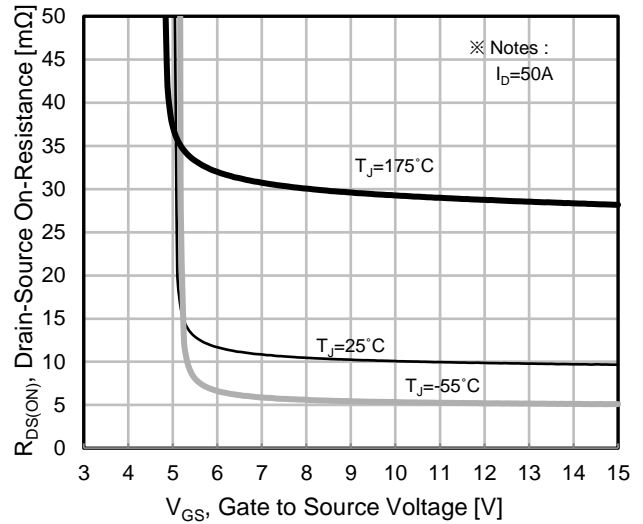


Fig. 4. On-Resistance vs. Gate to Source Voltage

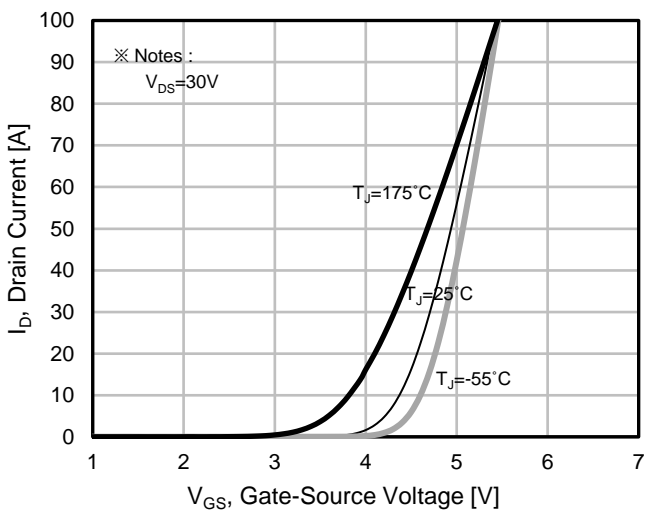


Fig. 5. Typ. Transfer Characteristics

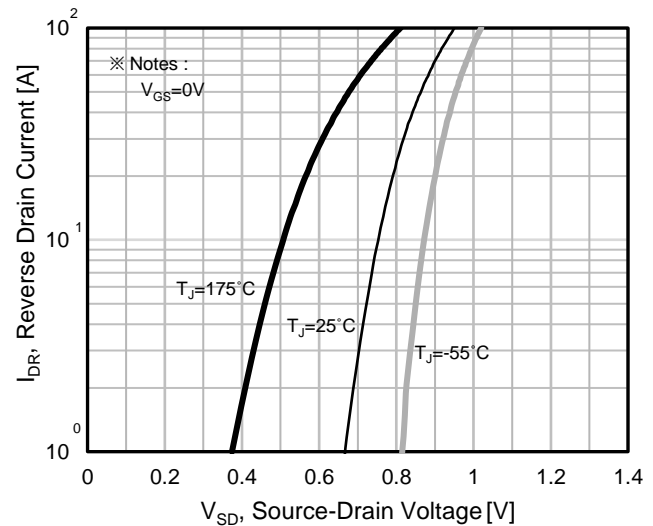


Fig. 6. Forward Characteristics of Reverse Diode

ELECTRICAL CHARACTERISTICS DIAGRAMS

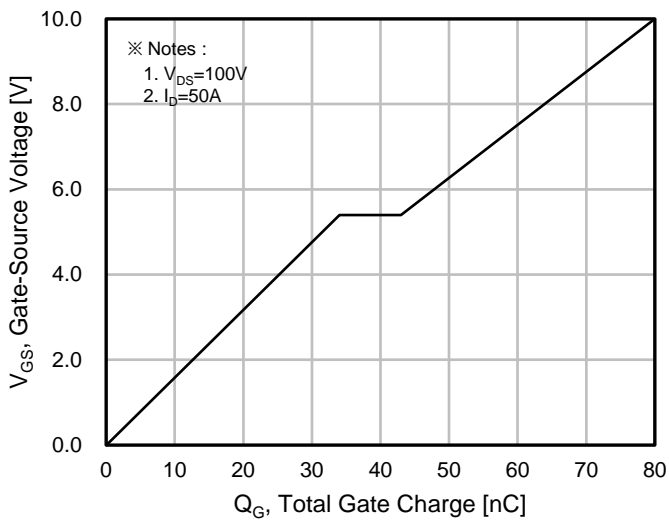


Fig. 7. Typ. Gate Charge

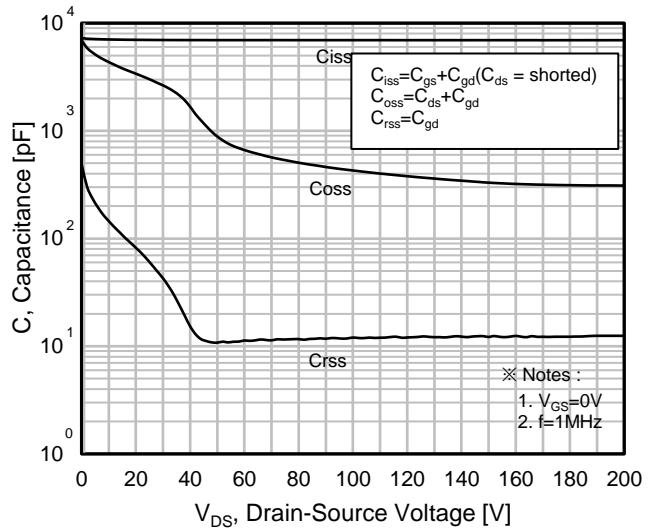


Fig. 8. Typ. Capacitances

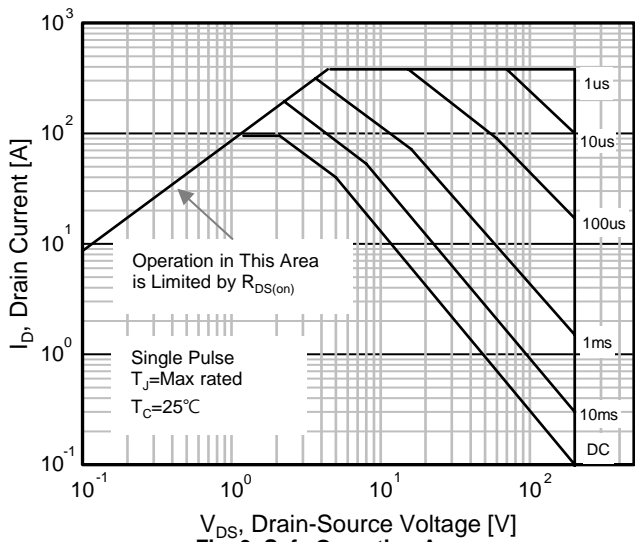


Fig. 9. Safe Operating Area

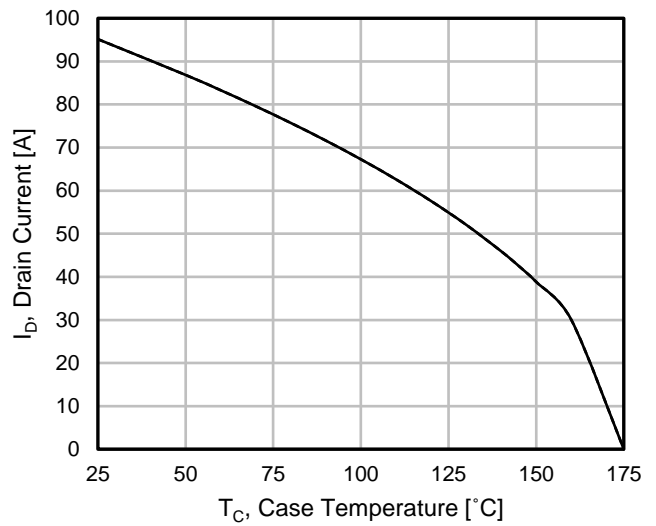


Fig. 10. Drain Current vs. Temperature

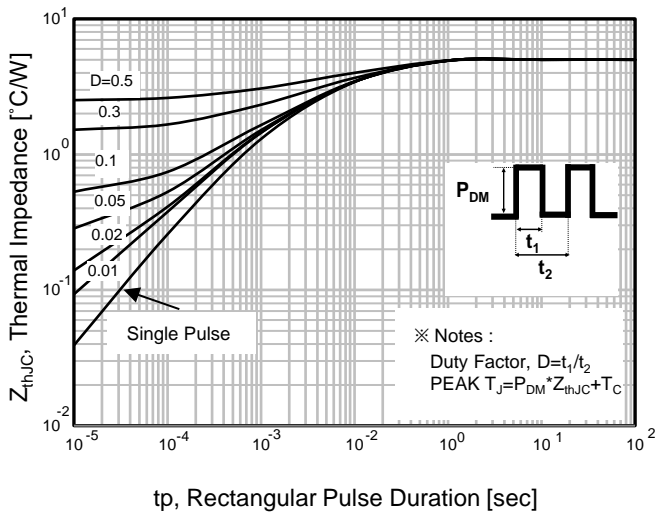


Fig. 11. Transient Thermal Impedance

ELECTRICAL CHARACTERISTICS DIAGRAMS

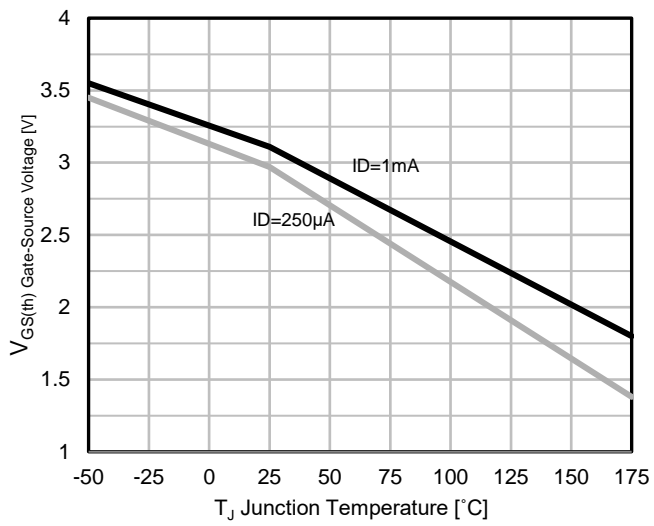


Fig.12 Gate-Source Threshold Voltage vs. Temperature

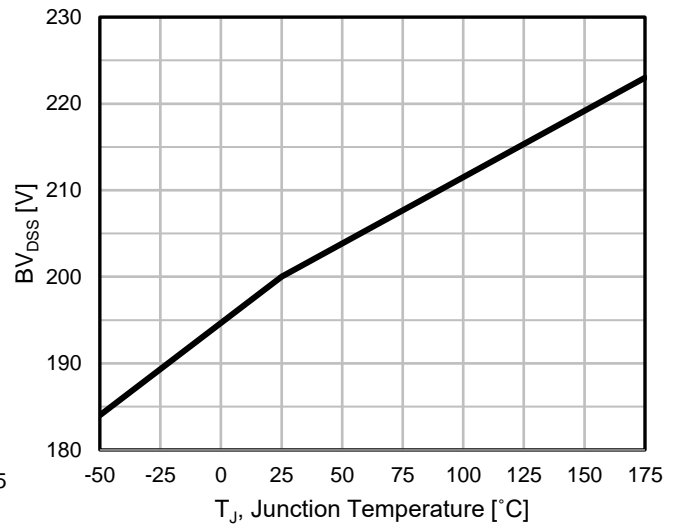
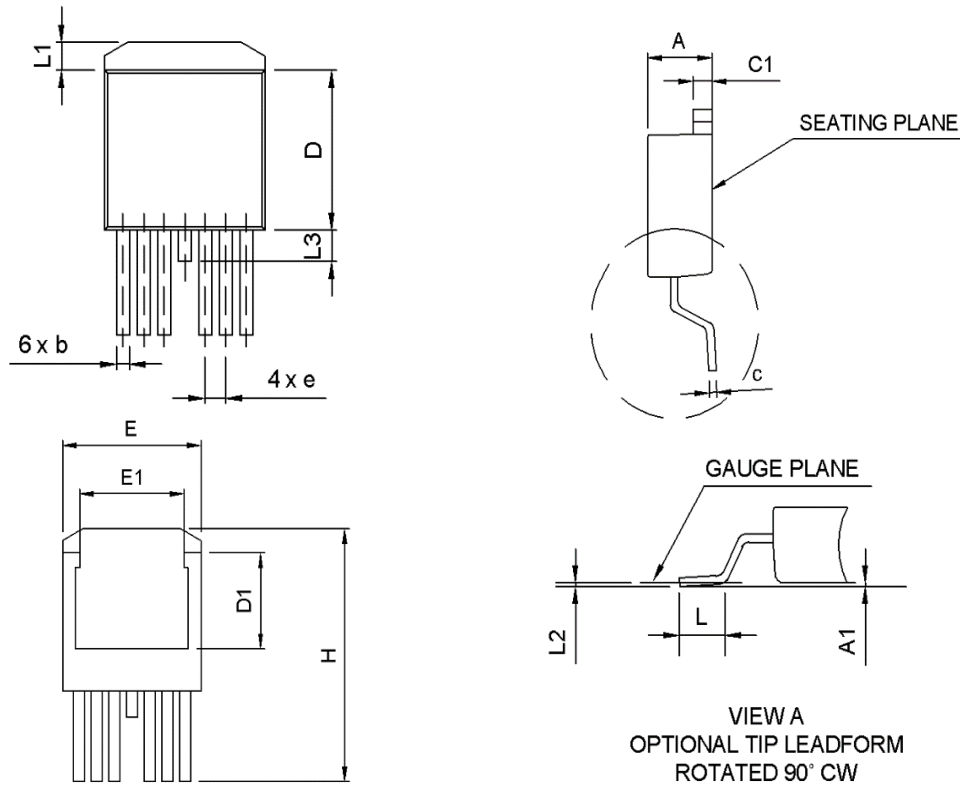


Fig.13 Drain-Source Voltage vs. Temperature

Package Outlines

TO263-7P




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.

DISCLAIMER :

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