

N-Ch 150V Fast Switching MOSFETs

Features

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

Product Summary

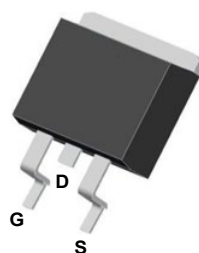


BVDSS	RDSON	ID
150V	9.5mΩ	120A

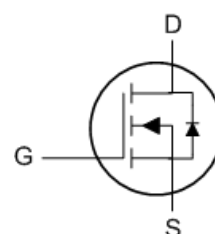
Applications

- DC-DC Converters
- Power management functions
- Synchronous-rectification applications

TO263Pin Configuration



TO-263



Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$, unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	150	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C = 25^\circ\text{C}$	I_D	120	A
	$T_C = 100^\circ\text{C}$		56	
Pulsed Drain Current ¹		I_{DM}	352	A
Single Pulse Avalanche Energy ²		E_{AS}	204.8	mJ
Total Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	178.6	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient ³	$R_{\theta JA}$	52	$^\circ\text{C/W}$
Thermal Resistance from Junction-to-Case	$R_{\theta JC}$	0.7	$^\circ\text{C/W}$

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Electrical Characteristics (T_J = 25°C, unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	150	-	-	V
Gate-body Leakage Current		I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T _J =25°C	I _{DSS}	V _{DS} = 150V, V _{GS} = 0V	-	-	1	μA
	T _J =100°C			-	-	100	
Gate-Threshold Voltage		V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2	3	4	V
Drain-Source On-Resistance ⁴		R _{DS(on)}	V _{GS} = 10V, I _D = 20A	-	9.5	11.5	mΩ
Forward Transconductance ⁴		g _{fs}	V _{DS} = 10V, I _D = 20A	-	69	-	S
Dynamic Characteristics ⁵							
Input Capacitance		C _{iss}	V _{DS} = 75V, V _{GS} = 0V, f = 1MHz	-	3310	-	pF
Output Capacitance		C _{oss}		-	268	-	
Reverse Transfer Capacitance		C _{rss}		-	9.4	-	
Gate Resistance		R _g	f = 1MHz	-	3.2	-	Ω
Switching Characteristics ⁵							
Total Gate Charge		Q _g	V _{GS} = 10V, V _{DS} = 75V, I _D = 20A	-	45	-	nC
Gate-Source Charge		Q _{gs}		-	15	-	
Gate-Drain Charge		Q _{gd}		-	8.5	-	
Turn-On Delay Time		t _{d(on)}	V _{GS} =10V, V _{DD} = 75V, R _G = 3Ω, I _D = 20A	-	16	-	ns
Rise Time		t _r		-	12	-	
Turn-Off Delay Time		t _{d(off)}		-	30	-	
Fall Time		t _f		-	18	-	
Body Diode Reverse Recovery Time		t _{rr}	I _F =20A, dI/dt=100A/μs	-	76	-	ns
Body Diode Reverse Recovery Charge		Q _{rr}		-	182	-	nC
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ⁴		V _{SD}	I _S = 20A, V _{GS} = 0V	-	-	1.2	V
Continuous Source Current	T _C =25°C	I _S	-	-	-	120	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)} = 150°C
2. The EAS data shows Max. rating. The test condition is V_{DD} = 50V, V_{GS} = 10V, L = 0.4mH, I_{AS} = 32A.
3. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

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Typical Characteristics

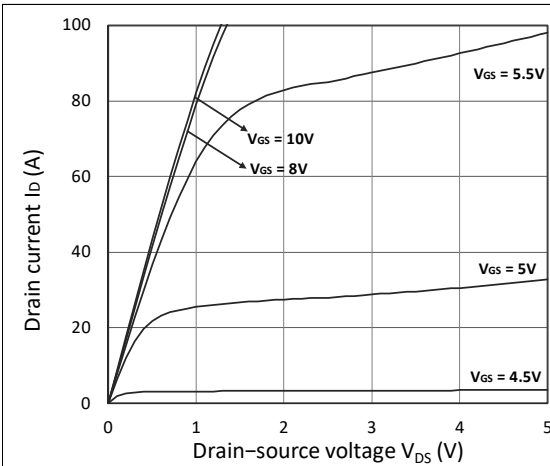


Figure 1. Output Characteristics

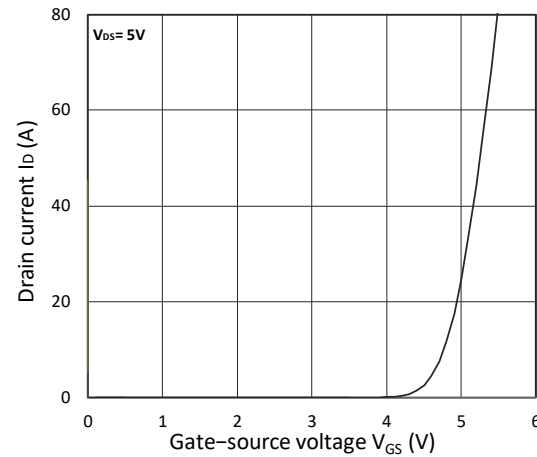


Figure 2. Transfer Characteristics

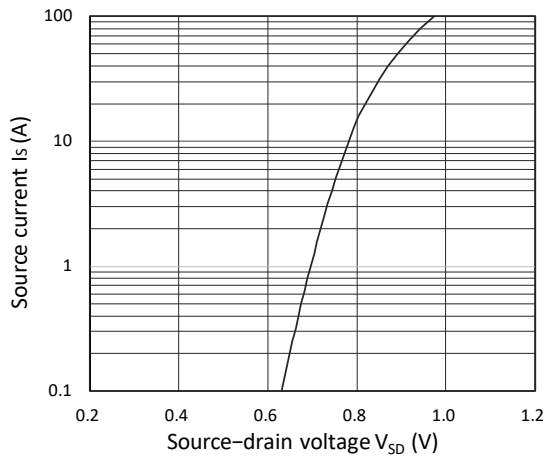


Figure 3. Forward Characteristics of Reverse

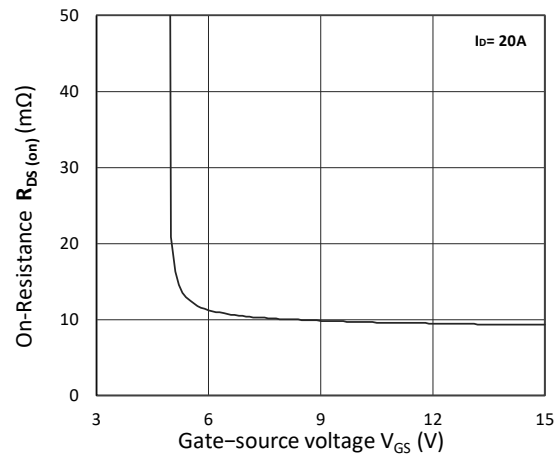


Figure 4. $R_{DS(on)}$ vs. V_{GS}

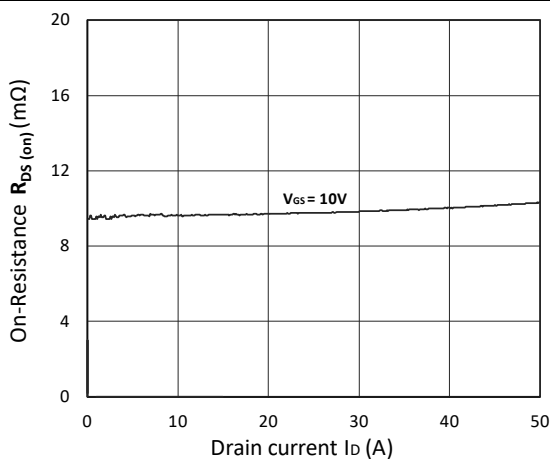


Figure 5. $R_{DS(on)}$ vs. I_D

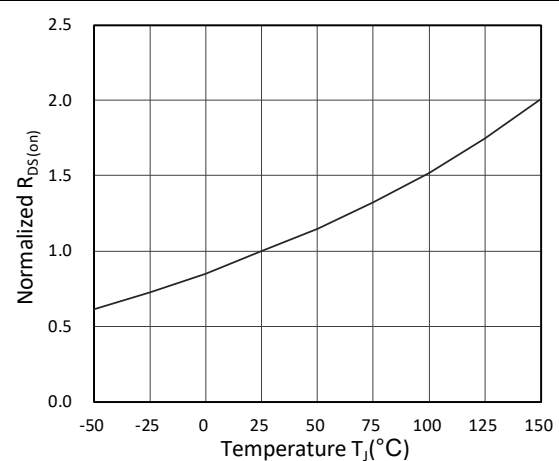


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

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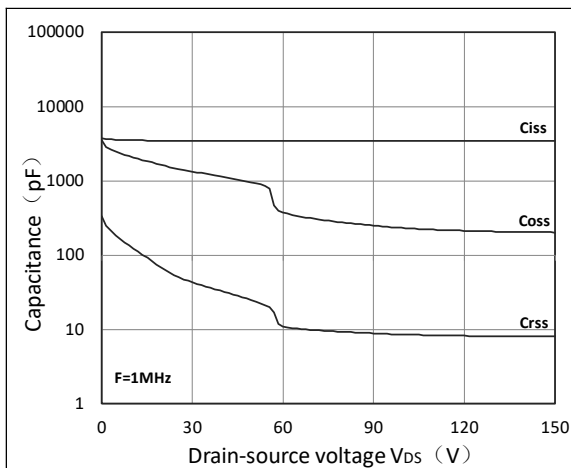


Figure 7. Capacitance Characteristics

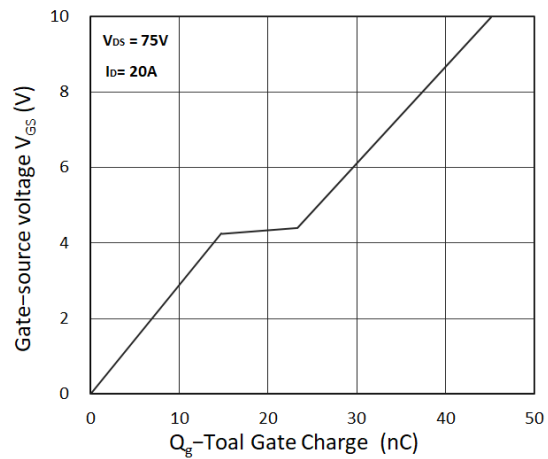


Figure 8. Gate Charge Characteristics

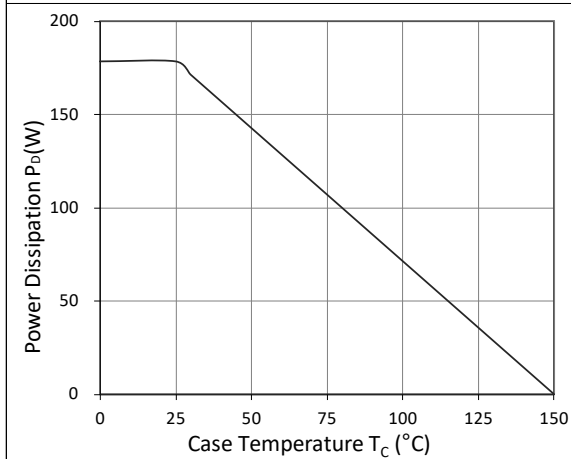


Figure 9. Power Dissipation

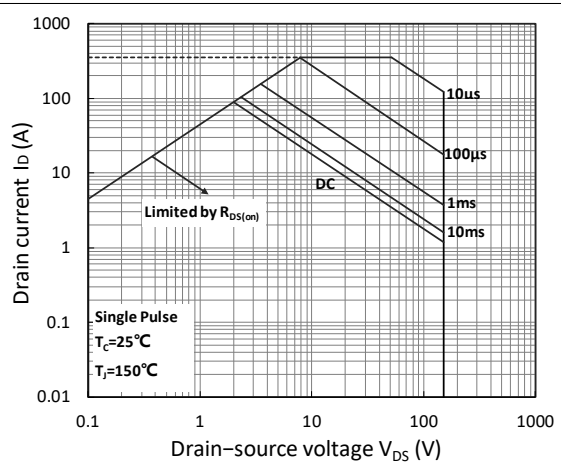


Figure 10. Safe Operating Area

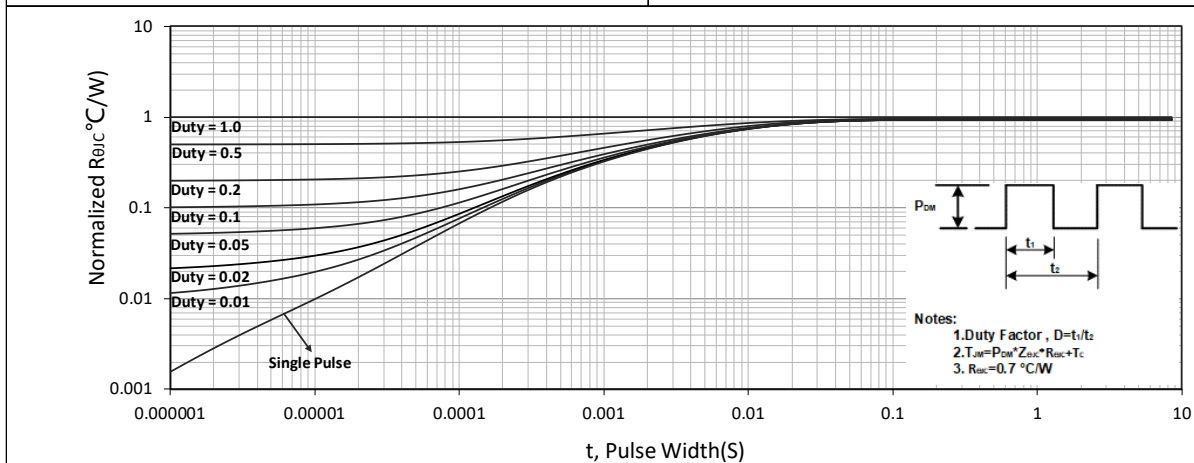


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

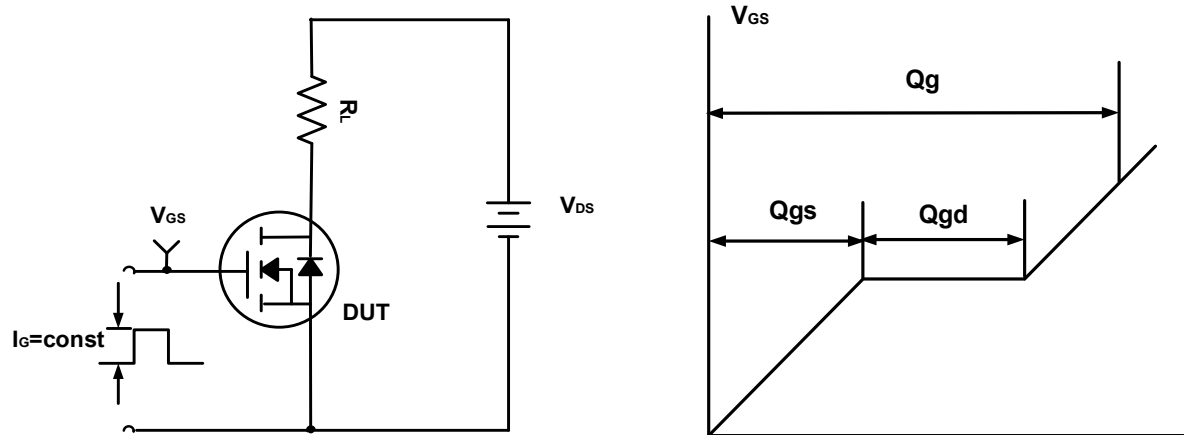


Figure A. Gate Charge Test Circuit & Waveforms

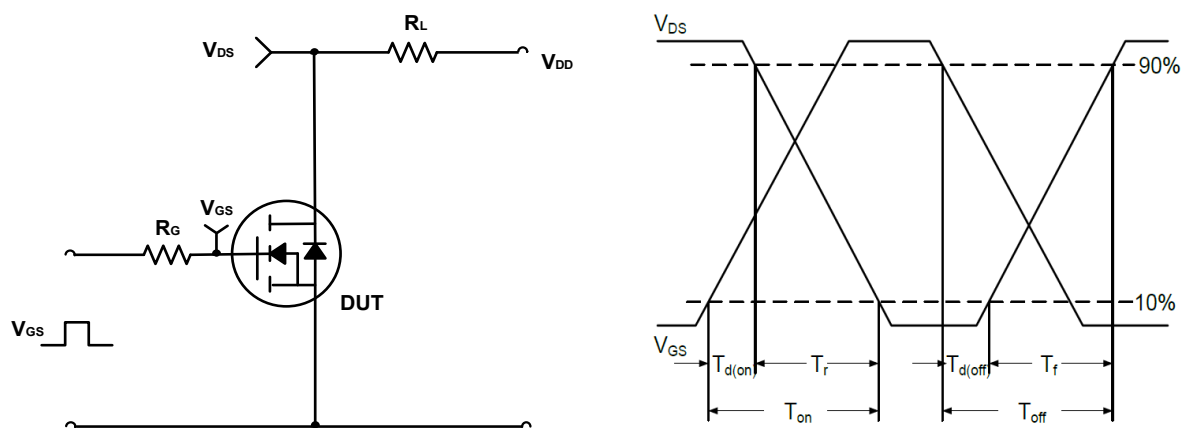


Figure B. Switching Test Circuit & Waveforms

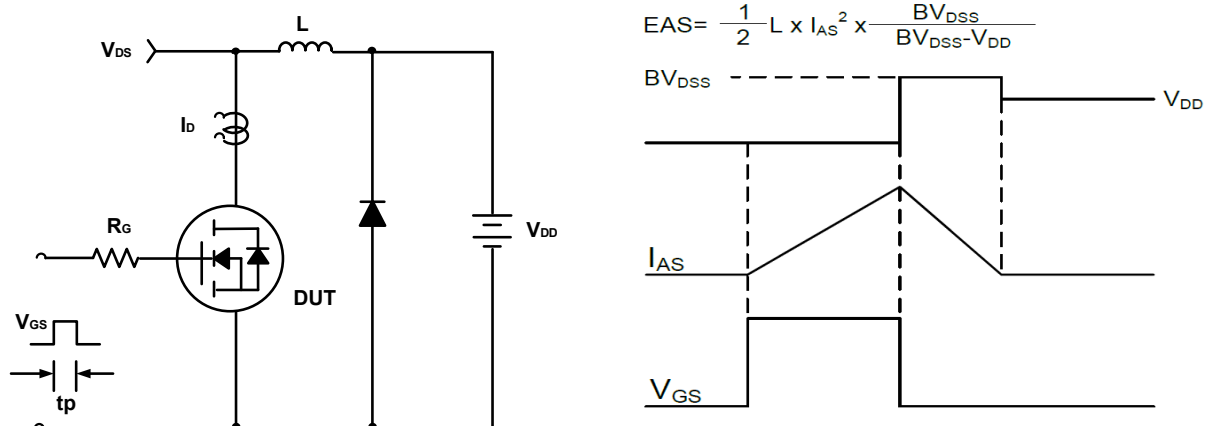
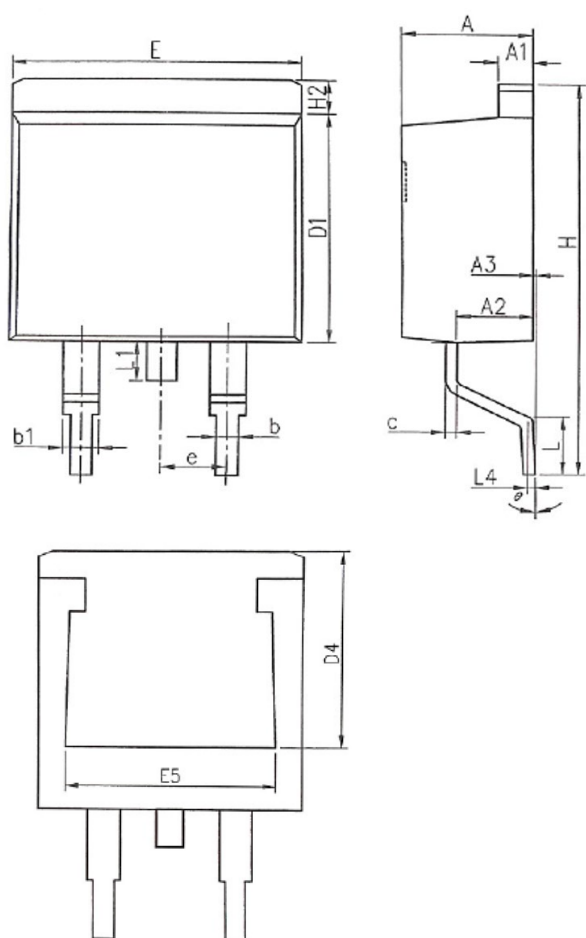


Figure C. Unclamped Inductive Switching Circuit & Waveforms

Mechanical Dimensions for TO-263



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	4.37	4.89
A1	1.17	1.42
A2	2.20	2.90
A3	0.00	0.25
b	0.70	0.96
b1	1.17	1.47
c	0.28	0.60
D1	8.45	9.30
D4	6.60	-
E	9.80	10.40
E5	7.06	-
e	2.54BSC	
H	14.70	15.70
H2	1.07	1.47
L	2.00	2.80
L1	-	1.75
L4	0.254BSC	
θ	0°	9°