

N-Ch 40V Fast Switching MOSFETs

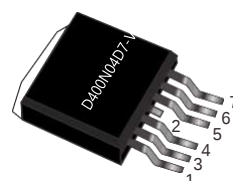
Features:

- Advanced Trench MOS Technology
- 100% EAS Guaranteed
- High Current Capability
- Green Device Available
- AEC-Q101 qualified and PPAP capable



AEC-Q101 Qualified

TO-263-7L Pin Configuration



Applications:

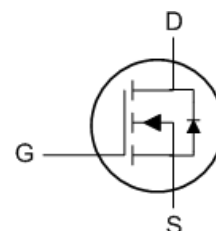
- SMPS Synchronous Rectification
- DC/DC Converters
- Or-ing

Product Summary

BVDSS	RDSON	ID
40V	1.1mΩ	400A

Pin Definition:

1. Gate
2. Drain
- 3/4/5/6/7. Source



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V (Silicon Limited)	400	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V (Silicon Limited)	280	A
$I_D@T_C = 25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V (Wire Bond Limited)	240	A
I_{DM}	Pulsed Drain Current ²	1610	A
EAS	Single Pulse Avalanche Energy ³	673	mJ
I_{AS}	Avalanche Current	116	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ⁴	380	W
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 175	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	40	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	0.4	$^\circ\text{C/W}$

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	40	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V , I _D =195 A	---	0.9	1.1	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	2	2.8	4	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =32V , V _{GS} =0V , T _J =25°C	---	---	1	uA
		V _{DS} =32V , V _{GS} =0V , T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V , V _{DS} =0V	---	---	±100	nA
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	---	1.2	---	Ω
Q _g	Total Gate Charge	V _{DS} =20V , V _{GS} =10V , I _D =20A	---	108	---	nC
Q _{gs}	Gate-Source Charge		---	25.4	---	
Q _{gd}	Gate-Drain Charge		---	26.8	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =20V , V _{GS} =10V , R _G =1.5Ω, I _D =20A	---	20	---	ns
T _r	Rise Time		---	145	---	
T _{d(off)}	Turn-Off Delay Time		---	55	---	
T _f	Fall Time		---	18	---	
C _{iss}	Input Capacitance	V _{DS} =20V , V _{GS} =0V , f=1MHz	---	6601	---	pF
C _{oss}	Output Capacitance		---	2073	---	
C _{rss}	Reverse Transfer Capacitance		---	248	---	
Diode Characteristics						
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V , Force Current	---	---	240	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V , I _S =195 A , T _J =25°C	---	---	1.2	V

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=240A$
- 4.The power dissipation is limited by 175°C junction temperature
- 5.Package limitation current is 240 A.

Typical Characteristics

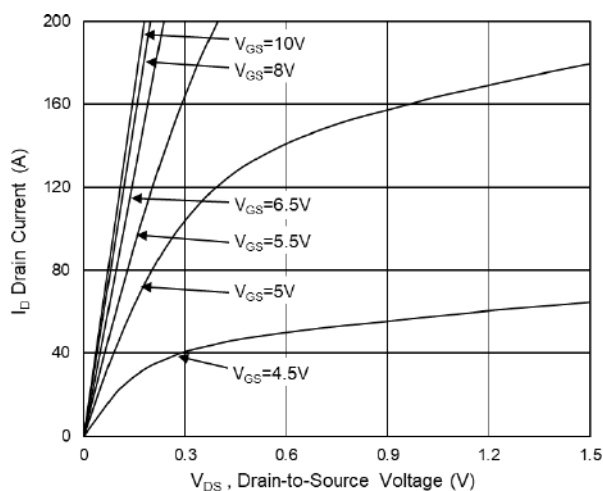


Fig.1 Typical Output Characteristics

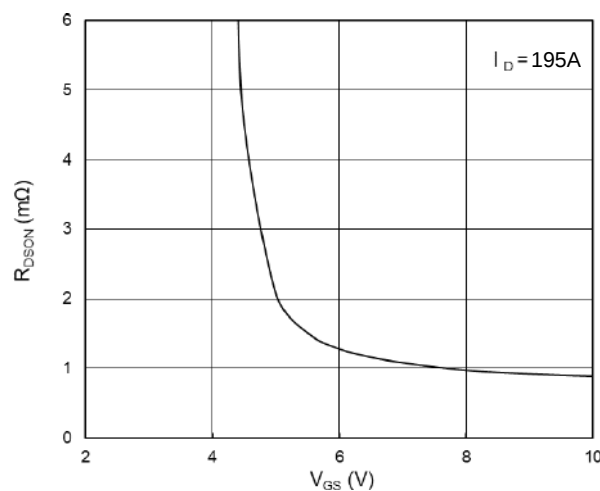


Fig.2 On-Resistance vs G-S Voltage

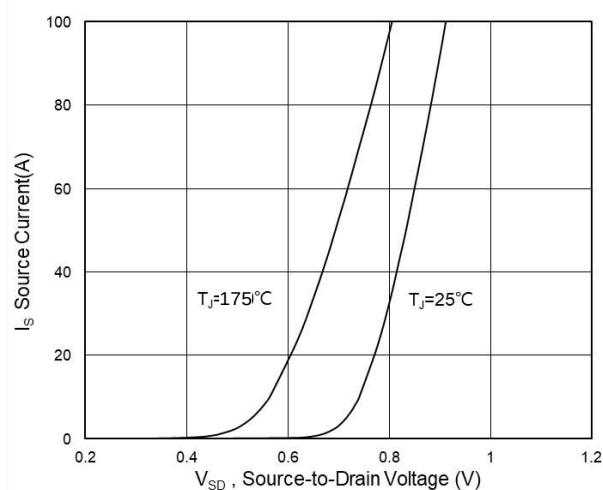


Fig.3 Source Drain Forward Characteristics

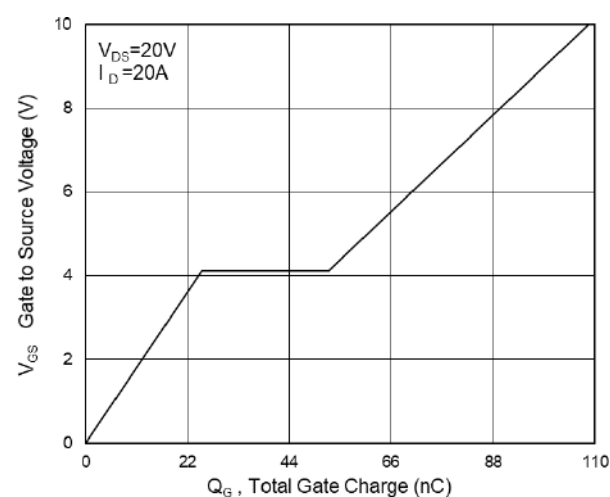


Fig.4 Gate-Charge Characteristics

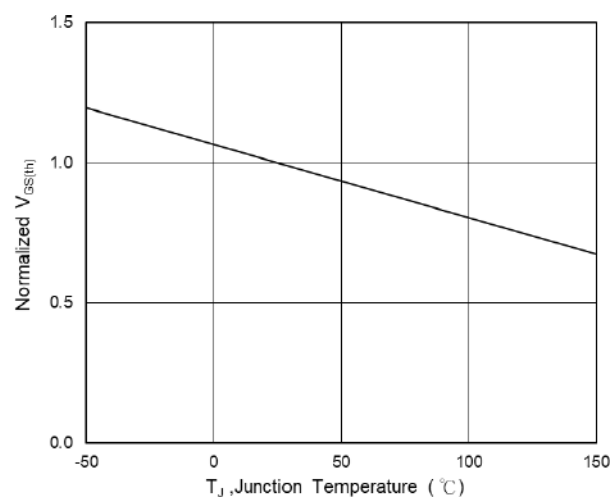


Fig.5 Normalized $V_{GS(th)}$ vs T_J

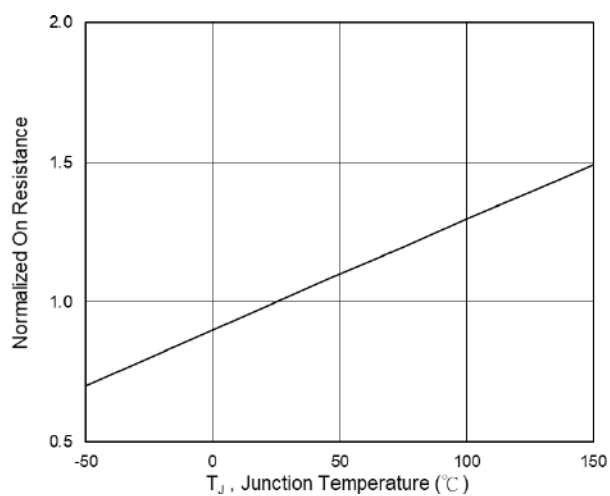


Fig.6 Normalized $R_{DS(on)}$ vs T_J

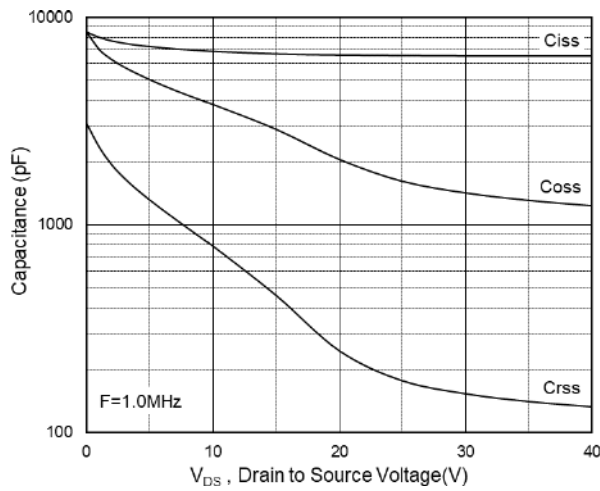


Fig.7 Capacitance

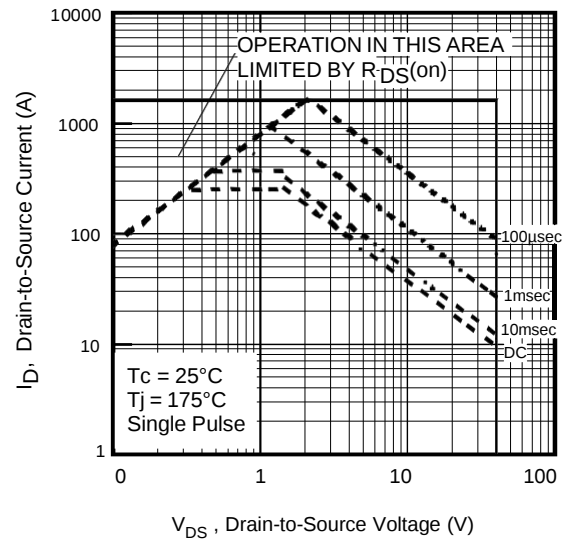


Fig.8 Safe Operating Area

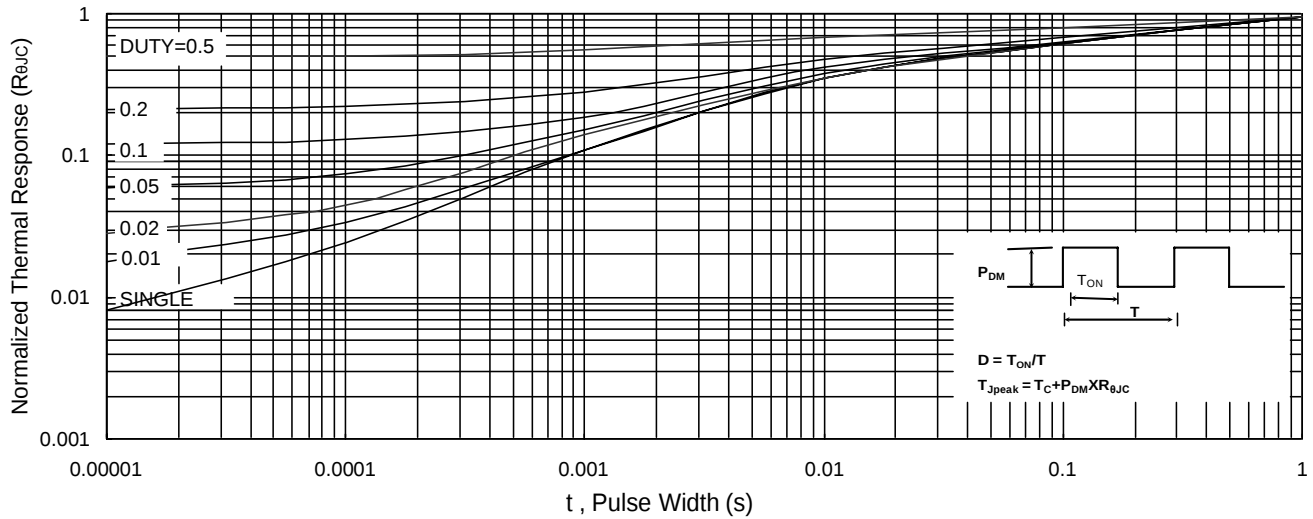


Fig.9 Normalized Maximum Transient Thermal Impedance

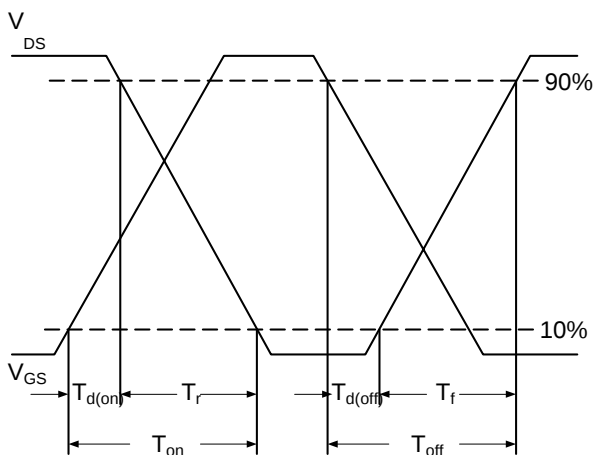


Fig.10 Switching Time Waveform

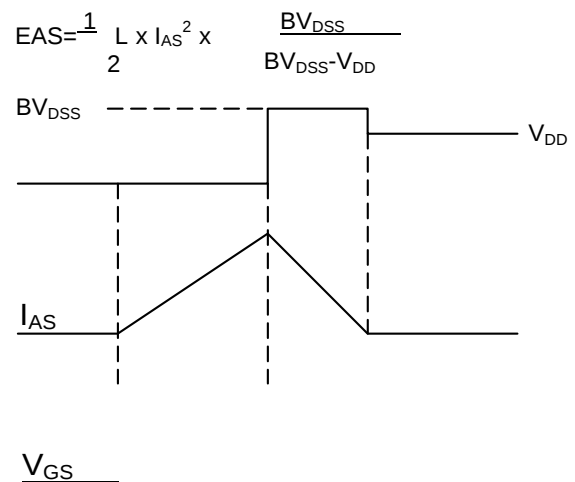
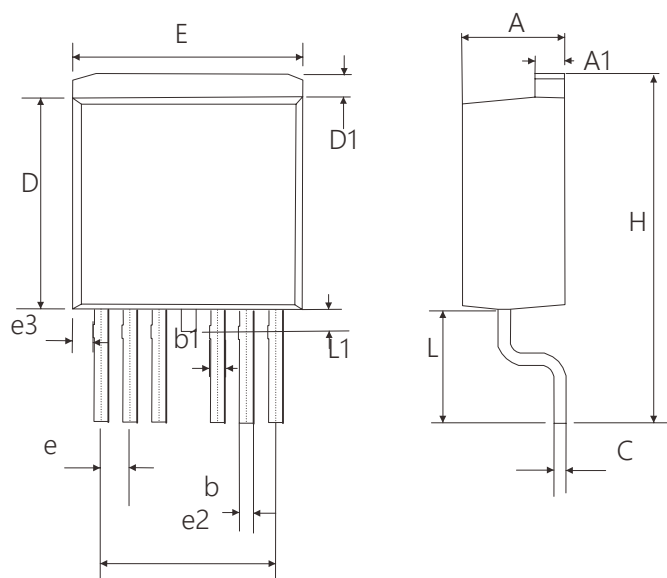


Fig.11 Unclamped Inductive Switching Waveform

TO-263-7L Outline



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.25	4.75	0.167	0.187
A1	1.2	1.4	0.047	0.055
b	0.5	0.7	0.020	0.028
b1	0.5	0.9	0.020	0.035
C	0.4	0.6	0.016	0.024
D	9.05	9.45	0.356	0.372
D1	0.7	1.3	0.028	0.051
E	9.8	10.2	0.386	0.402
e	1.07	1.47	0.042	0.058
e2	7.32	7.92	0.288	0.312
e3	0.64	1.04	0.025	0.041
H	14.65	15.65	0.577	0.616
L	4.47	5.47	0.176	0.215
L1	0.90	1.50	0.035	0.059