QM0005D

P-Channel 100V Fast Switching MOSFET

General Description

The QM0005D is the highest performance trench P-Channel MOSFET with extreme high cell density , which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

The QM0005D meet the RoHS and Green Product requirement with full function reliability approved.

Product Summary

Green RoHS、HF、Pb

BVDSS	RDSON (VGS=-10V)	ID (Tc=25℃)
-100V	150mΩ	-13.4A

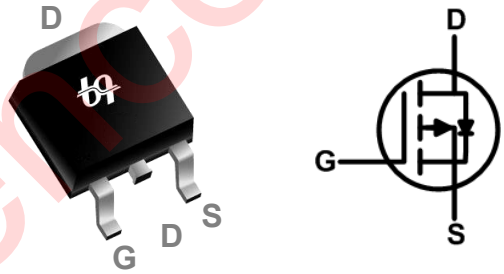
Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent Cdv/dt effect decline
- Green Device Available

Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Networking DC-DC Power System
- Power Tool Application

TO252 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ -10V[1]	-13.4	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ -10V[1]	-8.5	A
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ -10V[1]	-2.8	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ -10V[1]	-2.3	A
I_{DM}	Pulsed Drain Current[2]	-34	A
EAS	Single Pulse Avalanche Energy[3]	36.4	mJ
I_{AS}	Avalanche Current	27	A
P_D@T_C=25℃	Total Power Dissipation[4]	45	W
P_D@T_A=25℃	Total Power Dissipation[4]	2	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	2.8	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-100	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.05	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-10V , I_D=-6A	---	120	150	mΩ
		V_{GS}=-4.5V , I_D=-3A	---	130	165	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-1.2	-1.6	-2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-80V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
		V_{DS}=-80V , V_{GS}=0V , T_J=55℃	---	---	-5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=-5V , I_D=-6A	---	12.6	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	10	20	Ω
Q_g	Total Gate Charge (-10V)	V_{DS}=-80V , V_{GS}=-10V , I_D=-6A	---	30	42	nC
Q_{gs}	Gate-Source Charge		---	6.4	9	
Q_{gd}	Gate-Drain Charge		---	4.5	6.3	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-50V , V_{GS}=-10V , R_G=3.3Ω , I_D=-6A	---	6.8	13.6	ns
T_r	Rise Time		---	9.4	17	
$T_{d(off)}$	Turn-Off Delay Time		---	62	124	
T_f	Fall Time		---	9.6	19	
C_{iss}	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	2125	2980	pF
C_{oss}	Output Capacitance		---	104	146	
C_{rss}	Reverse Transfer Capacitance		---	60	84	

Guaranteed Avalanche Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy[5]	V_{DD}=25V , L=0.1mH , I_{AS}=19A	18	---	---	mJ

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,6]	V_G=V_D=0V , Force Current	---	---	-13.4	A
I_{SM}	Pulsed Source Current[2,6]		---	---	-34	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	I_F=-6A , di/dt=100A/μs , T_J=25℃	---	22.6	---	nS
Q_{rr}	Reverse Recovery Charge		---	29	---	nC

Note :
1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The EAS data shows Max. rating . The test condition is V_{DD}=-25V,V_{GS}=-10V,L=0.1mH
4.The power dissipation is limited by 150℃ junction temperature
5.The Min. value is 100% EAS tested guarantee.
6.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

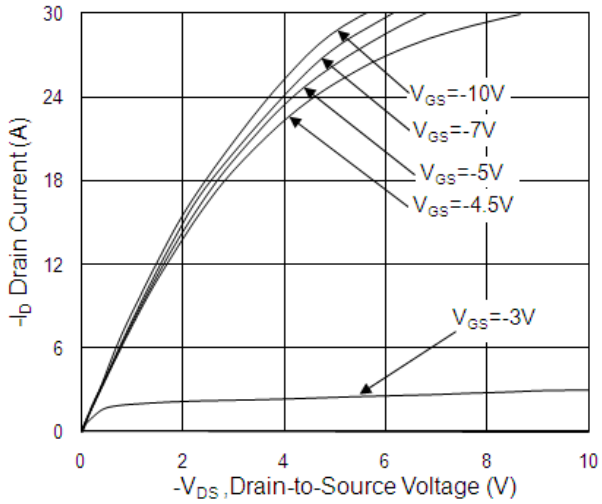


Fig.1 Typical Output Characteristics

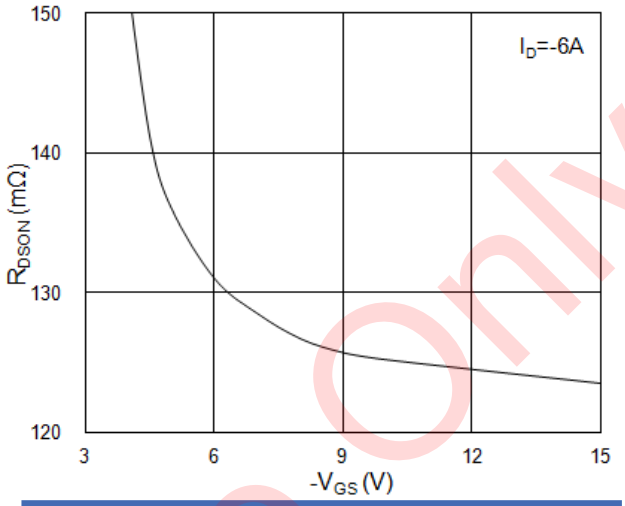


Fig.2 On-Resistance vs. Gate-Source

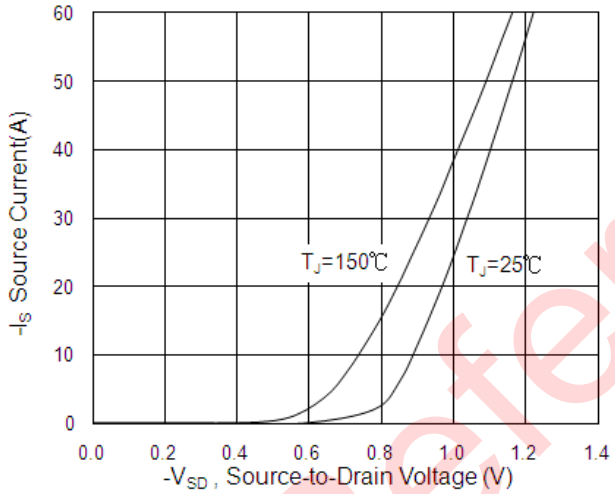


Fig.3 Forward Characteristics Of Reverse

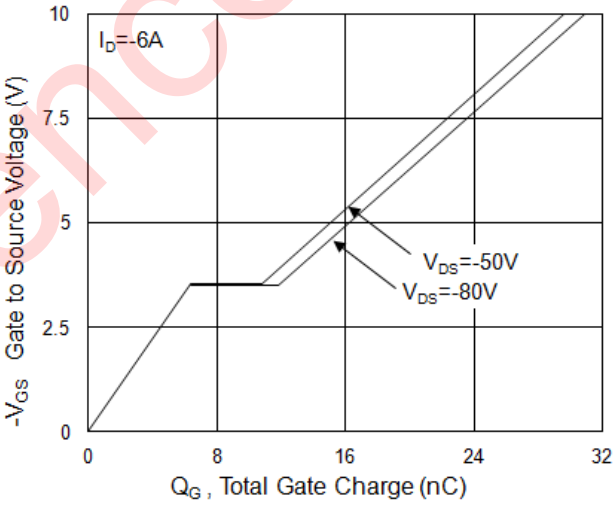


Fig.4 Gate-Charge Characteristics

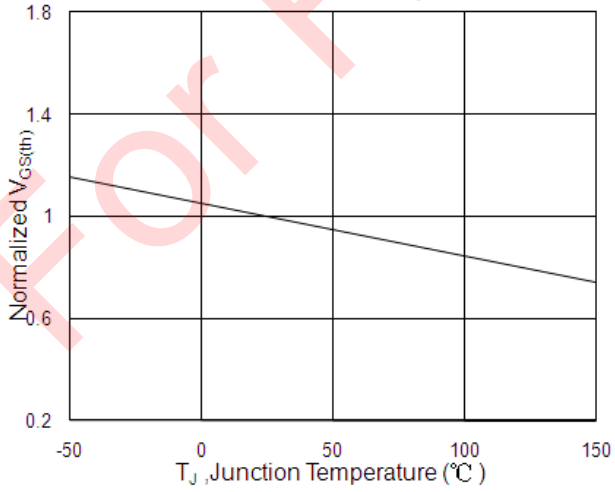


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

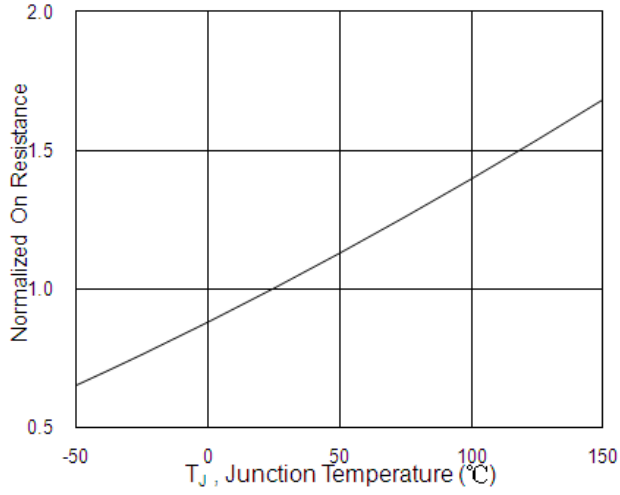


Fig.6 Normalized R_{DSON} vs. T_J

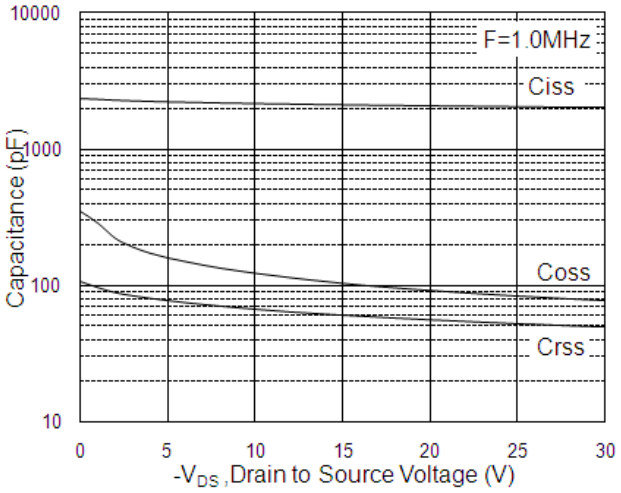


Fig.7 Capacitance

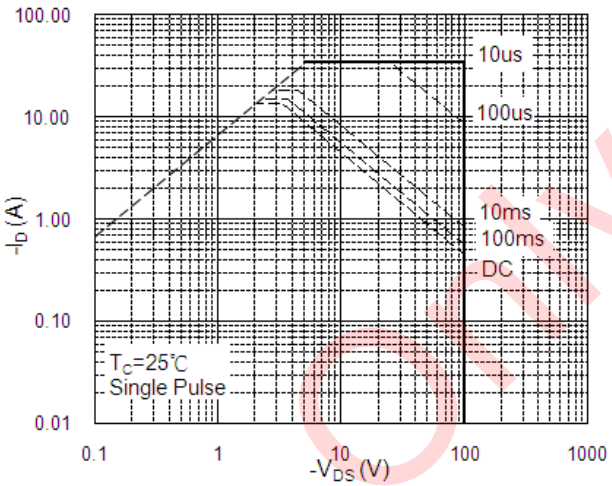


Fig.8 Safe Operating Area

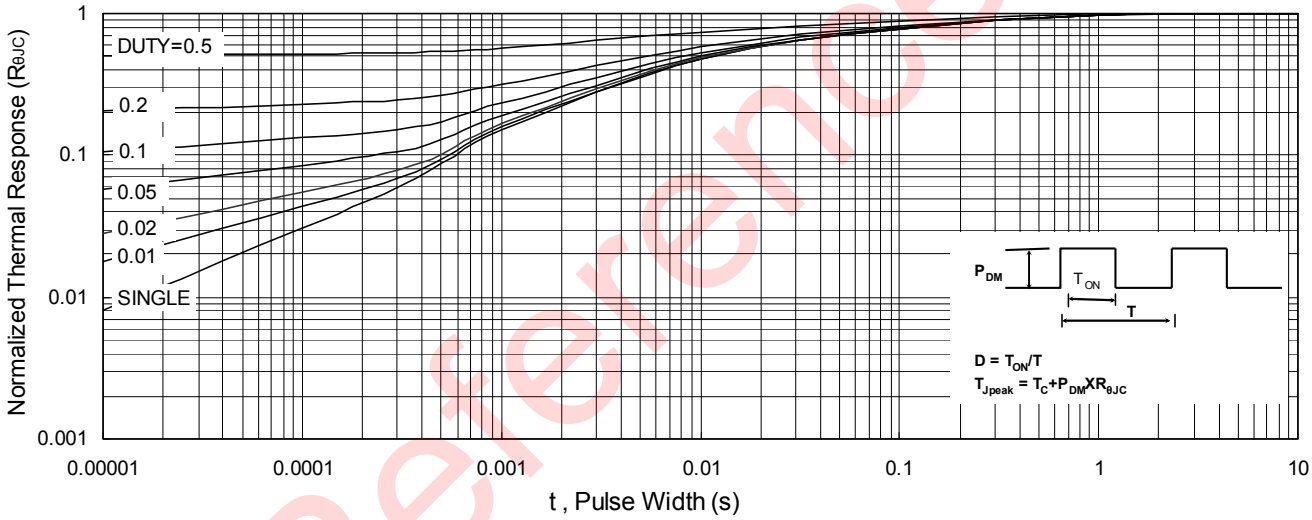


Fig.9 Normalized Maximum Transient Thermal Impedance

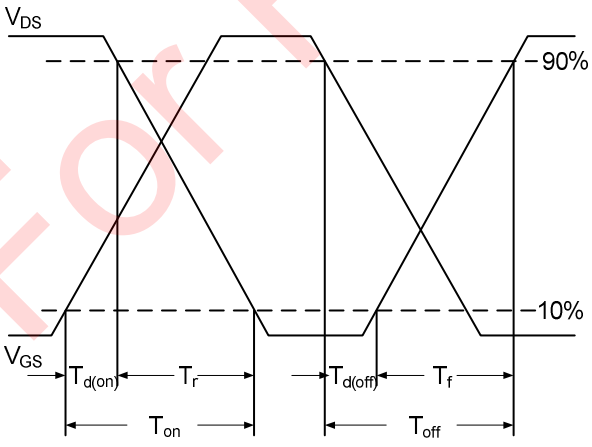


Fig.10 Switching Time Waveform

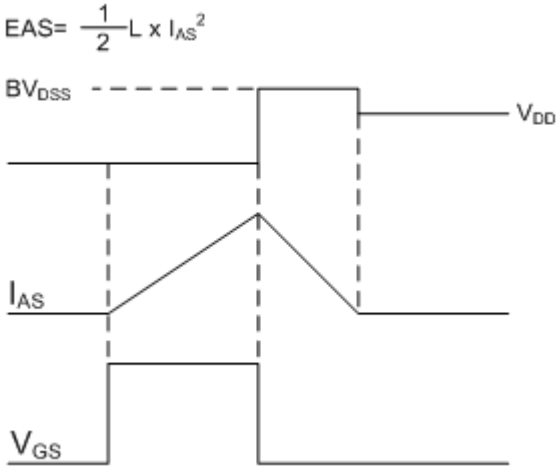
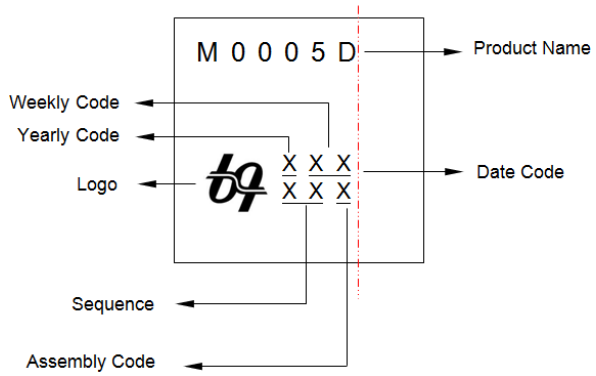
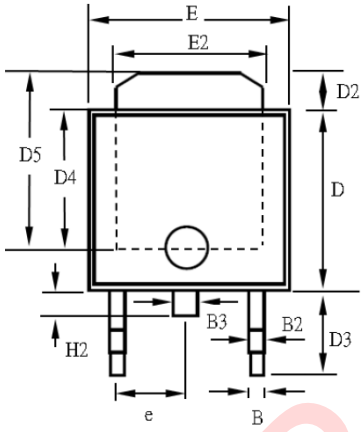


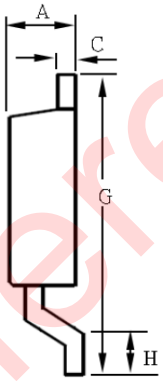
Fig.11 Unclamped Inductive Switching Waveform

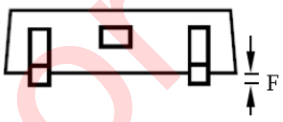
Top Marking

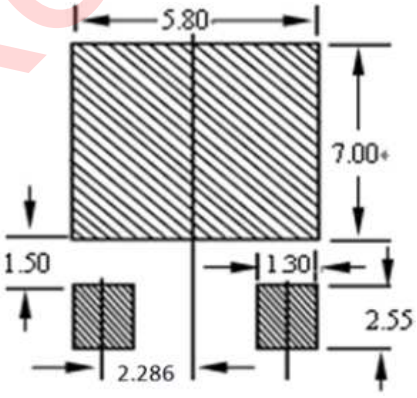


TO252 Package Outline Drawing









LAND PATTERN RECOMMENDATION

SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	2.18	--	2.40
B	0.64	--	0.90
B2	0.76	--	1.44
B3	0.60	--	1.00
C	0.43	--	0.89
D	5.33	--	6.23
D2	0.88	--	2.03
D3	2.66	--	2.90
D4	3.04	--	--
D5	4.57	--	5.35
E	6.35	--	6.80
E2	3.81	--	5.46
F	0.00	--	0.20
G	9.39	--	10.50
H	1.38	--	1.78
H2	0.50	--	1.02
e	--	2.286	--

Note:
1. ALL DIMENSIONS LISTED ON THE DRAWING MEETING JEDEC STANDARD.
2. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
3. RECOMMENDED LAND PATTERN DESIGN IS ONLY FOR REFERENCE

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