iS30M035S1C

SuperQ™ 300V N-Channel Power MOSFET

FEATURES

- Industry leading resistance in PDFN 5x6 package
- High short-circuit withstand capability (SCWC)
- 100% UIS tested in production, 175°C rated
- Low switching losses, Q_{SW} and E_{OSS}
- Easier parallelling with ± 0.5V gate threshold

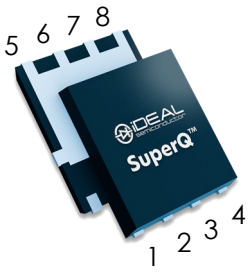
APPLICATIONS

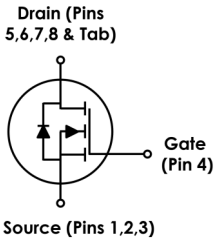
- LED Lighting
- Boost converters and SMPS control FETs
- Motor Drive

DESCRIPTION

Engineered for LED lighting and high-efficiency SMPS and motor drives, this 300V SuperQ MOSFET delivers ultra-low conduction and switching losses in a robust PDFN 5x6 package. Featuring low $R_{DS(on)}$ and Q_{SW}, it minimizes heat dissipation at both full and partial loads.

PRODUCT SUMMARY





PDFN 5x6mm

Parameter T_A = 25°C	Value	Unit
V_{DS}	300	V
$R_{DS(on),max}$	35	mΩ
I_D	39	A
Q_G	28	nC
Q_{SW}	2.7	nC
E_{OSS}	1.4	µJ

Pb

HAL

RoHS

ORDERING INFORMATION			
Part Number	**Package**	**Marking**	**Packaging**
iS30M035S1C	PDFN 5x6	iS30M035S1	5,000 pcs Reel

ABSOLUTE MAXIMUM RATINGS			
SYMBOL	**PARAMETER** (T_A = 25°C unless otherwise specified)	**VALUE**	**UNIT**
V_{GS}	Gate-to-source voltage	± 20	V
I_D	Continuous drain current (silicon limited), T_C = 25°C	39	A
	Continuous drain current (silicon limited), T_C = 100°C	28	
I_{DM}	Pulsed drain current	143	A
P_D	Power dissipation, T_C = 25°C	125	W
T_J, T_{stg}	Operating junction, storage temperature	-55 to 175	°C
E_{AS}	Avalanche energy, single pulse I_D = 8.9A, R_{GS} = 25Ω	39	mJ

THERMAL CHARACTERISTICS					
SYMBOL	**PARAMETER** (T_A = 25°C unless otherwise specified)	**VALUE**			**UNIT**
		MIN	**TYP**	**MAX**	
$R_{\theta JC}$	Junction-to-case thermal resistance - PDFN 5x6	-	-	1.2	°C/W
$R_{\theta JA}$	Junction-to-ambient thermal resistance (1)	-	-	50	°C/W

(1) 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

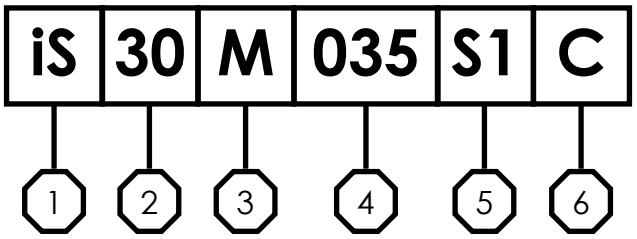
ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)						
SYMBOL	PARAMETER	TEST CONDITIONS	VALUE			UNIT
			MIN	TYP	MAX	
STATIC CHARACTERISTICS						
BV_{DSS}	Drain-to-source voltage	V_{GS} = 0V, I_D = 1mA	300	-	-	V
I_{DSS}	Drain-to-source leakage current	V_{GS} = 0V, V_{DS} = 240V, T_J = 25°C	-	-	1	µA
		V_{GS} = 0V, V_{DS} = 240V, T_J = 125°C (2)	-	-	100	
I_{GSS}	Gate-to-source leakage current	V_{DS} = 0V, V_{GS} = 20V	-	-	100	nA
$V_{GS(th)}$	Gate-to-source threshold voltage	V_{DS} = V_{GS}, I_D = 70µA	3.1	3.6	4.1	V
$R_{DS(on)}$	Drain-to-source on-resistance	V_{GS} = 10V, I_D = 10A	-	30	35	mΩ
DYNAMIC CHARACTERISTICS						
C_{iss}	Input capacitance (2)	V_{GS} = 0V, V_{DS} = 150V, f = 100kHz	-	1,865	2,425	pF
C_{rss}	Reverse transfer capacitance (2)		-	12	16	
C_{oss}	Output capacitance (2)		-	94	122	
$C_{o(er)}$	Effective output capacitance	V_{DS} = 0 to 150V, V_{GS} = 0V	-	284	-	
R_G	Series gate resistance	f = 1MHz	-	4.5	6.8	Ω
$t_{d(on)}$	Turn-on delay time	V_{DS} = 150V, V_{GS} = 10V, I_{DS} = 10A, $R_{G,EXT}$ = 0 Ω	-	TBD	-	ns
t_r	Rise time		-	TBD	-	
$t_{d(off)}$	Turn-off delay time		-	TBD	-	
t_f	Fall time		-	TBD	-	
GATE CHARGE CHARACTERISTICS						
Q_g	Gate charge total (2)	V_{DS} = 150V, I_D = 10A, V_{GS} = 0 to 10V	-	28	36	nC
Q_{sw}	Switching charge (3)		-	2.7	-	
Q_{gd}	Gate to drain charge (2)(3)		-	1.2	1.6	
$Q_{g(th)}$	Gate charge at threshold		-	6.6	-	
Q_{gs2}	Gate to source charge (3)		-	1.3	-	
$V_{plateau}$	Gate plateau voltage		-	5.7	-	V
Q_{oss}	Output charge (2)	V_{DS} = 0 to 150V, V_{GS} = 0V	-	137	178	nC
E_{oss}	Capacitive stored energy		-	1.4	-	µJ
DIODE CHARACTERISTICS						
V_{SD}	Diode forward voltage	I_{SD} = 10A, V_{GS} = 0V	-	1	1.2	V
Q_{rr}	Reverse recovery charge	V_{DS} = 150V, I_F = 10A, di/dt = 100A/µs	-	550	-	nC
t_{rr}	Reverse recovery time		-	105	-	ns

(2) Defined by design. Not subject to production test.

(3) Q_{SW} should be used for switching loss calculations. See Figure 16 for gate charge definitions. For more information see Qsw application note on www.idealsemi.com

DEVICE DECODER RING

Device Code



1 – iDEAL Semiconductor product

2 – Voltage rating divided by 10 (300V)

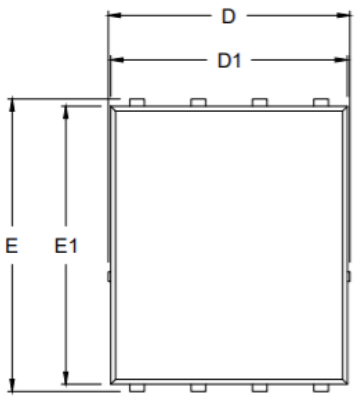
3 – M = N-Channel MOSFET, Standard Threshold

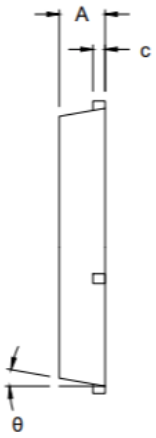
4 – Maximum drain-to-source resistance

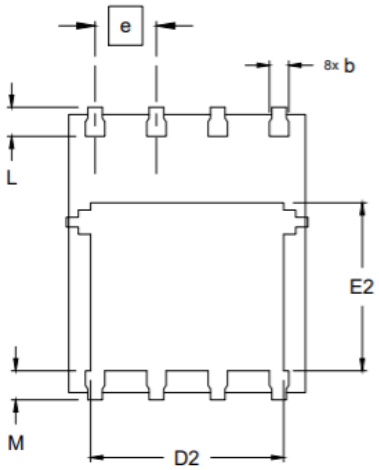
5 – SuperQ™ Generation

6 – C = PDFN 5x6

PDFN 5x6 Package Drawing







SYMBOL	MIN	MAX
A	0.95	1.05
b	0.31	0.51
c	0.25 REF	
D	4.94	5.30
D1	4.80	5.1
D2	3.70	4.10
E	5.97	6.35
E1	5.67	6.10
E2	3.37	3.76
e	1.27 TYP	
L	0.51	0.71
M	0.51	0.73
θ	0°	10°

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