

SuperQ® 200V N-Channel Power MOSFET

16mΩ, 62A, TO-220

FEATURES

- Low $R_{DS(on)}$ in TO-220 package
- High short-circuit withstand capability (SCWC)
- 100% UIS tested in production
- Low switching losses, Q_{SW} and E_{OSS}
- Easier paralleling with $\pm 0.5V$ gate threshold tolerance

APPLICATIONS

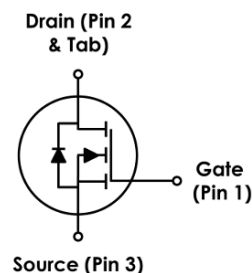
- Motor Control
- Boost Converters and SMPS
- Control FETs
- Class D Audio
- Battery Management Systems

PRODUCT SUMMARY

Parameter	Typ	Max	Unit
V_{DS}		200	V
$R_{DS(on)}$ @ 10V	14	16	mΩ
I_D		62	A
Q_G	29	37	nC
Q_{SW}	3.0		nC
E_{OSS}	1.5		μJ

DESCRIPTION

Engineered for SMPS and high-efficiency motor drives, this 200V SuperQ MOSFET delivers ultra-low conduction and switching losses in a robust TO-220 package. Featuring low $R_{DS(on)}$ and industry leading Q_{SW} and E_{OSS} , it minimizes heat dissipation at both full and partial loads.



ORDERING INFORMATION

Part Number	Package	Marking	Packaging
iS20M016S1P	TO-220	iS20M016S1	50pc Tube

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER ($T_A = 25^\circ\text{C}$ unless otherwise specified)	VALUE	UNIT
V_{GS}	Gate-to-source voltage	± 20	V
I_D	Continuous drain current (silicon limited), $T_C = 25^\circ\text{C}$	62	A
	Continuous drain current (silicon limited), $T_C = 100^\circ\text{C}$	44	
I_{DM}	Pulsed drain current	228	
I_S	Continuous diode forward current, $T_C = 25^\circ\text{C}$	62	
$I_{S PULSE}$	Diode pulse current	228	
P_D	Power dissipation, $T_C = 25^\circ\text{C}$	150	W
T_J, T_{SG}	Operating junction, storage temperature	-55 to 175	$^\circ\text{C}$
E_{AS}	Avalanche energy, single pulse $I_D = 31A$, $R_{GS} = 25\Omega$	209	mJ

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER ($T_A = 25^\circ\text{C}$ unless otherwise specified)	VALUE			UNIT
		MIN	TYP	MAX	
$R_{\theta JC}$	Junction-to-case thermal resistance – TO-220	-	-	1.0	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction-to-ambient thermal resistance ⁽¹⁾	-	-	50	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction-to-ambient thermal resistance, minimal footprint	-	-	62	$^\circ\text{C/W}$

(1) 40mm x 40mm x 1.5mm epoxy PCB FR4 with 6cm² (one-layer, 70μm thick) copper area for drain connection. PCB is vertical in still air.

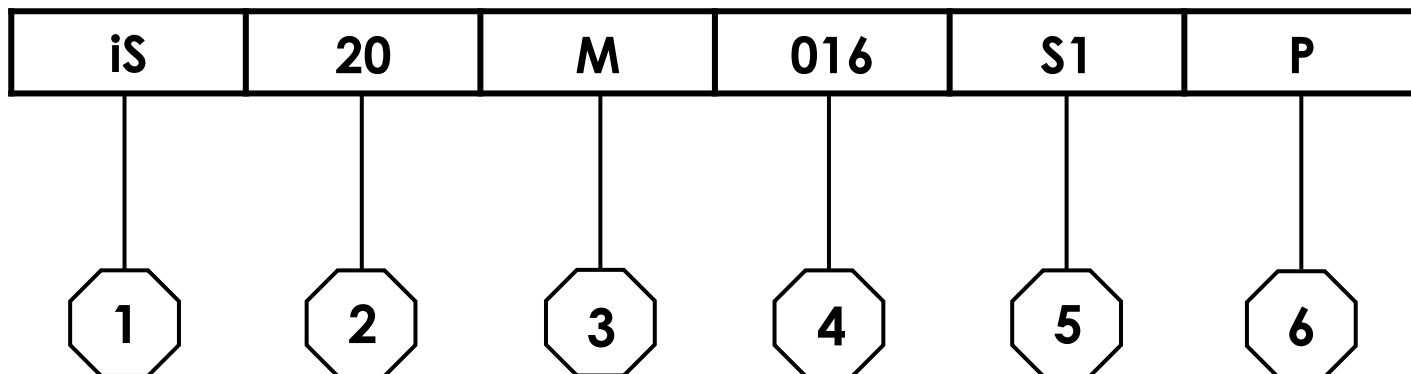
ELECTRICAL CHARACTERISTICS (T _A = 25°C unless otherwise specified)							
SYMBOL	PARAMETER	TEST CONDITIONS	VALUE			UNIT	
			MIN	TYP	MAX		
STATIC CHARACTERISTICS							
BV _{DSS}	Drain-to-source voltage	V _{GS} = 0V, I _D = 1mA	200	-	-	V	
I _{DSS}	Drain-to-source leakage current	V _{GS} = 0V, V _{DS} = 160V, T _J = 25°C	-	0.05	1.0	μA	
		V _{GS} = 0V, V _{DS} = 160V, T _J = 125°C ⁽²⁾	-	-	100		
I _{GSS}	Gate-to-source leakage current	V _{DS} = 0V, V _{GS} = 20V	-	10	100	nA	
V _{GS(th)}	Gate-to-source threshold voltage	V _{DS} = V _{GS} , I _D = 105μA	2.5	3.0	3.5	V	
R _{DS(on)}	Drain-to-source on-resistance	V _{GS} = 10V, I _D = 19A	-	14	16	mΩ	
g _{fs}	Transconductance	V _{DS} = 10V, I _D = 19A	24	48	-	S	
DYNAMIC CHARACTERISTICS							
C _{iss}	Input capacitance ⁽²⁾	V _{GS} = 0V, V _{DS} = 100V, f = 100kHz	-	1,872	2,433	pF	
C _{rss}	Reverse transfer capacitance ⁽²⁾		-	11	15		
C _{oss}	Output capacitance ⁽²⁾		-	102	132		
C _{o(er)}	Effective output capacitance	V _{DS} = 0 to 100V, V _{GS} = 0V	-	295	-	Ω	
R _g	Series gate resistance	f = 1MHz	-	1.0	2.0		
T _{d(on)}	Turn-on delay time	V _{DS} = 100V, V _{GS} = 10V, I _{DS} = 19A, R _{G,EXT} = 0Ω	-	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} = 100V, I _D = 19A, V _{GS} = 0 to 10V	-	29	37	nC	
Q _{sw}	Switching charge ⁽³⁾		-	3.0	-		
Q _{gd}	Gate to drain charge ⁽²⁾⁽³⁾		-	1.3	1.6		
Q _{g(th)}	Gate charge at threshold ⁽³⁾		-	9.0	-		
Q _{gs2}	Gate to source charge ⁽³⁾		-	1.7	-		
V _{plateau}	Gate plateau voltage		-	5.0	-	V	
Q _{oss}	Output charge ⁽²⁾	V _{DS} = 0 to 100V, V _{GS} = 0V	-	125	163	nC	
E _{oss}	Capacitive stored energy		-	1.5	-	μJ	
DIODE CHARACTERISTICS							
V _{SD}	Diode forward voltage	I _{SD} = 19A, V _{GS} = 0V	-	1.0	1.2	V	
Q _{RR}	Reverse recovery charge	V _{DS} = 100V, I _F = 19A,	-	446	-	nC	
t _{rr}	Reverse recovery time	di/dt = 100A/μs	-	110	-	ns	

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

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

DEVICE DECODER RING

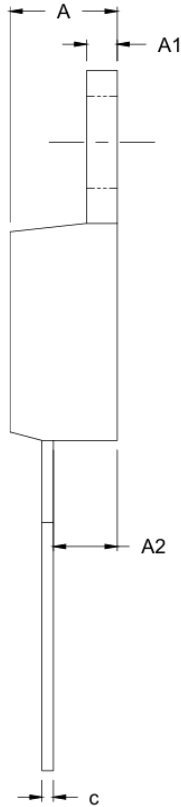
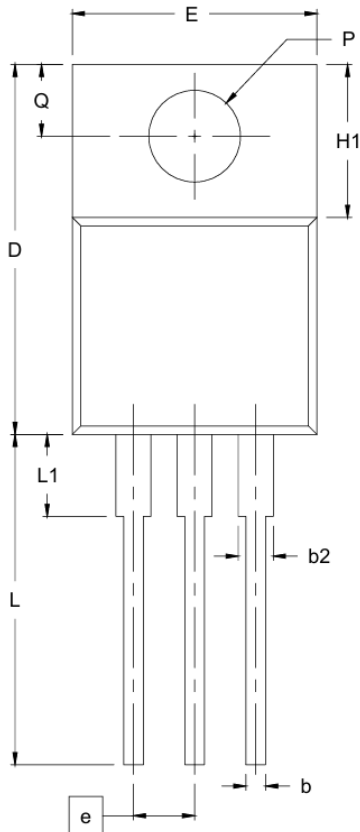
DEVICE CODE:



	— iDEAL Semiconductor product
	— Voltage rating divided by 10 (200V)
	— M = N-Channel MOSFET, Standard Threshold
	— Maximum drain-to-source resistance
	— SuperQ® Generation
	— P = TO-220

Package Drawing

TO-220 Package



SYMBOL	MIN	MAX
A	4.19	4.82
A1	1.14	1.40
A2	2.38	2.92
b	0.63	1.01
b2	1.13	1.78
c	0.31	0.64
D	14.22	16.51
E	9.66	10.66
e	2.54 BSC	
H1	5.85	6.85
L	12.70	14.73
L1	2.39	4.42
P	3.54	4.08
Q	2.54	3.42

Notes:

1. All linear dimensions in millimeters
2. Dimensions D and E do not include mold flash or protrusions

Revision History

Revision History		
Version	Date	Comments
Preliminary 1.0	September 2026	Preliminary Release

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design resources:



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