

SuperQ® 150V N-Channel Power MOSFET

3.4mΩ, 75A, ITO-220

FEATURES

- Low $R_{DS(on)}$ in ITO-220 package
- High short-circuit withstand capability (SCWC)
- 100% UIS tested in production
- Low switching losses, Q_{SW} and E_{OSS}
- Industrial rating to 175°C junction temperature

APPLICATIONS

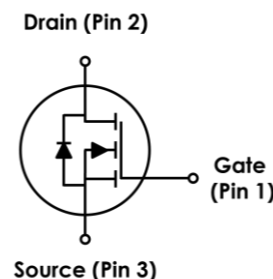
- Solar inverter
- Boost converters and SMPS control FETs
- Secondary side synchronous rectifier
- Motor control

PRODUCT SUMMARY

Parameter	Typ	Max	Unit
V_{DS}		150	V
$R_{DS(on)}$ @ 10V	3.0	3.4	mΩ
I_D		75	A
Q_G	88	114	nC
Q_{SW}	8.9		nC
E_{OSS}	1.7		μJ

DESCRIPTION

Engineered for high-efficiency motor drives and SMPS, this 150V SuperQ MOSFET delivers ultra-low conduction and switching losses in a robust ITO-220 package. Featuring best-in-class $R_{DS(on)}$ and Q_{SW} , it minimizes heat dissipation at both full and partial loads.



ORDERING INFORMATION

Part Number	Package	Marking	Packaging
iS15M3R4S1F	ITO-220	iS15M3R4S1	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), $TC = 25^\circ\text{C}$	75	A
	Continuous drain current (silicon limited), $TC = 100^\circ\text{C}$	53	
I_{DM}	Pulsed drain current	298	
I_S	Continuous diode forward current, $TC = 25^\circ\text{C}$	53	
$I_{S,PULSE}$	Diode pulse current	298	
P_D	Power dissipation, $TC = 25^\circ\text{C}$	43	W
T_J, T_{sg}	Operating junction, storage temperature	-55 to 175	$^\circ\text{C}$
E_{AS}	Avalanche energy, single pulse $I_D = 43\text{A}$, $R_{GS} = 25\Omega$	450	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 – ITO-220	-	-	3.5	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction-to-ambient thermal resistance ⁽¹⁾	-	-	50	$^\circ\text{C/W}$

(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.

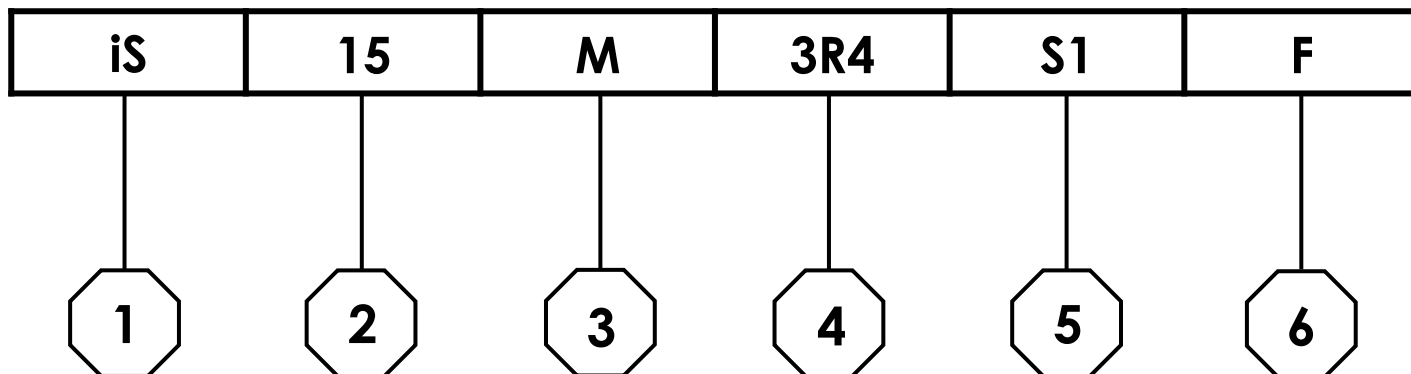
ELECTRICAL CHARACTERISTICS (T _A = 25°C unless otherwise specified)						
SYMBOL	PARAMETER	TEST CONDITIONS	VALUE			UNIT
			MIN	TYP	MAX	
STATIC CHARACTERISTICS						
BV _{DSS}	Drain-to-source voltage	V _{GS} = 0V, I _D = 1mA	150	-	-	V
I _{DSS}	Drain-to-source leakage current	V _{GS} = 0V, V _{DS} = 120V, T _J = 25°C	-	0.1	1.0	μA
		V _{GS} = 0V, V _{DS} = 120V, T _J = 125°C ⁽²⁾	-	-	100	
I _{GSS}	Gate-to-source leakage current	V _{DS} = 0V, V _{GS} = 20V	-	30	100	nA
V _{GS(th)}	Gate-to-source threshold voltage	V _{DS} = V _{GS} , I _D = 231μA	2.5	3.3	4.1	V
R _{DS(on)}	Drain-to-source on-resistance	V _{GS} = 10V, I _D = 40A	-	3.1	3.4	mΩ
g _{fs}	Transconductance	V _{DS} = 10V, I _D = 40A	70	140	-	S
DYNAMIC CHARACTERISTICS						
C _{iss}	Input capacitance ⁽²⁾	V _{GS} = 0V, V _{DS} = 75V, f = 100kHz	-	5,373	6,985	pF
C _{rss}	Reverse transfer capacitance ⁽²⁾		-	67	88	
C _{oss}	Output capacitance ⁽²⁾		-	262	341	
C _{o(er)}	Effective output capacitance	V _{DS} = 0 to 75V, V _{GS} = 0V	-	617	-	
R _g	Series gate resistance	f = 1MHz	-	1.2	1.8	Ω
T _{d(on)}	Turn-on delay time	V _{DS} = 75V, V _{GS} = 10V, I _{DS} = 40A, 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} = 75V, I _D = 40A, V _{GS} = 0 to 10V	-	88	114	nC
Q _{sw}	Switching charge ⁽³⁾		-	8.9	-	
Q _{gd}	Gate to drain charge ⁽²⁾⁽³⁾		-	5.5	7.2	
Q _{g(th)}	Gate charge at threshold ⁽³⁾		-	15.7	-	
Q _{gs2}	Gate to source charge ⁽³⁾		-	3.5	-	
V _{plateau}	Gate plateau voltage		-	5.0	-	V
Q _{oss}	Output charge ⁽²⁾	V _{DS} = 0 to 75V, V _{GS} = 0V	-	241	313	nC
E _{oss}	Capacitive stored energy		-	1.7	-	μJ
DIODE CHARACTERISTICS						
V _{SD}	Diode forward voltage	I _{SD} = 40A, V _{GS} = 0V	-	0.8	1.0	V
Q _{RR}	Reverse recovery charge	V _{DS} = 75V, I _F = 40A, di/dt = 100A/μs	-	216	-	nC
t _{rr}	Reverse recovery time		-	94	-	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

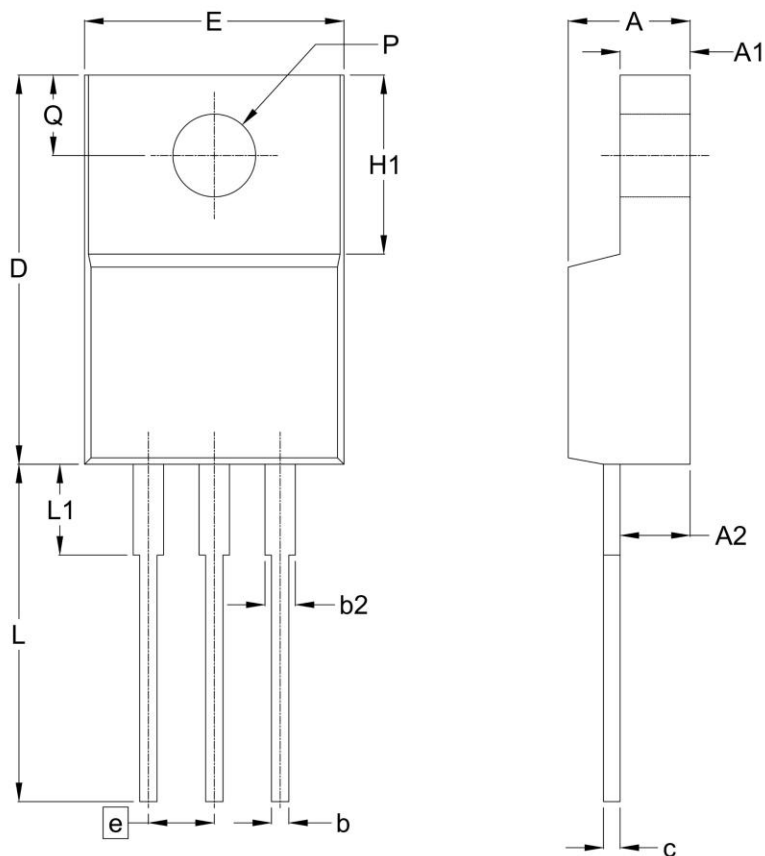
DEVICE CODE:



	— iDEAL Semiconductor product
	— Voltage rating divided by 10 (150V)
	— M = N-Channel MOSFET, Standard Threshold
	— Maximum drain-to-source resistance
	— SuperQ® Generation
	— F = ITO-220

Package Drawing

ITO-220 Package



SYMBOL	MIN	MAX
A	4.30	4.90
A1	2.50	3.44
A2	2.56	2.96
b	0.50	0.84
b2	0.99	1.35
c	0.49	0.79
D	14.70	16.07
E	9.70	10.31
e	2.54 BSC	
H1	6.70	7.10
L	12.50	13.50
L1	----	3.50
P	2.98	3.40
Q	2.70	3.50

Notes:

1. 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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