



Description

The RQ3E180AJTB1 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



DFN3X3-8L

General Features

$V_{DS} = 30V$ $I_D = 90A$

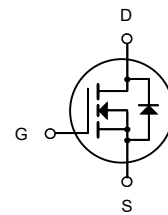
$R_{DS(ON)} < 4.6 m\Omega @ V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply



N-Channel MOSFET

Ordering Information

Product ID	Pack	Brand	Qty(PCS)
RQ3E180AJTB1	DFN3X3-8L	HXY MOSFET	5000

Absolute Maximum Ratings ($T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	30	V
V _{GS}	Gate-Source Voltage	±20	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	90	A
$I_D@T_C=75^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	45	A
IDM	Pulsed Drain Current ²	290	A
EAS	Single Pulse Avalanche Energy ³	196	mJ
IAS	Avalanche Current	36	A
$P_D@T_C=25^\circ C$	Total Power Dissipation ⁴	46	W
TSTG	Storage Temperature Range	-55 to 175	°C
T _J	Operating Junction Temperature Range	-55 to 175	°C
R _{θJA}	Thermal Resistance Junction-ambient ¹	62	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	1.72	°C/W



Electrical Characteristics (T_J=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	30	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =1mA	---	---	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =30A	---	3.5	4.6	mΩ
		V _{GS} =4.5V, I _D =15A	---	7.8	10	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.6	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	---	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =30V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =30V, V _{GS} =0V, T _J =100°C	---	---	100	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =30A	---	80	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	2	---	Ω
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =4.5V, I _D =30A	---	20	---	nC
Q _{gs}	Gate-Source Charge		---	5	---	
Q _{gd}	Gate-Drain Charge		---	7.2	---	
T _{d(on)}	Turn-On Delay Time	V _{GS} =10V, V _{DD} =15V, R _G =3Ω, I _D =30A	---	9	---	ns
T _r	Rise Time		---	16	---	
T _{d(off)}	Turn-Off Delay Time		---	43	---	
T _f	Fall Time		---	12	---	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	2088	---	pF
C _{oss}	Output Capacitance		---	277	---	
C _{rss}	Reverse Transfer Capacitance		---	209	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	90	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1.2	V

Note :

F The data is tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

G The data is tested by pulsed pulse width ≤ 300us, duty cycle ≤ 2%

H The EAS data shows Max. heating test condition as V_{GS}=0, V_{DD}=24V, V_{GS}=10V, L=0.1mH, I_{AS}=36A.

I The power dissipation is limited by 50°C junction temperature

J The data is theoretically the same as I_{DM} and I_{DM(A)}. In real applications it should be limited by total power dissipation.



Typical Characteristics

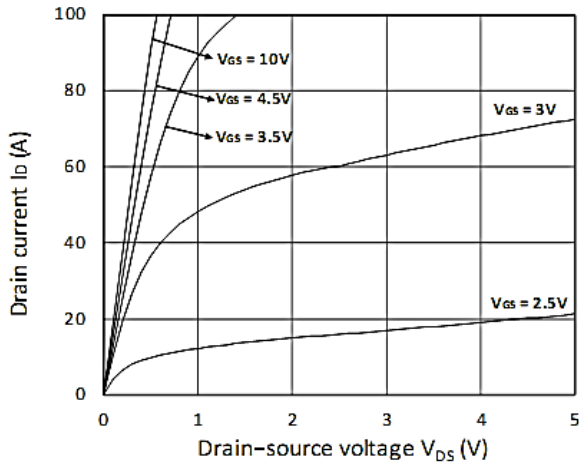


Figure 1. Output Characteristics

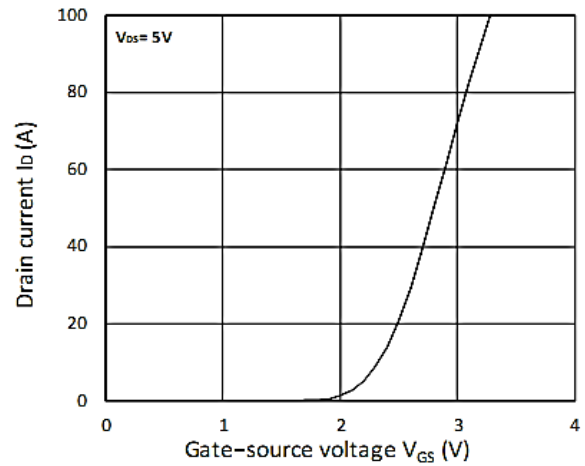


Figure 2. Transfer Characteristics

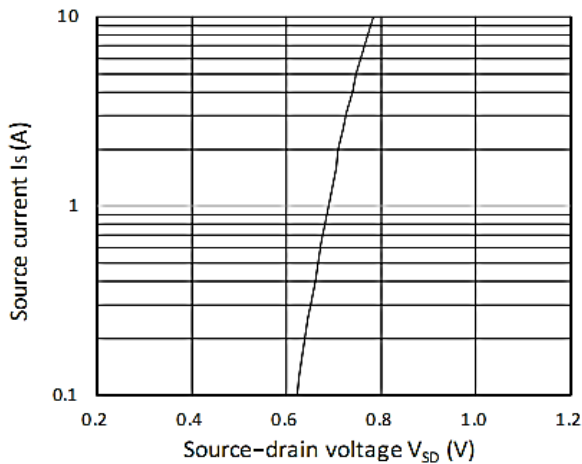


Figure 3. Forward Characteristics of Reverse

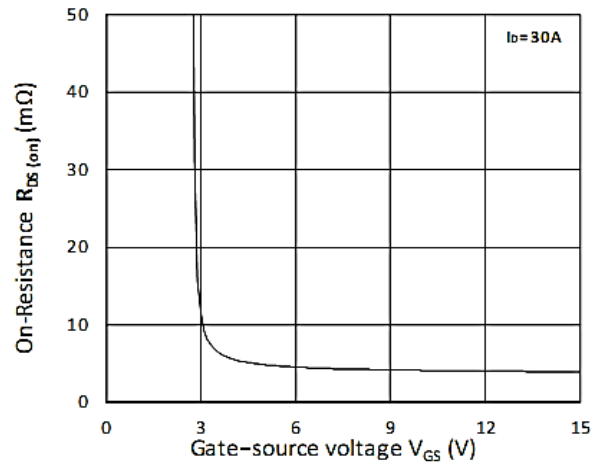


Figure 4. R_DS(ON) vs. V_GS

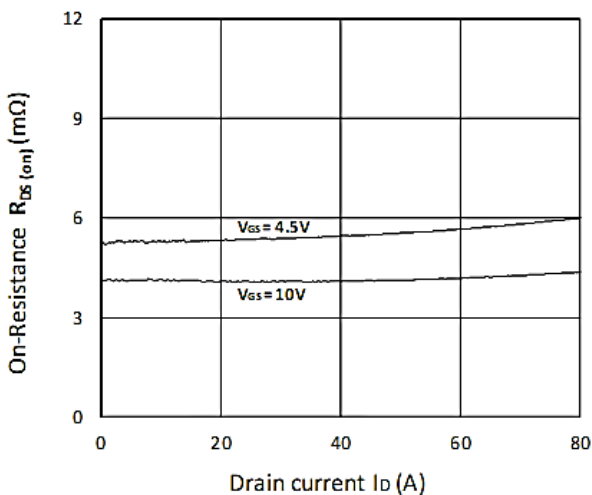


Figure 5. R_DS(ON) vs. I_D

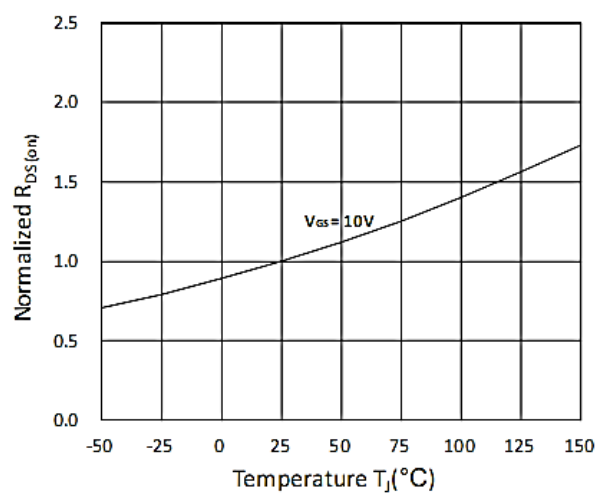


Figure 6. Normalized R_DS(on) vs. Temperature



Figure 7. Capacitance Characteristics



Figure 8. Gate Charge Characteristics



Figure 9. Power Dissipation

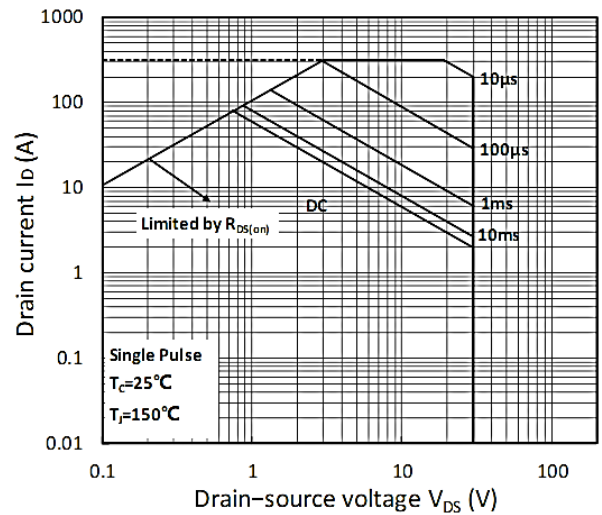


Figure 10. Safe Operating Area

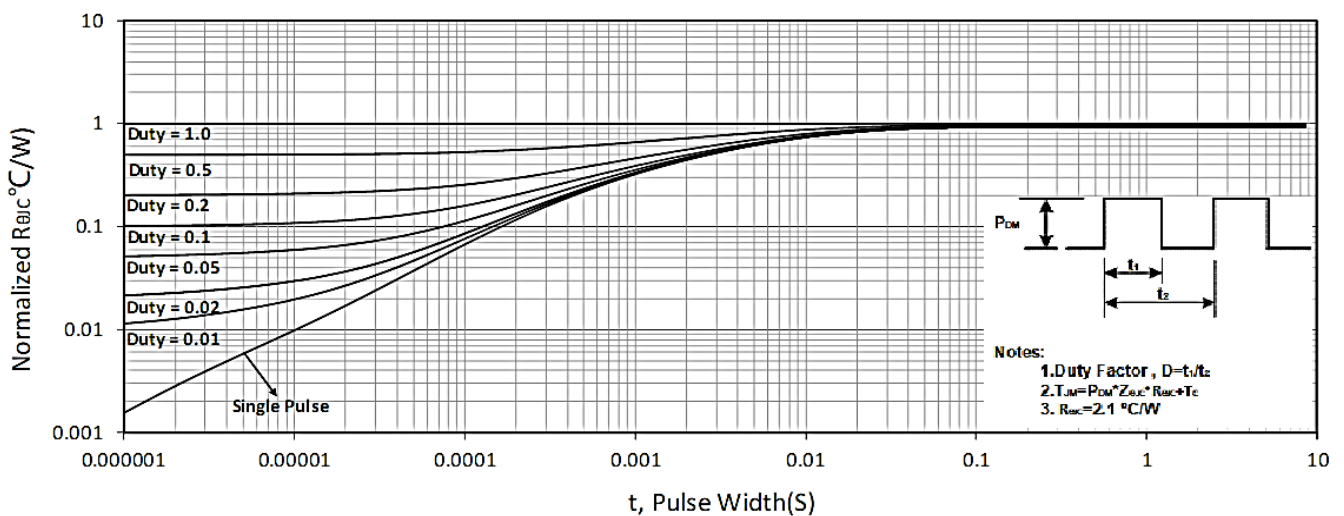
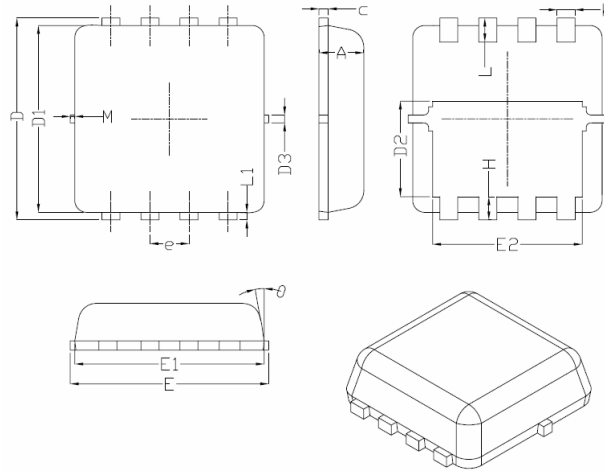


Figure 11. Normalized Maximum Transient Thermal Impedance



DFN3X3-8L Package Information



Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.48	1.58	1.68
D3	-	0.13	-
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	-	0.13	-
M	*	*	0.15
θ		10°	12°



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