

N-Channel MOSFET

RCQ5606

■ Description

The RCQ5606 is the new generation trench N-channel MOSFET has been designed to minimize the on-state resistance ($R_{DS(ON)}$) yet maintain superior switching performance, making it ideal for high efficiency power management applications

■ Features

- High - speed switching
- Excellent gate charge x $R_{DS(ON)}$ product (FOM)
- for extremely low $R_{DS(ON)}$
- Lead-Free, Halogen-Free; RoHS Compliant

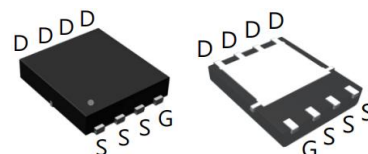
■ Applications

- LED applications
- Power Tools, Load Switch
- Power Management

V_{DSS}	60V
I_D	80A
$R_{DS(ON)}$	5.5mΩ @ $V_{GS}=10V$

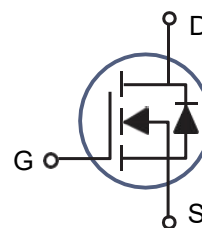
■ Outline

PDFN5x6-8L Pin Configuration



■ Equivalent

(1\2\3)Source
(4)Gate
(5\6\7\8)Drain



■ Absolute Maximum Ratings

Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current-Continuous ^(Note2)	$T_C=25^{\circ}C$	I_D	80	A
	$T_C=70^{\circ}C$		64	A
-Pulsed ^(Note 1· Note 2)		I_{DM}	340	A
Single Pulse Avalanche Energy ^(Note 3)		E_{AS}	182	mJ
Maximum Power Dissipation	$T_C=25^{\circ}C$	P_D	135	W
	$T_C=70^{\circ}C$		108	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C
Thermal Resistance Junction-Ambient		$R_{\theta JA}$	62	°C /W
Thermal Resistance Junction-Case		$R_{\theta JC}$	0.92	°C/W

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V , I _D =250uA	60			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V , V _{GS} =0V			1	uA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V , V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250uA	2	3	4	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V , I _D =30A		5.5	8.0	mΩ
Forward Transconductance	g _{FS}	V _{GS} =10V , I _D =3A		15		S
DYNAMIC CHARACTERISTICS Note4						
Input Capacitance	C _{ISS}	V _{DS} =30V , V _{GS} =0 V , f =1.0MHz		4720		pF
Output Capacitance	C _{OSS}			320		pF
Reverse Transfer Capacitance	C _{RSS}			160		pF
Total Gate Charge	Q _g	V _{DS} =30V , I _D =10A , V _{GS} =4.5V		33		nC
Gate-Source Charge	Q _{gs}	V _{DS} =30V , I _D =10A , V _{GS} =10V		11		nC
Gate-Drain Charge	Q _{gd}			12		nC
SWITCHING CHARACTERISTICS Note4						
Turn-On Delay Time	t _{D(ON)}	V _{DD} =15V , I _D =1A , V _{GS} =10V , R _G =3.3Ω		20		ns
Rise Time	tr			14		ns
Turn-Off Delay Time	tD(OFF)			61.4		ns
Fall Time	tf			17		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Diode Forward Voltage	V _{SD}	V _{GS} =0V , I _S =1A			1.0	V

Notes:

- 1、 Pulse Test Width < 300us,Duty Cycle< 2%
- 2、 Drain current limited by maximum junction temperature.
- 3、 Starting T_j=25°C ,L=0.1mH,V_{DD}=25V,V_{GS}=10V ,R_G=25Ω
- 4、 Guaranteed by design,not subject to production testing.

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■ Typical Performance Characteristics

Fig.1 Continuous Drain Current vs. TC

T_C , Case Temperature ($^{\circ}\text{C}$)

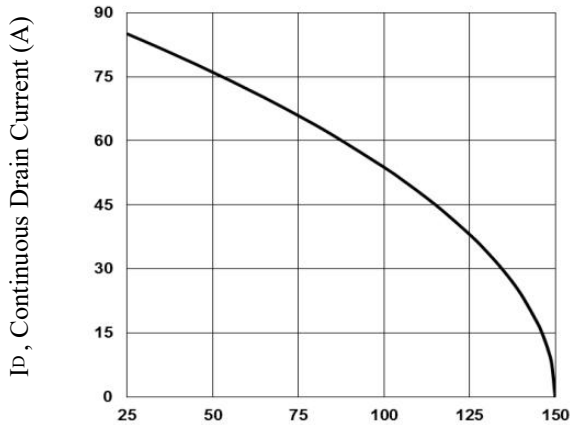


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

T_J , Junction Temperature ($^{\circ}\text{C}$)

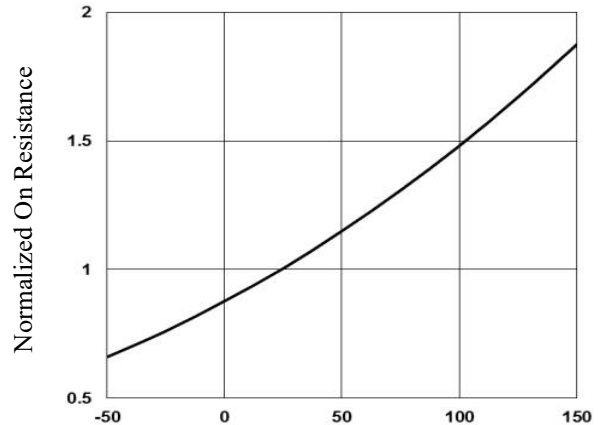


Fig.3 Normalized V_{th} vs. T_J

T_J , Junction Temperature ($^{\circ}\text{C}$)

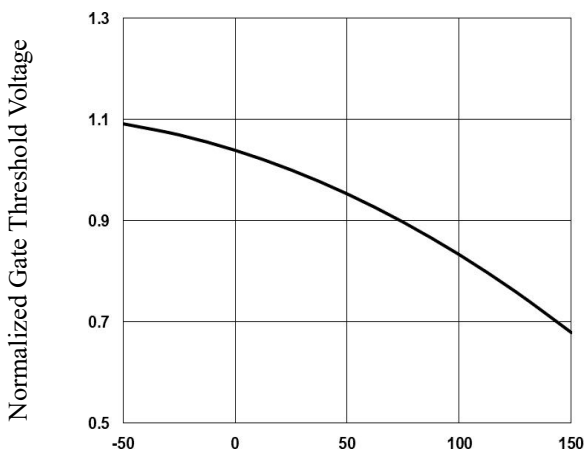


Fig.4 Gate Charge Waveform

Q_g , Gate Charge (nC)

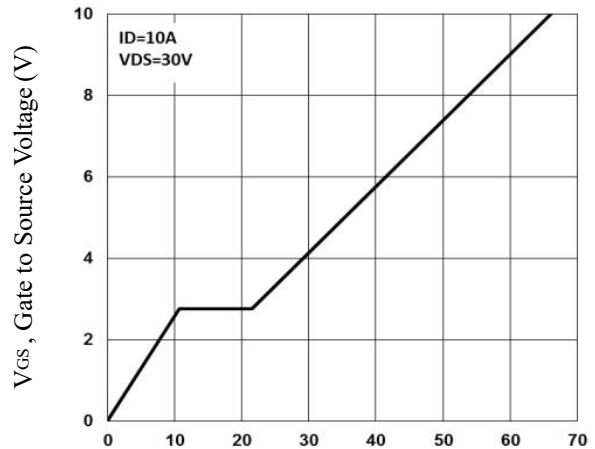


Fig.5 Normalized Transient Response

Square Wave Pulse Duration (s)

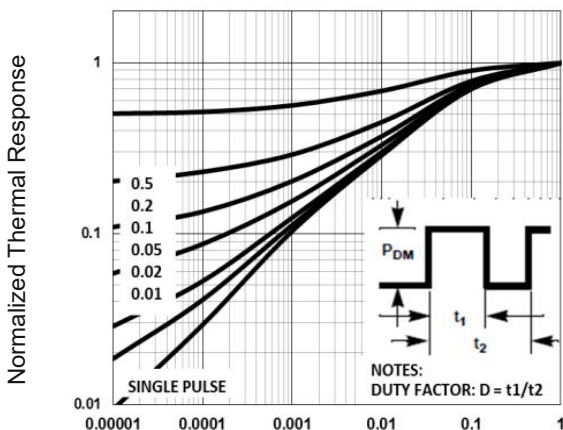
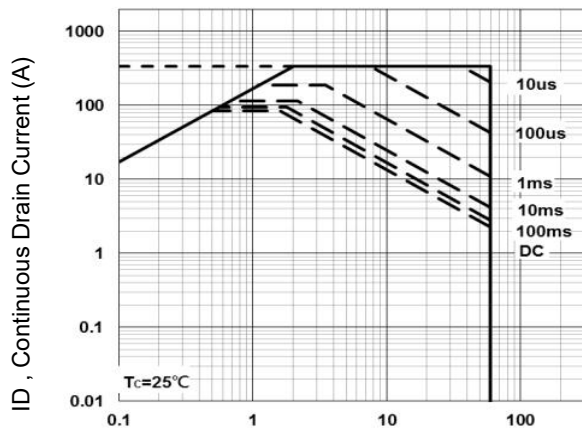


Fig.6 Maximum Safe Operation Area

V_{DS} , Drain to Source Voltage (V)



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Fig.7 Switching Time Waveform

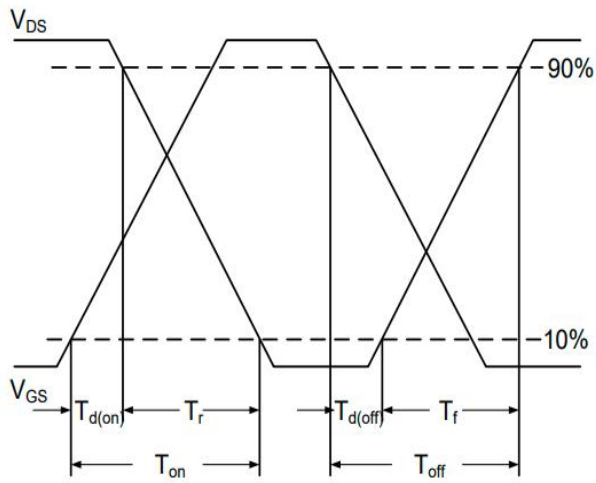
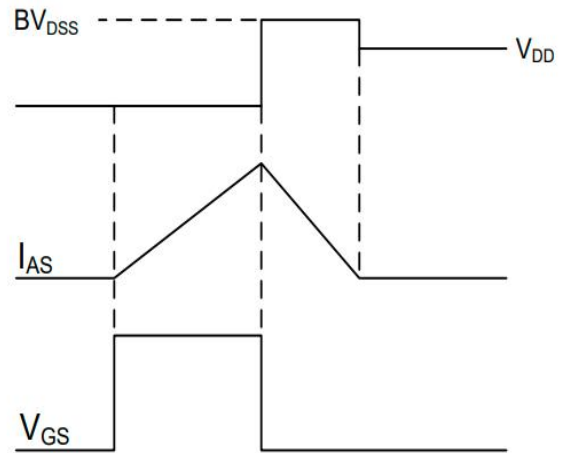
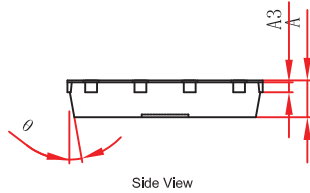
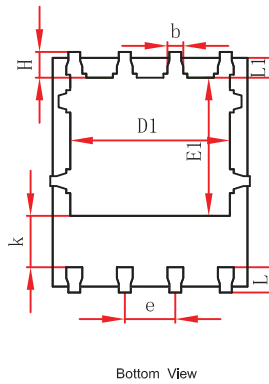
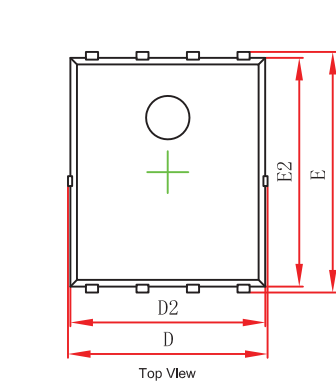


Fig.8 EAS Waveform



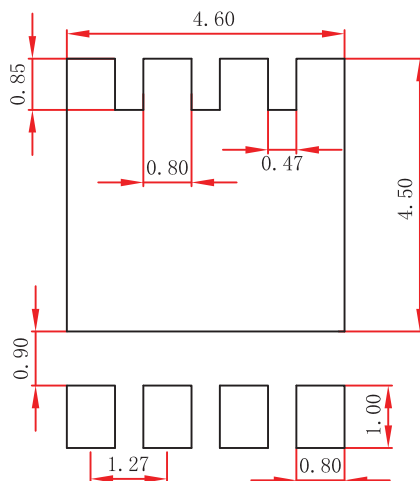
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PDFN5x6-8 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°

PDFN5x6-8 Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.