

P-Channel MOSFET

RCQ5305

■ Features

- $V_{DS} = -30V$
- $I_D = -90A$
- $R_{DS(ON)} < 7.5m\Omega @ V_{GS} = -10V$
- $R_{DS(ON)} < 12.5m\Omega @ V_{GS} = -4.5V$
- High - speed switching
- Excellent gate charge x $R_{DS(ON)}$ product (FOM)
- for extremely low $R_{DS(ON)}$
- Lead-Free, Halogen-Free; RoHS Compliant

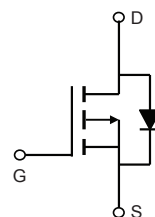
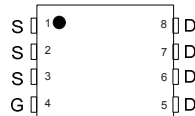
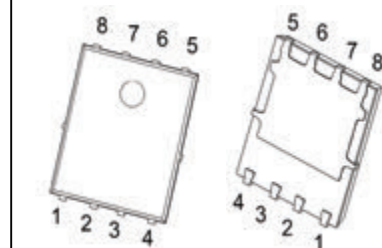
■ Applications

- LED Applications
- Load Switch
- Power Management

■ Marking

Marking	**** RCQ5305
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PDFN5x6-8



■ Absolute Maximum Ratings

Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current-Continuous ^(Note 2)	$T_C = 25^\circ C$	I_D	-90	A
	$T_C = 70^\circ C$		-71	A
-Pulsed ^(Note 1- Note 2)		I_{DM}	-360	A
Single Pulse Avalanche Energy ^(Note 3)		E_{AS}	240	mJ
Maximum Power Dissipation	$T_C = 25^\circ C$	P_D	120	W
	$T_C = 70^\circ C$		95	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ C$
Thermal Resistance Junction-Ambient		$R_{\theta JA}$	62	$^\circ C/W$
Thermal Resistance Junction-Case		$R_{\theta JC}$	1.05	$^\circ C/W$

P-Channel MOSFET

RCQ5305

■ 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	-30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-30V , 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	-1.2	-1.7	-2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V , I _D =-20A		5.5	7.5	mΩ
		V _{GS} =-4.5V , I _D =10A		9.5	12.5	mΩ
Forward Transconductance	g _{FS}	V _{gs} =-10V , I _D =-3A		6		S
DYNAMIC CHARACTERISTICS ^{Note4}						
Input Capacitance	C _{ISS}	V _{DS} =-15V , V _{GS} =0 V , f =1.0MHz		2600		pF
Output Capacitance	C _{OSS}			400		pF
Reverse Transfer Capacitance	C _{RSS}			340		pF
Total Gate Charge	Q _g	V _{DS} =-15V , I _D =-20A , V _{GS} =-4.5V		55		nC
Gate-Source Charge	Q _{gs}			15		nC
Gate-Drain Charge	Q _{gd}			17		nC
SWITCHING CHARACTERISTICS ^{Note4}						
Turn-On Delay Time	t _{D(ON)}	V _{DD} =-15V , I _D =-20A , V _{GS} =-10V , R _{GEN} =5Ω		30		ns
Rise Time	tr			12		ns
Turn-Off Delay Time	tD(OFF)			180		ns
Fall Time	tf			70		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Diode Forward Voltage	V _{SD}	V _{GS} =0V , I _S =-20A			-1.2	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}=-15V,V_{GS}=-10V ,R_G=25Ω
- 4、 Guaranteed by design,not subject to production testing.

P-Channel MOSFET

RCQ5305

■ Typical Performance Characteristics

Fig.1 Continuous Drain Current vs. TC
 T_C , Case Temperature ($^{\circ}\text{C}$)

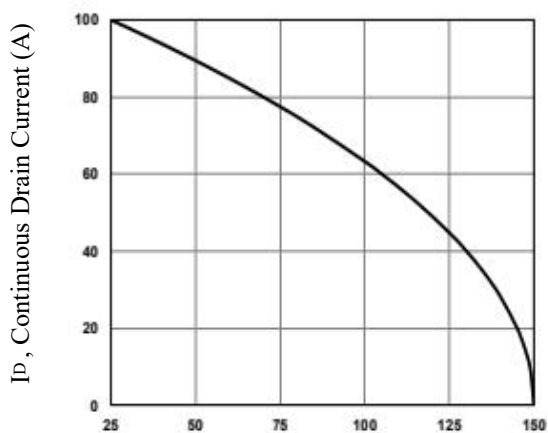


Fig.2 Normalized $R_{DS(on)}$ vs. T_J
 T_J , Junction Temperature ($^{\circ}\text{C}$)

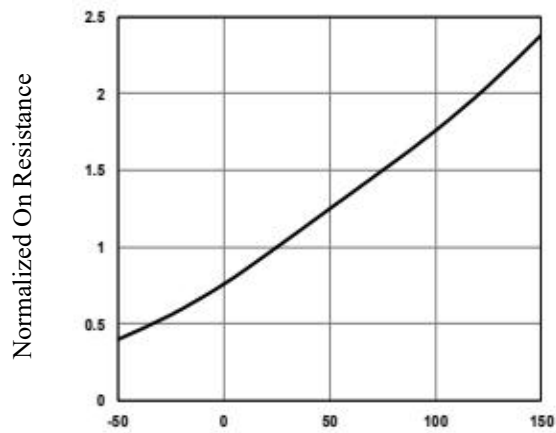


Fig.3 Normalized V_{th} vs. T_J
 T_J , Junction Temperature ($^{\circ}\text{C}$)

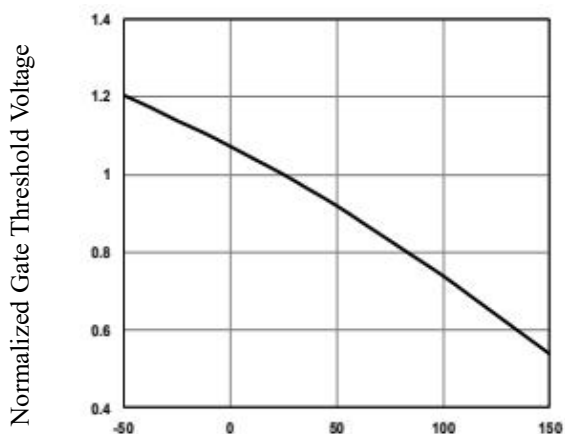


Fig.4 Gate Charge Waveform
 Q_g , Gate Charge (nC)

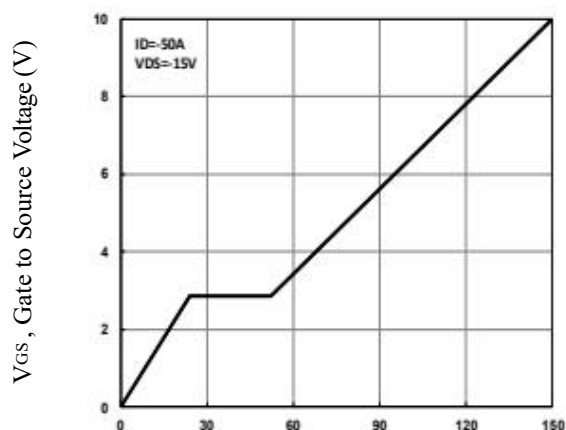


Fig.5 Typical Output Characteristics
 V_{DS} , Drain to Source Voltage (V)

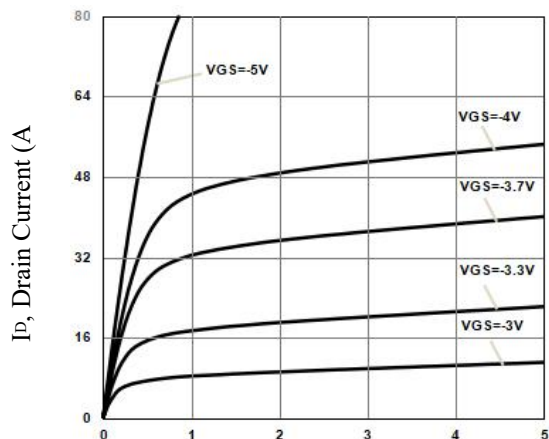
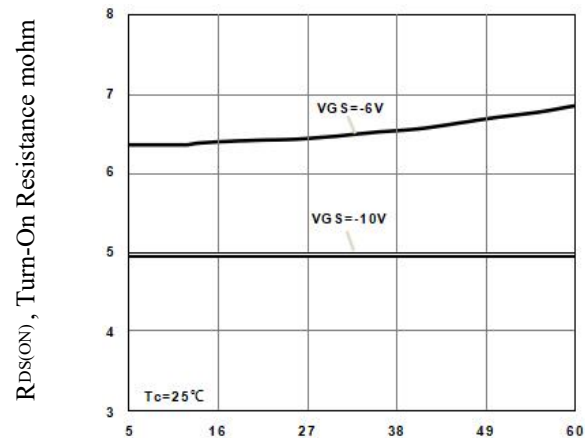


Fig.6 Turn-On Resistance vs. I_D
 I_D , Drain Current (A)



P-Channel MOSFET RCQ5305

Fig.7 Capacitance Characteristics

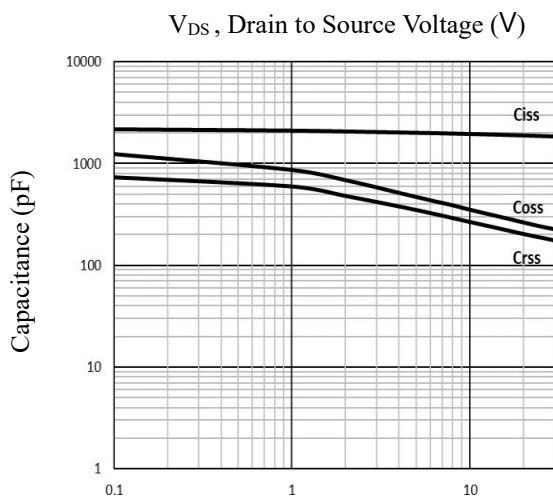


Fig.9 Maximum Safe Operation Area

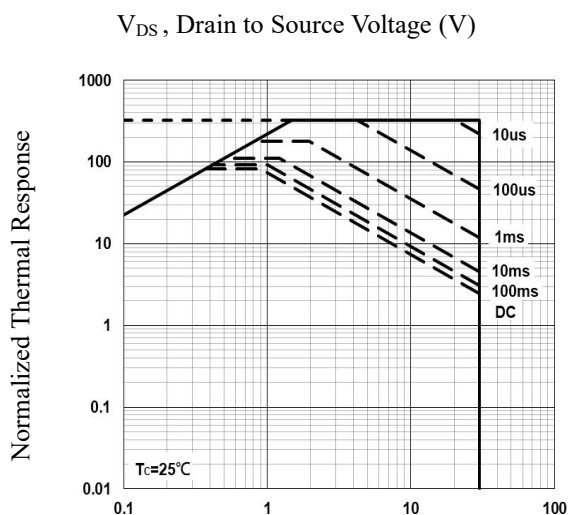


Fig.8 Normalized Transient Impedance

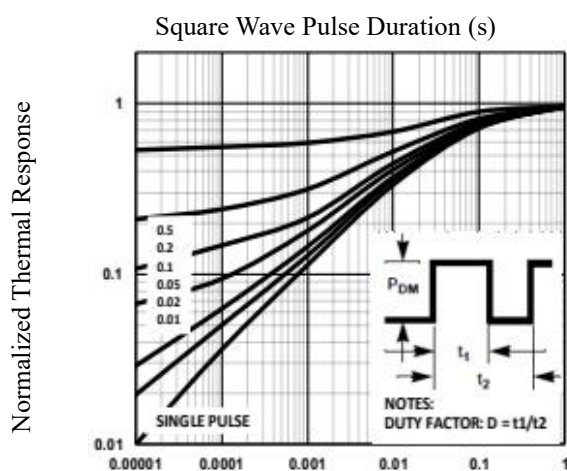
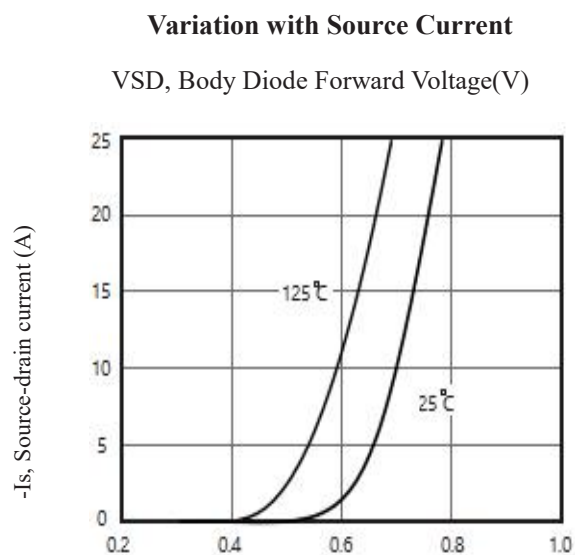


Fig.10 Body Diode Forward Voltage



P-Channel MOSFET RCQ5305

Figure 11a. Switching Test Circuit

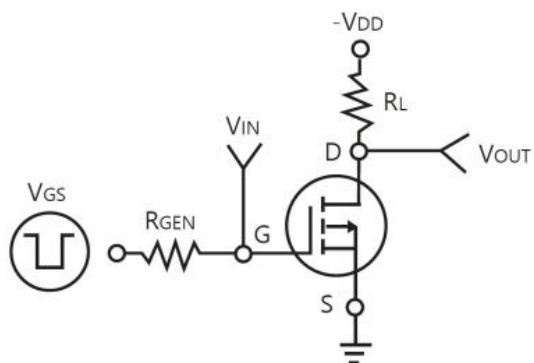


Figure 11b. Switching Waveforms

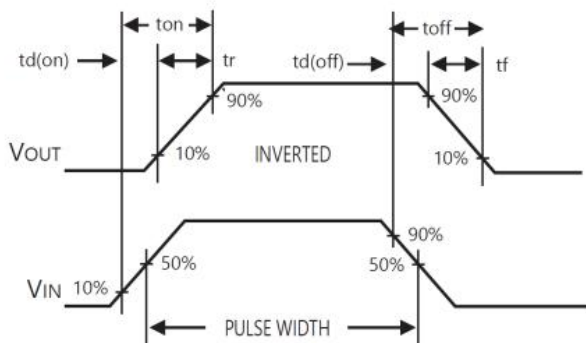


Figure 12a. Unclamped Inductive Test Circuit

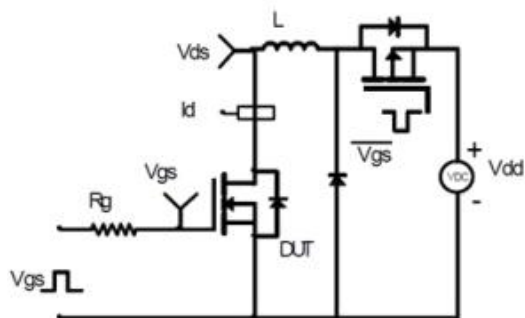
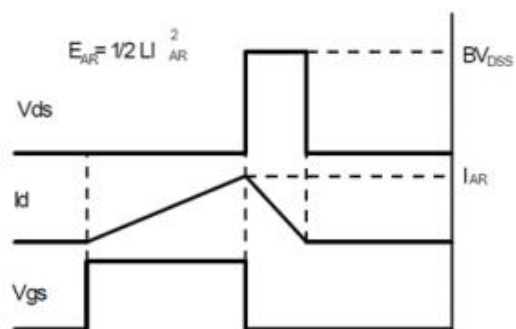


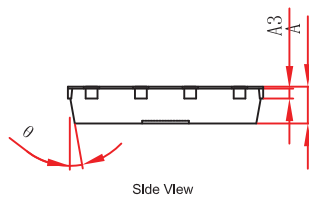
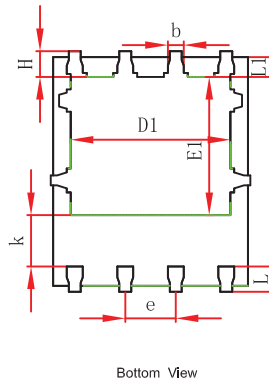
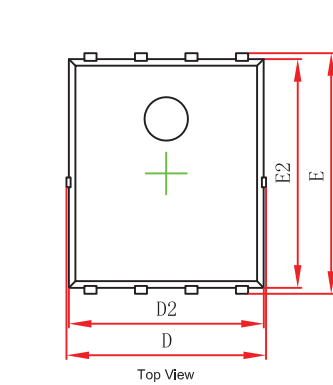
Figure 12b. Unclamped Inductive Waveforms



P-Channel MOSFET

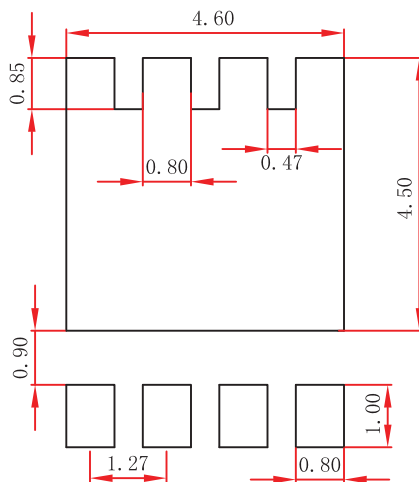
RCQ5305

■ 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.