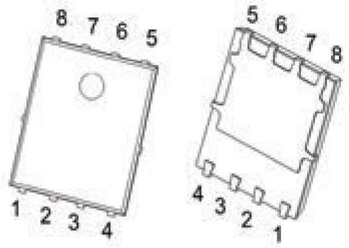
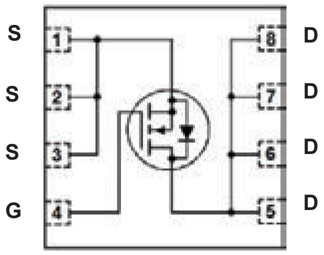
N-Channel Enhancement MOSFET
RCQ5402

PDFN5x6-8



■ Features

- V_{DS} = 40 V
- I_D = 140 A
- $R_{DS(ON)}$< 2.0mΩ @ V_{GS}=10V
- $R_{DS(ON)}$< 3.2 mΩ @ V_{GS}=4.5V
- 100% UIS Tested
- 100% Avalanche Tested



■ Absolute Maximum Ratings

Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current-Continuous(Note2)	T_C=25°C	I_D	140	A
	T_C=70°C		110	A
-Pulsed(Note 1、Note 2)		I_{DM}	460	A
Single Pulse Avalanche Energy(Note 3)		E_{AS}	253	mJ
Maximum Power Dissipation	T_C=25°C	P_D	120	W
	T_C=70°C		94	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		$R_{\theta JC}$	1.1	°C/W

■ Electrical Characteristics (T_C=25 ℃, 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	40			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=40V , 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	1.7	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS} =10V , I_D =20A		1.6	2	mΩ
		V_{GS} =4.5V , I_D =15A		2.5	3.2	mΩ
Forward Transconductance	g_{FS}	V_{GS} 10V , I_D =3A		12		S
DYNAMIC CHARACTERISTICS Note4						
Input Capacitance	C_{ISS}	V_{DS} =15V , V_{GS} =0 V , f =1.0MHz		2700		pF
Output Capacitance	C_{OSS}			1050		pF
Reverse Transfer Capacitance	C_{RSS}			70		pF
Total Gate Charge	Qg	V_{DS} =20V , I_D =70A , V_{GS} =10V		42		nC
Gate-Source Charge	Qgs	V_{DS} =20V , I_D =70A , V_{GS} =10V		10		nC
Gate-Drain Charge	Qgd			7		nC
SWITCHING CHARACTERISTICS Note4						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD} =20V , I_D =70A , V_{GS} =10V , R_{GEN} =1Ω		10		ns
Rise Time	tr			12		ns
Turn-Off Delay Time	tD(OFF)			18		ns
Fall Time	tf			30		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 Tj=25°C ,L=0.1mH,V_{DD}=25V,VGS=10V ,RG=25Ω

4、 Guaranteed by design,not subject to production testing.

■ Typical Performance Characteristics

Fig.1 Continuous Drain Current vs. TC

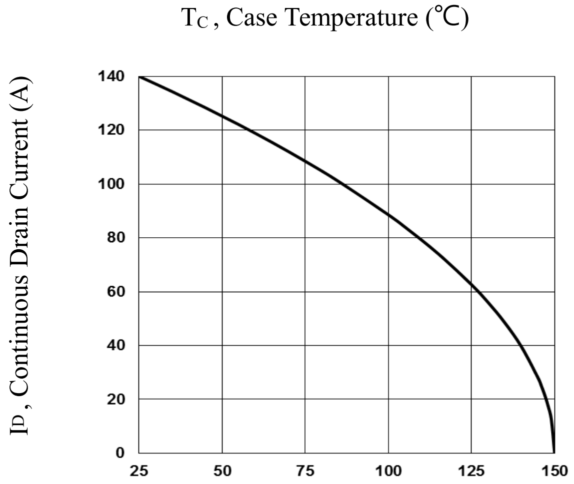


Fig.2 Normalized RDSON vs. TJ

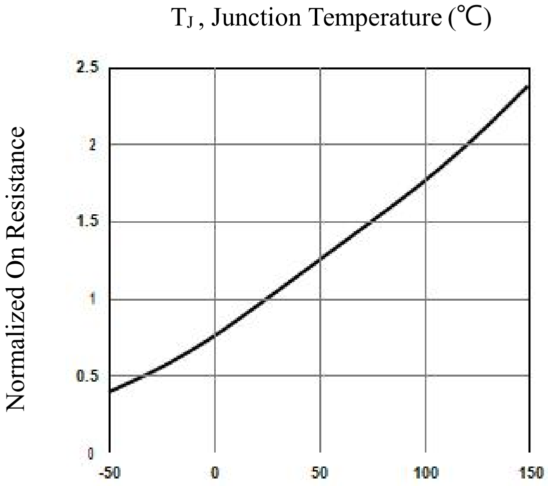


Fig.3 Normalized Vth vs. TJ

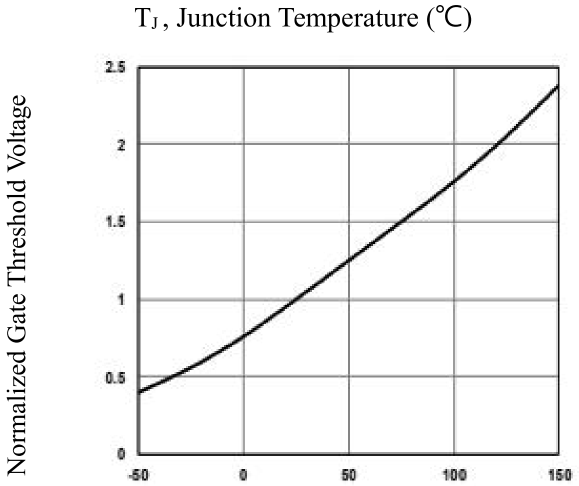


Fig.4 Gate Charge Waveform

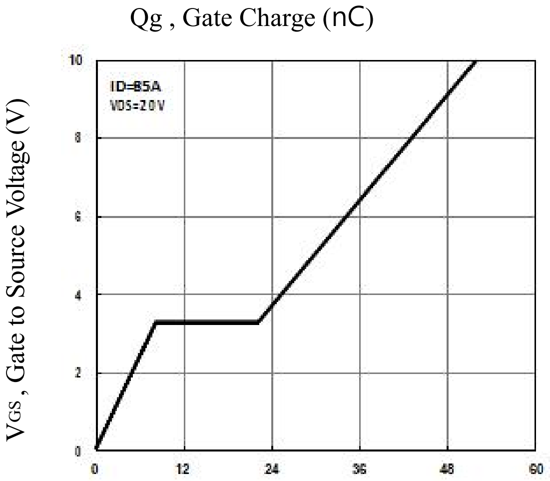


Fig.5 Typical Output Characteristics

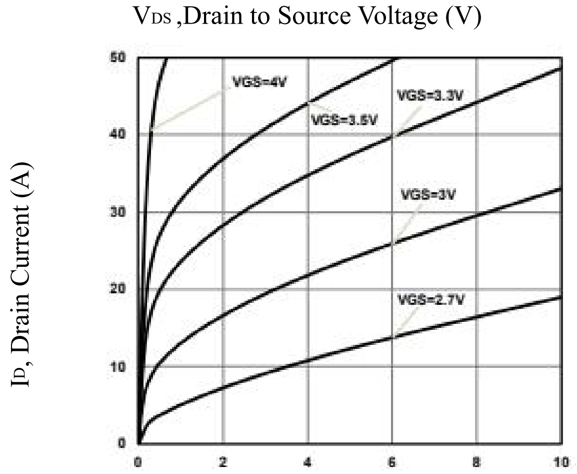


Fig.6 Turn-On Resistance vs. ID

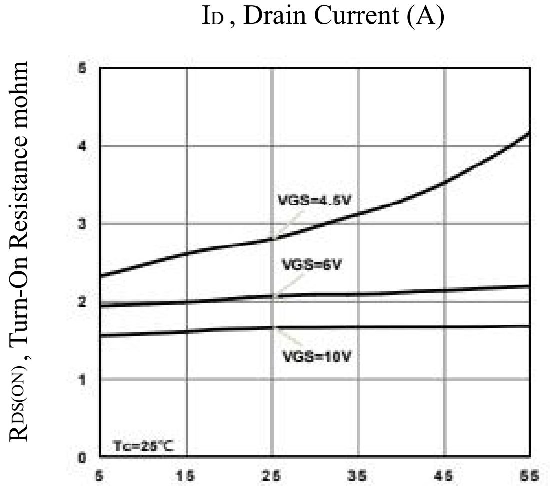


Fig.7 **Capacitance Characteristics**

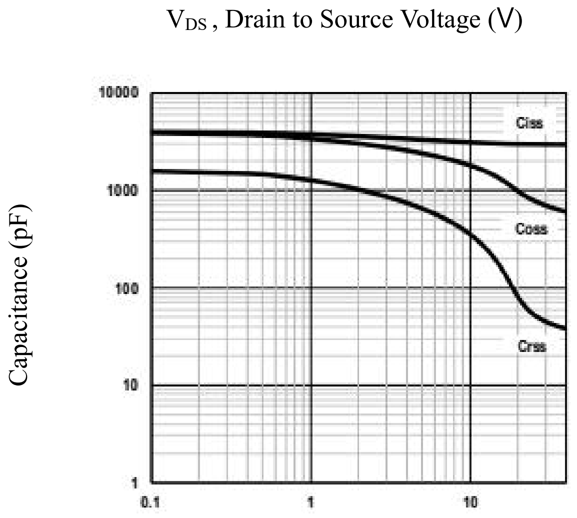


Fig.8 **Normalized Transient Impedance**

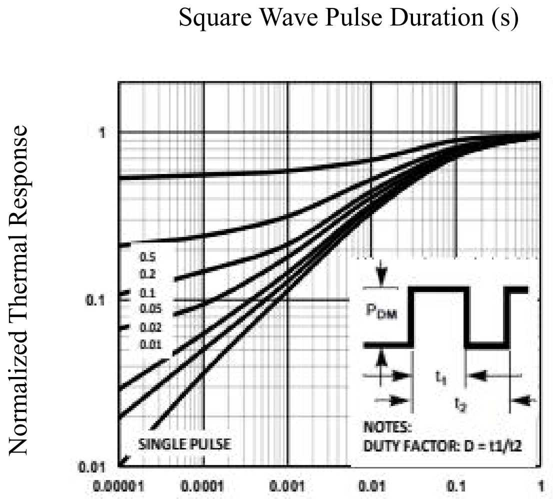


Fig.9 **Maximum Safe Operation Area**

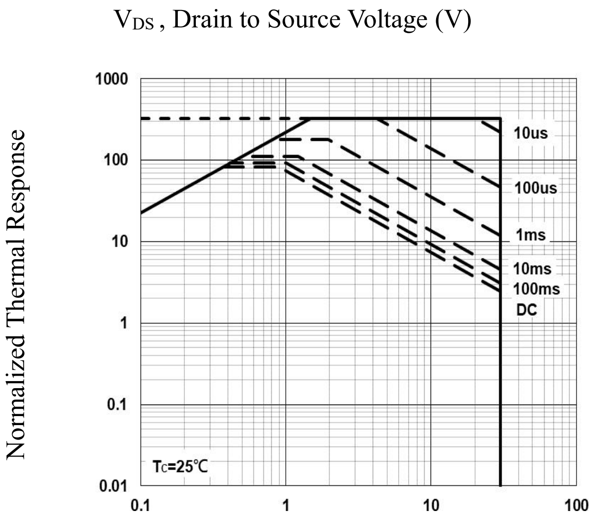


Fig.10 **Body Diode Forward Voltage Variation with Source Current**

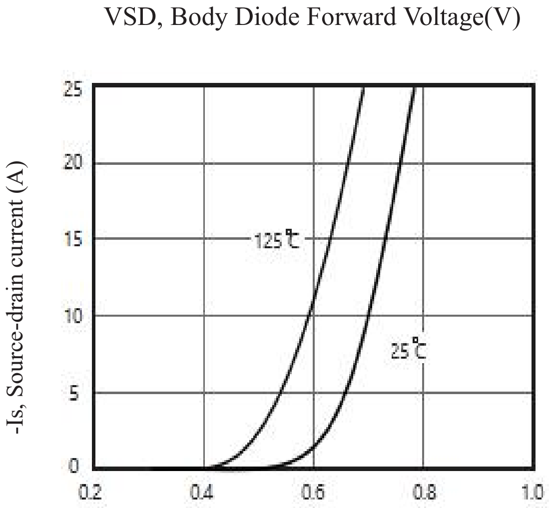


Figure 11a. Switching Test Circuit

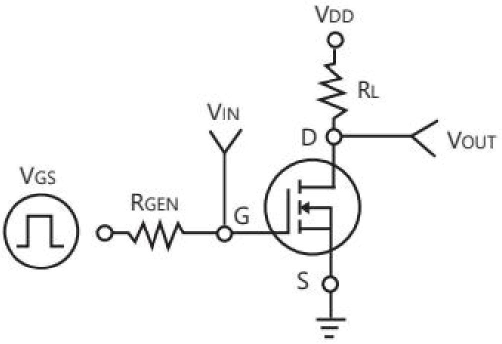


Figure 11b. Switching Waveforms

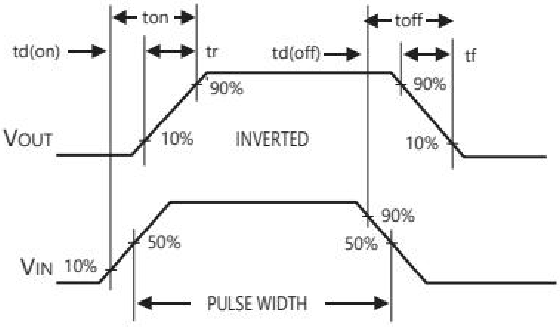


Figure 12a.Unclamped Inductive Test Circuit

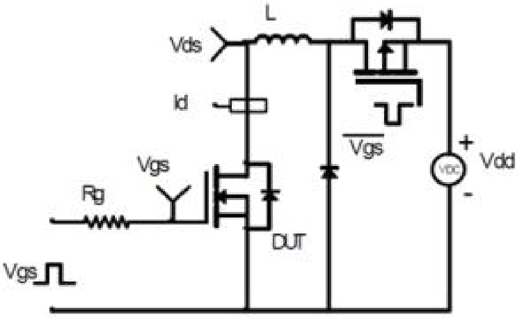
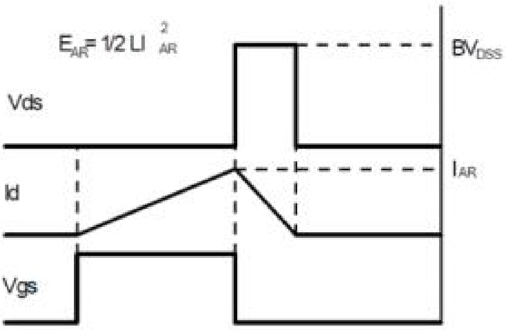


Figure 12b.Unclamped Inductive Waveforms



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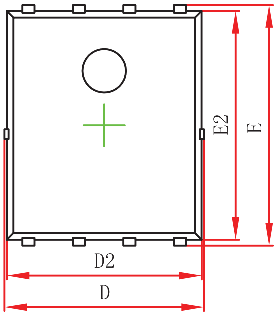
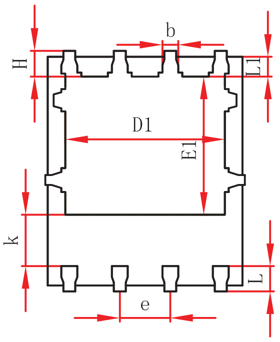
RCQ5402

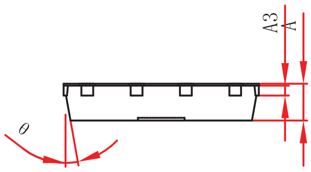
■ PDFN5x6-8 Package Outline Dimensions



Top View



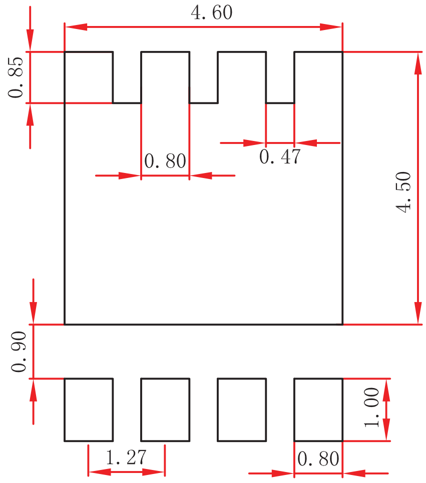
Bottom View



Side View

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:±0.05mm.
3.The pad layout is for reference purposes only.