

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
40V	1.0mΩ@10V	250A
	1.6mΩ@4.5V	

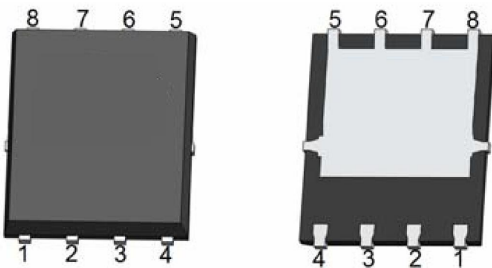
Feature

- Fast switching speed
- Reliable and rugged
- Lead-free parts meet RoHS requirements
- Epoxy:UL94-V0 rated flame retardant
- Suffix "-Q1" for AEC-Q101

Application

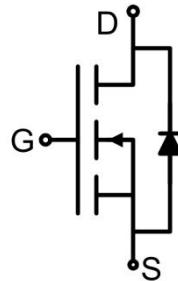
- DC-to-DC converters
- Switch mode power supply
- Brushless DC motor control

Package

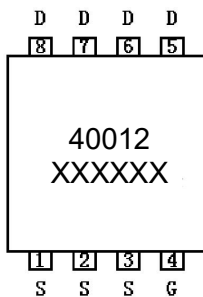


PDFN5*6-8L

Circuit diagram



Marking



Absolute maximum ratings ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current($T_C = 25^{\circ}\text{C}$)	I_D	250	A
Continuous Drain Current($T_C = 100^{\circ}\text{C}$)	$I_D(100^{\circ}\text{C})$	162	A
Pulsed Drain Current ¹⁾ ($T_C = 25^{\circ}\text{C}$)	I_{DM}	400	A
Power Dissipation($T_C = 25^{\circ}\text{C}$)	P_D	89	W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.3	$^{\circ}\text{C}/\text{W}$
Thermal resistance junction to ambient ³⁾	$R_{\theta JA}$	60	$^{\circ}\text{C}/\text{W}$
Single pulse avalanche energy current ²⁾ ($L = 0.5\text{mH}$)	I_{AS}	34	A
Single pulse avalanche energy ²⁾ ($L = 0.5\text{mH}$)	E_{AS}	290	mJ
Junction Temperature	T_J	150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

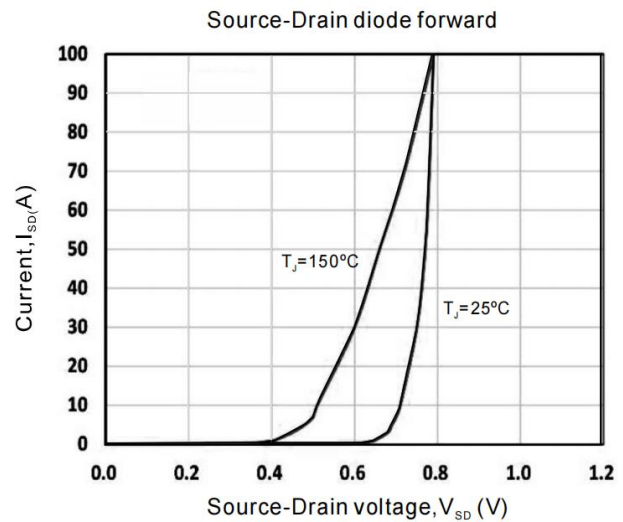
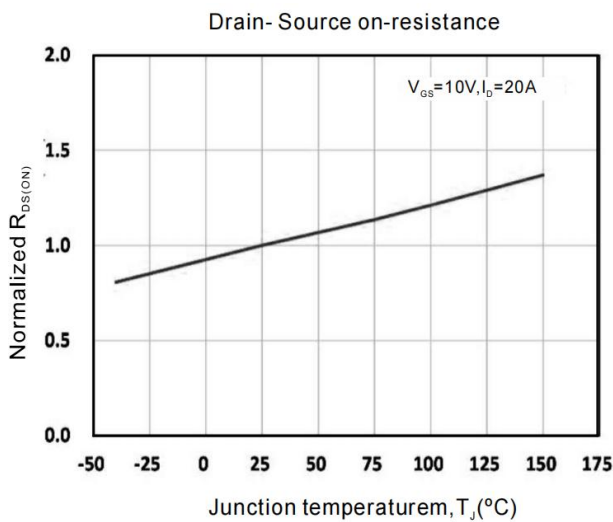
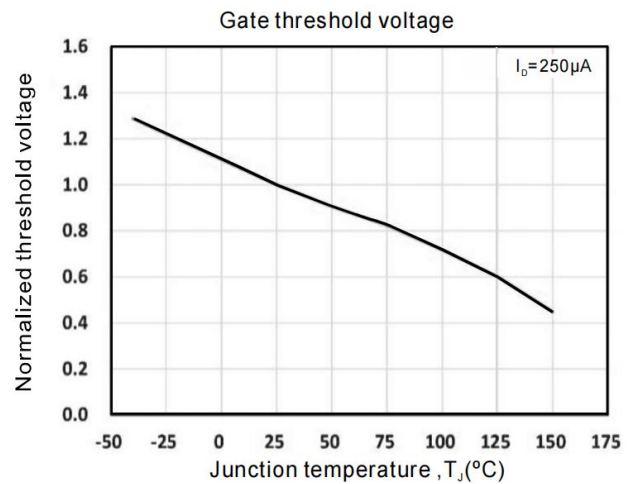
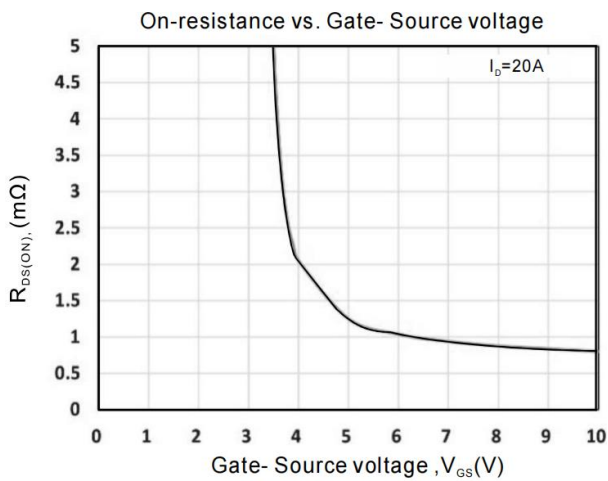
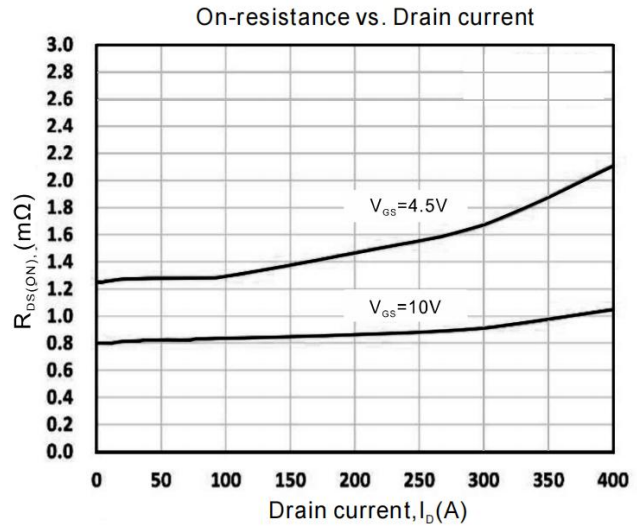
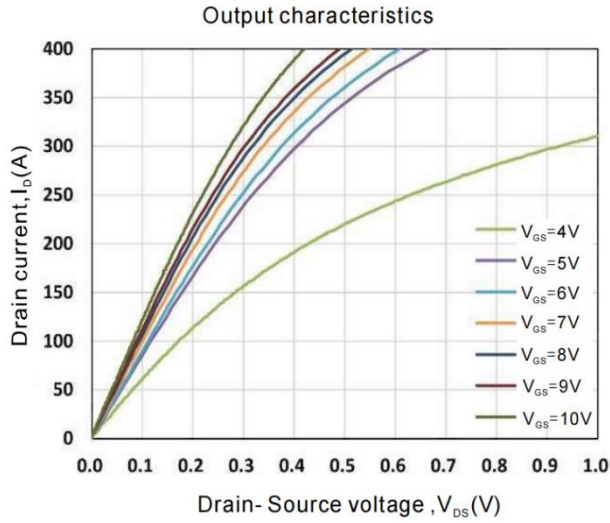
Electrical characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$	40			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 32\text{V}, V_{GS} = 0\text{V}$			1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$			± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1.0	1.7	2.3	V
Drain-source on-resistance ⁴⁾	$R_{DS(on)}$	$V_{GS} = 10\text{V}, I_D = 20\text{A}$		0.8	1	m Ω
Drain-source on-resistance ⁴⁾	$R_{DS(on)}$	$V_{GS} = 4.5\text{V}, I_D = 10\text{A}$		1.25	1.6	m Ω
Dynamic characteristics⁵⁾						
Input Capacitance	C_{iss}	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$		4928		pF
Output Capacitance	C_{oss}			2000		
Reverse Transfer Capacitance	C_{rss}			65		
Total Gate Charge	Q_g	$V_{DS} = 20\text{V}, V_{GS} = 10\text{V}, I_D = 20\text{A}$		69		nC
Gate-Source Charge	Q_{gs}			16.5		
Gate-Drain Charge	Q_{gd}			10		
Turn-on delay time	$t_{d(on)}$	$V_{DS} = 20\text{V}, V_{GS} = 10\text{V}, I_D = 20\text{A}, R_G = 3\Omega$		10.7		nS
Turn-on rise time	t_r			25.3		
Turn-off delay time	$t_{d(off)}$			65.2		
Turn-off fall time	t_f			53.6		
Source-Drain Diode characteristics						
Diode Forward voltage ⁴⁾	V_{SD}	$V_{GS} = 0\text{V}, I_S = 10\text{A}$			1.1	V
Diode reverse recovery time	t_{rr}	$V_R = 20\text{V}, I_F = 20\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$		48.6		nS
Diode reverse recovery charge	Q_{rr}			35.5		nC

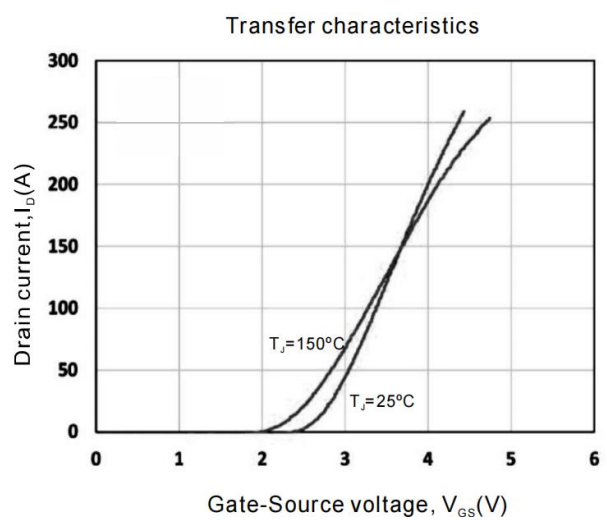
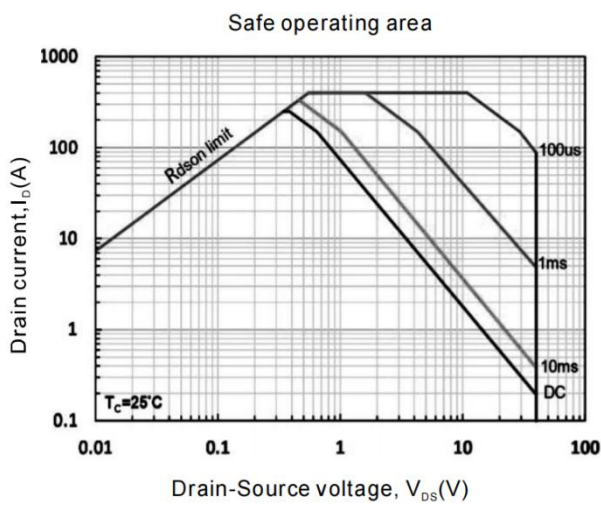
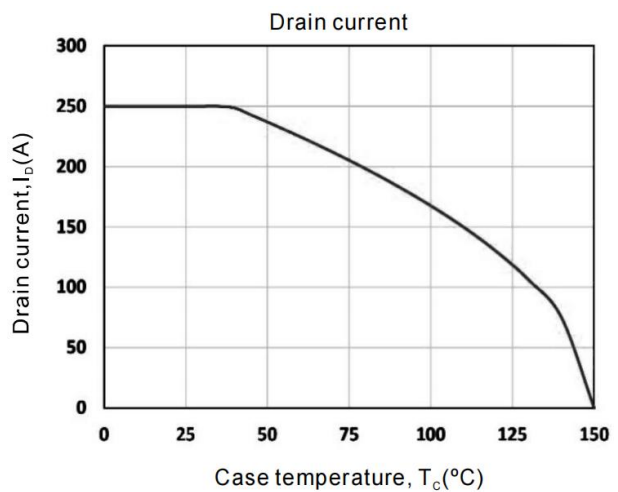
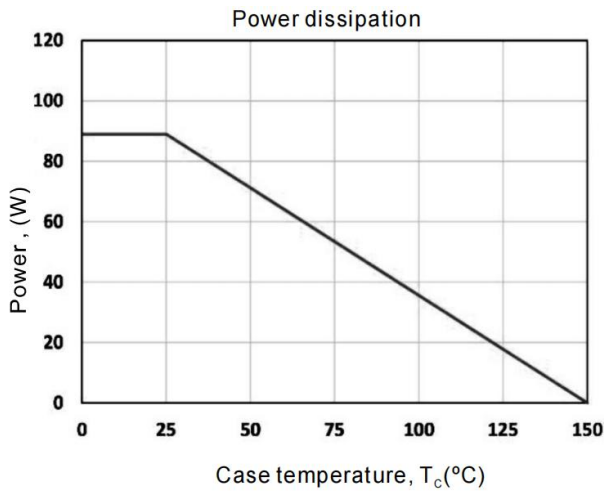
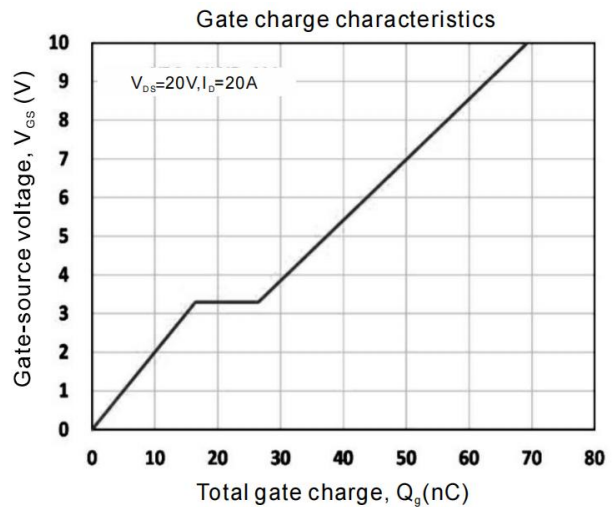
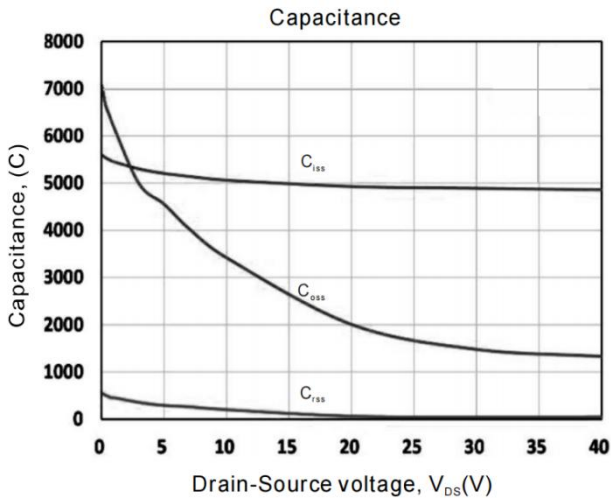
Notes:

- 1) Max.current is limited by bonding.
- 2) UIS tested and pulse width are limited by maximum junction temperature 150°C .
- 3) Surface mounted on 1in2 FR-4 board with 1oz.
- 4) Pulse tere (pulse width $\leq 300\mu\text{A}$, duty cycle $\leq 2\%$)
- 5) Guaranteed by design, not subject to production.

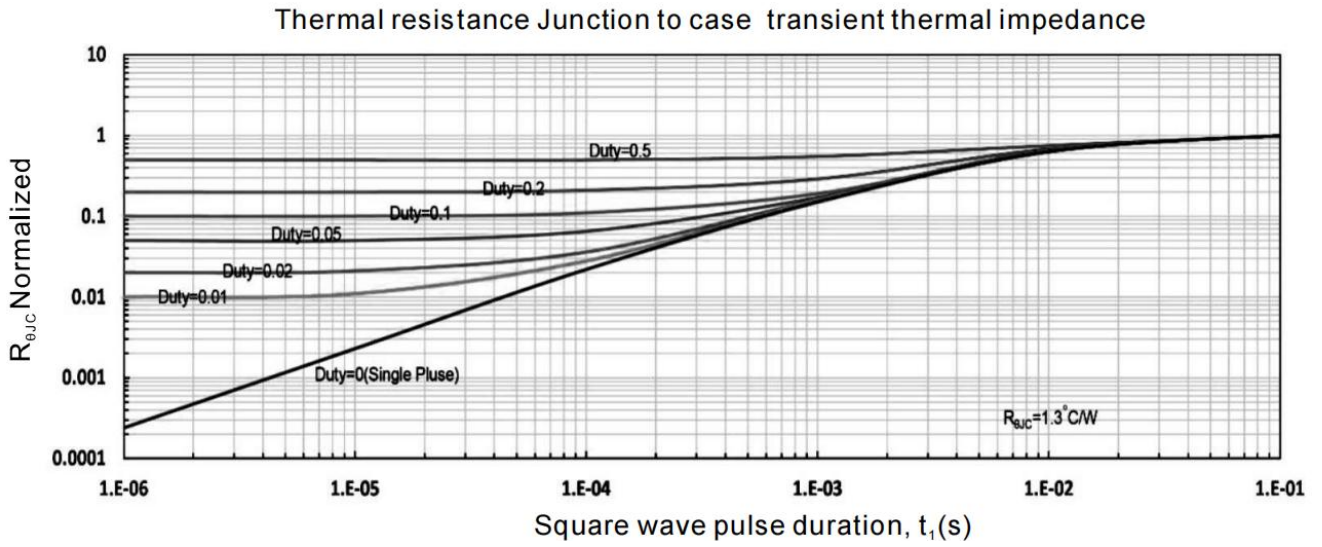
Typical Characteristics



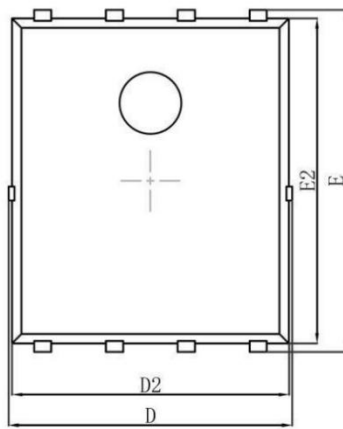
Typical Characteristics



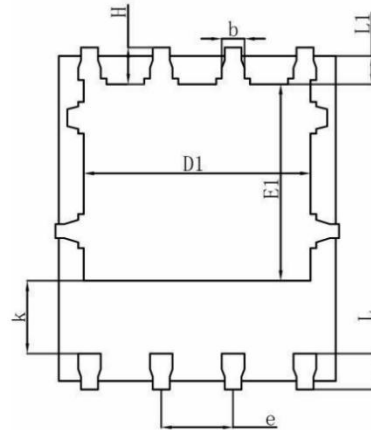
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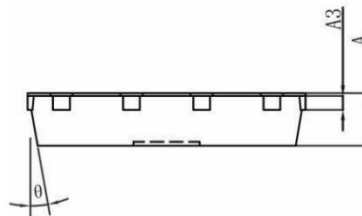
PDFN5*6-8L Package Information



Top View



Bottom View



Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.800	1.100	0.031	0.043
A3	0.254 REF.		0.010 REF.	
D	4.800	5.100	0.189	0.201
E	5.950	6.200	0.234	0.244
D1	3.610	4.110	0.142	0.162
E1	3.375	3.780	0.133	0.149
D2	4.824	4.976	0.190	0.196
E2	5.670	5.900	0.223	0.232
k	1.190	1.450	0.047	0.057
b	0.350	0.510	0.014	0.020
e	1.270 BSC.		0.050 BSC.	
L	0.510	0.711	0.000	0.000
L1	0.424	0.576	0.020	0.028
H	0.574	0.726	0.017	0.023
θ	10°	12°	10°	12°