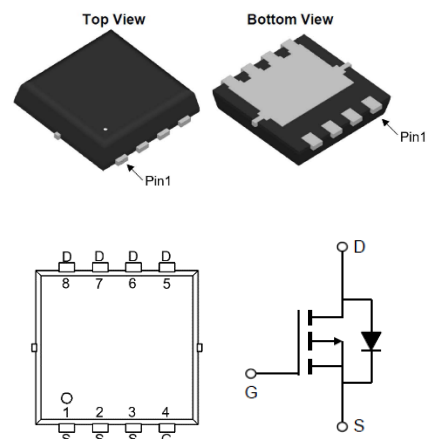


-60V_{DS}/±20V_{GS} P-Channel Enhancement Mode MOSFET

Features

- V_{DS}=-60V, I_D=-12A
- R_{DS(ON)}=40mΩ (TYP.) V_{GS}=-10V
- R_{DS(ON)}=55mΩ (TYP.) V_{GS}=-4.5V
- Fast Switching
- Low On-Resistance

PDFN3030



Applications

- Switch switching
- Power management in portable/desktop PCs

Ordering Information

Device	package	Device Marking	Package Qty.
HAQ60P12	PDFN3333	Q60P12	5000/PCS

Absolute Maximum Ratings (T_C=25°C, unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage (V _{GS} =0V)	V _{DS}	-60	V
Gate-Source Voltage (V _{GS} =0V,static)	V _{GS}	±20	V
Continuous Drain Current (T _C =25°C)	I _D	-12	A
Continuous Drain Current (T _C =100°C)		-8	A
Pulesd Drain Current	I _{DM}	-70	A
Avalanche Energy, Single Pulsed	E _{AS}	102	mJ
Maximum Power Dissipation (T _C =25°C)	P _D	35	W
Maximum Power Dissipation (T _C =100°C)		16	W
Operating,Storage Temperature Range	T _J ,T _{STG}	-55~150	°C

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance,Junction-to-Case	R _{θJC}	-	3.8	-	°C/ W
Thermal Resistance,Junction-to-Ambient	R _{θJA}	-	59	-	°C/ W

Electrical Characteristics

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-30V, V_{GS}=0V$	-	-	-1	μA
Gate -Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.5	-0.8	-1.1	V
Drain-Source On-stage Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-1A$	-	40	54	m Ω
		$V_{GS}=-4.5V, I_D=-1A$	-	55	65	
		$V_{GS}=-2.5V, I_D=-1A$	-	65	80	

Dynamic Characteristics

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Input capacitance	C_{iss}	$V_{DS}=-15V$	-	1450	-	pF
Output capacitance	C_{oss}	$V_{GS}=0V$	-	170	-	
Reverse transfer capacitance	C_{rss}	$f=1MHz$	-	165	-	
Gate Resistance	R_g	$f=1MHz$	-	6	-	Ω
Total Gate Charge	Q_g	$V_{DS}=-15V$	-	36	-	nC
Gate Source Charge	Q_{gs}	$V_{GS}=-10V$	-	3	-	
Gate Drain Charge	Q_{gd}	$I_D=-15A$	-	9.5	-	
Turn-on delay Time	$t_{d(on)}$	$V_{GS}=-10V$	-	16	-	ns
Rise time	t_r	$V_{DS}=-15V$	-	19	-	
Turn-off delay Time	$t_{d(off)}$	$R_L=1\Omega$	-	70	-	
Fall time	t_f	$R_G=3\Omega$	-	41	-	

Reverse Diode Characteristics

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Body Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_{SD}=-1A$	-	-0.75	-1	V
Reverse Recovery Time	t_{rr}	$V_{GS}=0V, I_{SD}=-15A$	-	39	-	ns
Reverse Recovery Charge	Q_{rr}	$d_i/d_t=100A/\mu s$	-	26	-	nC

Electrical Characteristics Diagrames

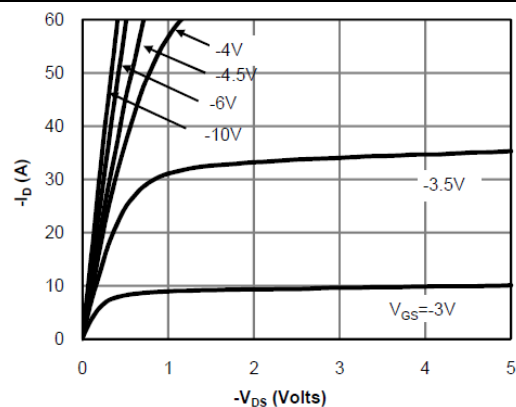
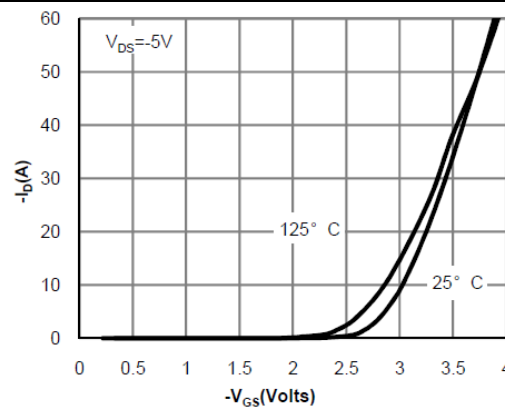
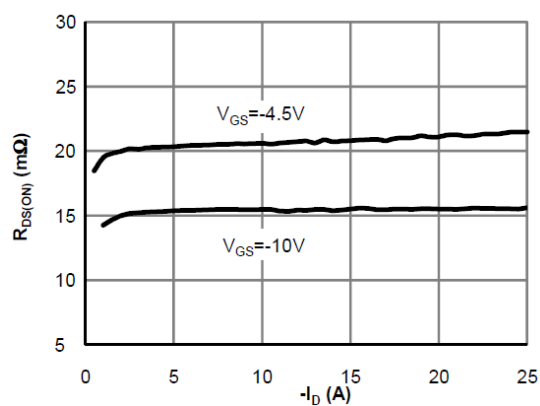
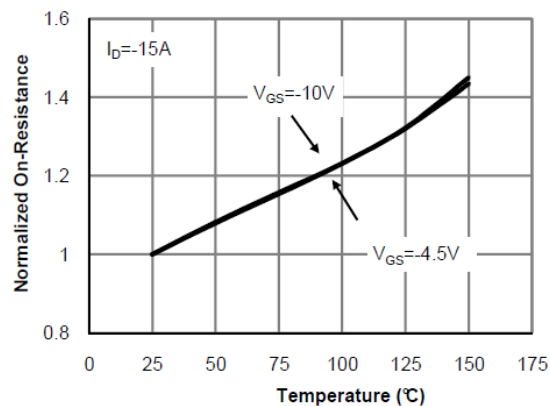
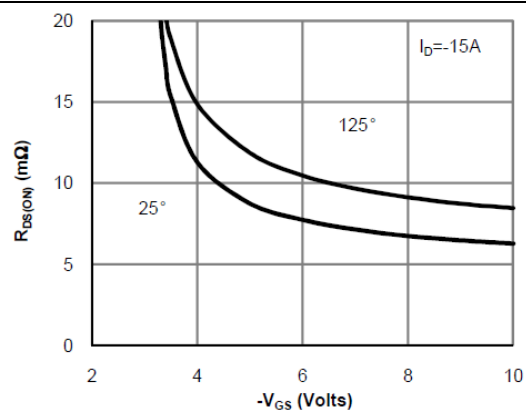
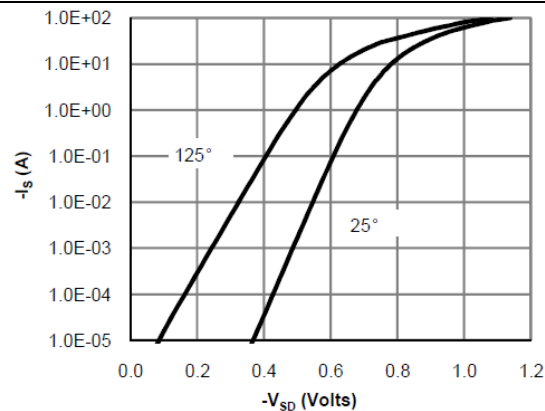
Figure 1. On-Regin Characteristics

Figure 2. Transfer Characteristics

Figure 3. On-Resistance vs. Drain Current and Gate Voltage

Figure 4. On-Resistance vs. Junction Temperature

Figure 5. On-Resistance vs. Gate-Source Voltage

Figure 6. Body-Diode Characteristics


Figure 7. Gate-Charge Characteristics

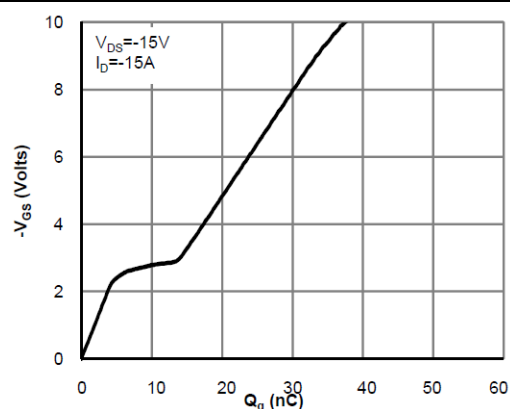


Figure 8. Capacitance Characteristics

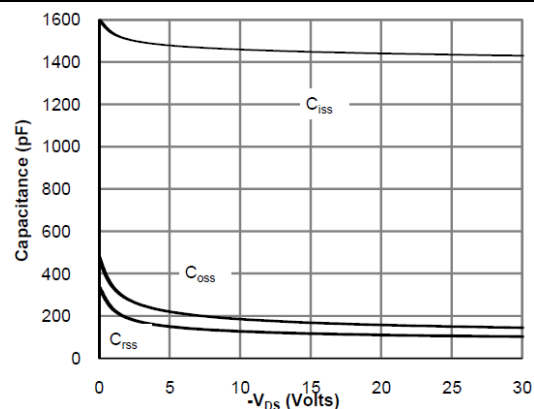


Figure 9. Maximum Forward Biased Safe Operating Area

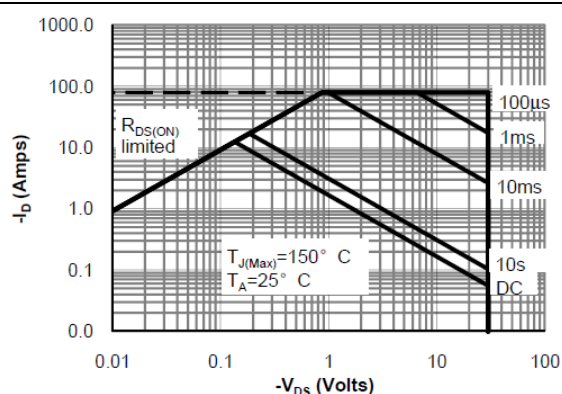


Figure 10. Single Pulse Power Rating Junction-to-Ambient

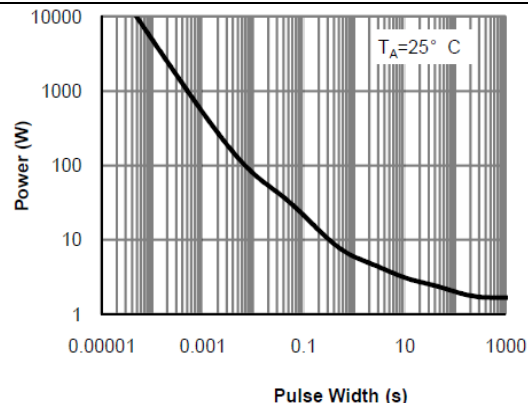
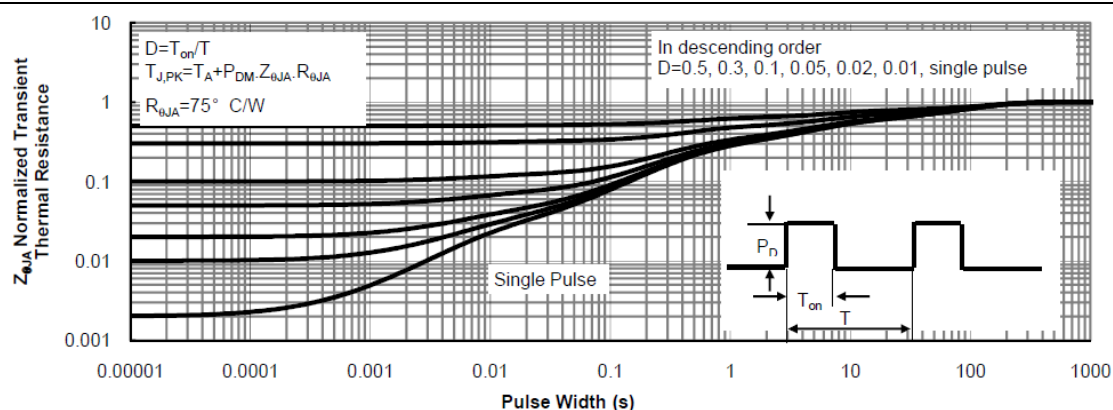
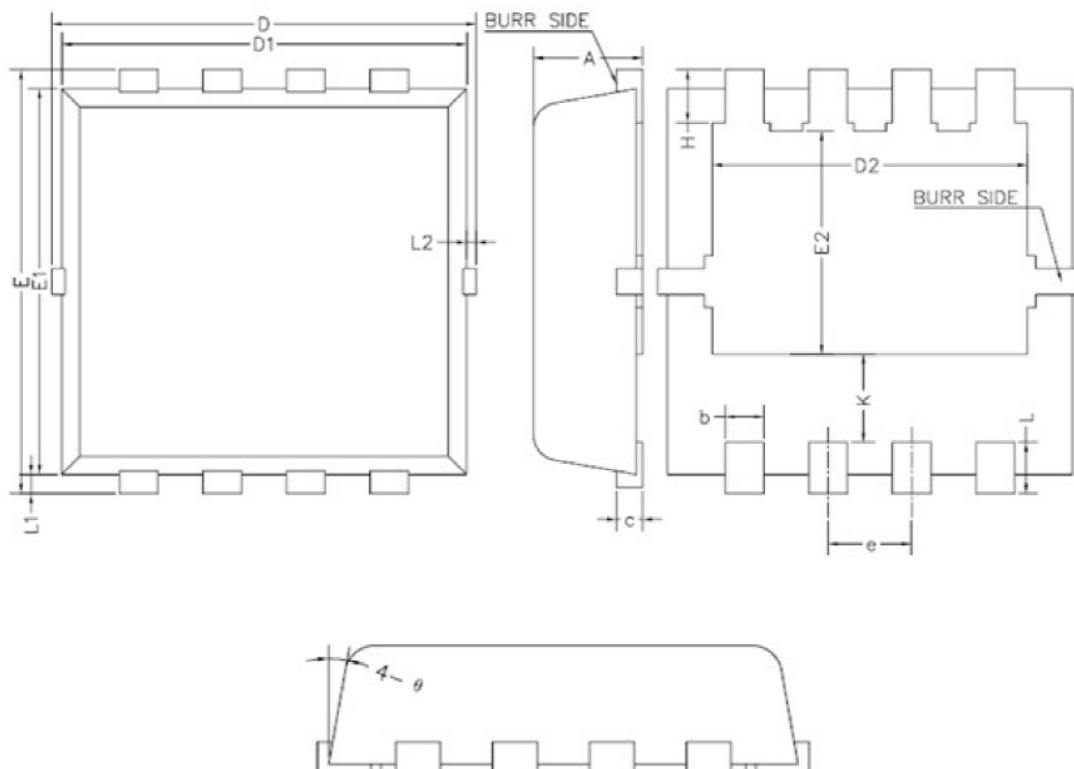


Figure 11. Normalized Maximum Transient Thermal Impedance



Physical Dimensions

PDFN3030



符号	尺寸 (mm)			符号	尺寸 (mm)		
	最小值	典型值	最大值		最小值	典型值	最大值
A	0.70	0.80	0.90	E1	2.90	3.00	3.10
b	0.25	0.30	0.35	E2	1.64	1.74	1.84
c	0.14	0.15	0.20	H	0.32	0.42	0.52
D	3.10	3.30	3.50	K	0.59	0.69	0.79
D1	3.05	3.15	3.25	L	0.25	0.40	0.55
D2	2.35	2.45	2.55	L1	0.10	0.15	0.20
e	0.55	0.65	0.75	L2	-	-	0.15
E	3.10	3.30	3.50	θ	8°	10°	12°

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