

700V Enhancement-mode GaN Transistor

Description

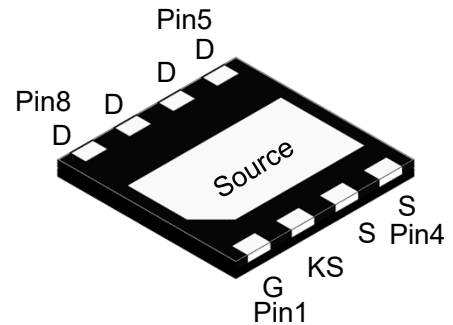
700V Normally-OFF GaN			
$V_{DS}(V)$	$R_{DS(on)}(m\Omega)$	$I_{DS}(A)$	$Q_G(nC)$
700	160	16	7.8

Feature

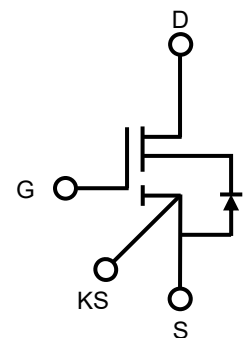
- Normally-off device combines high voltage GaN HEMT and low voltage silicon MOSFET
- Normally off power switch
- Low reverse-recovery charge
- High switching frequency
- Low gate charge, low output charge
- Qualified for industrial applications according to JEDEC Standards
- Package: DFN8*8-8L

Applications

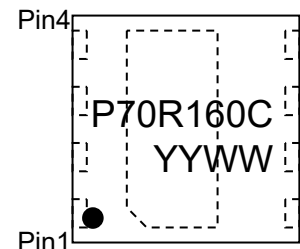
- Fast charger
- Renewable energy
- Telecom and data-com
- Servo motors
- Industrial
- Automotive



Bottom View



Circuit Diagram



Marking (Top View)

Absolute maximum rating@25°C

Rating		Symbol	Value	Units
Drain-Source Voltage		V_{DS}	700	V
Drain-Source Voltage-transient ¹⁾		$V_{DS(transient)}$	800	V
Gate-Source Voltage		V_{GS}	-20 to +20	V
Drain Current-Continuous ²⁾	$T_C = 25^\circ C$	I_D	16	A
	$T_C = 125^\circ C$		7.0	A
Pulse Drain Current (pulse width: 100μs)		I_{DM}	21	A
Maximum Power Dissipation		P_D	78	W
Junction and Storage Temperature Range		T_J, T_{STG}	-55~+150	°C

Notes:

1. In off-state, spike duty cycle $D < 0.01$, spike duration $< 1\mu s$
2. For increased stability at high current operation.

Thermal characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
Thermal Resistance, Junction - Case	$R_{\theta JC}$	-	1.6	-	°C/W

Electrical characteristics per line@25°C (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V	700	-	-	V
Total Drain Leakage Current	I _{DSS}	V _{DS} = 700V,V _{GS} = 0V	-	-	10	μA
		V _{DS} = 700V,V _{GS} = 0V, T _J =150°C	-	-	100	
Gate Threshold Voltage	V _{GS(th)}	V _{GS} = V _{DS} , I _D = 1mA	1.0	1.7	3.0	V
Gate Threshold Voltage Temperature Coefficient	ΔV _{GS(th)} /T _J		-	-6.8	-	mV/°C
Gate-Source Leakage Current	I _{GSS}	V _{GS} = ±20V	-	-	±100	nA
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 1A	-	160	220	mΩ
		V _{GS} = 10V, I _D = 1A, T _J =150°C	-	340	-	
Input Capacitance	C _{iss}	V _{DS} = 400V,V _{GS} = 0V, f= 1MHz	-	378	-	pF
Output Capacitance	C _{oss}		-	23	-	
Reverse Transfer Capacitance	C _{rss}		-	0.97	-	
Output Charge	Q _{oss}	V _{GS} =0V, V _{DS} =0V to 400V, f= 1MHz	-	36	-	nC
Total Gate Charge	Q _g	V _{GS} =0 to 10V, V _{DS} =400V, I _D =1A	-	7.8	-	nC
Gate-Source Charge	Q _{gs}		-	1.1	-	
Gate-Drain Charge	Q _{gd}		-	1.8	-	
Turn-on Delay Time	t _{d(on)}	V _{DS} =400V, V _{GS} =0V to 10V, I _D =2.1A, R _{G-on(ext)} =6.8Ω, R _{G-off(ext)} =2.2Ω, L=250μH	-	2.5	-	ns
Turn-on Rise Time	t _r		-	7.0	-	
Turn-Off Delay Time	t _{d(off)}		-	9.7	-	
Turn-Off Fall Time	t _f		-	28	-	
Reverse Device Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} = 0V,I _{SD} = 10A	-	2.5	-	V
Reverse Recovery Time	t _{rr}	I _F =10A, V _{DD} =400V, dl _F /dt=165A/μs	-	13	-	ns
Reverse Recovery Charge	Q _{rr}		-	3.2	-	nC

Typical Characteristics

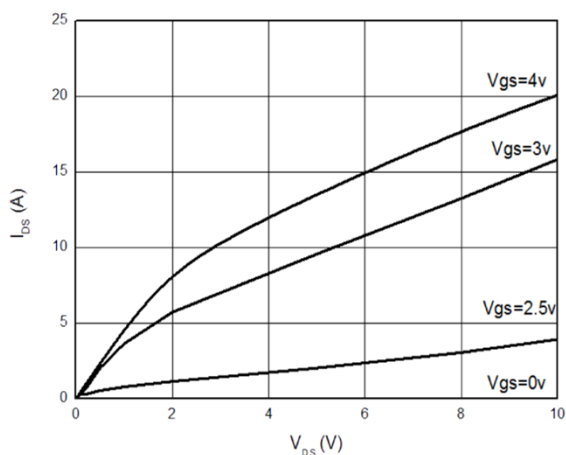
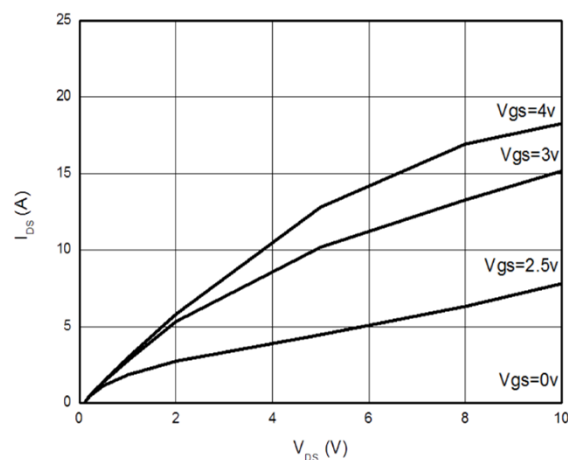
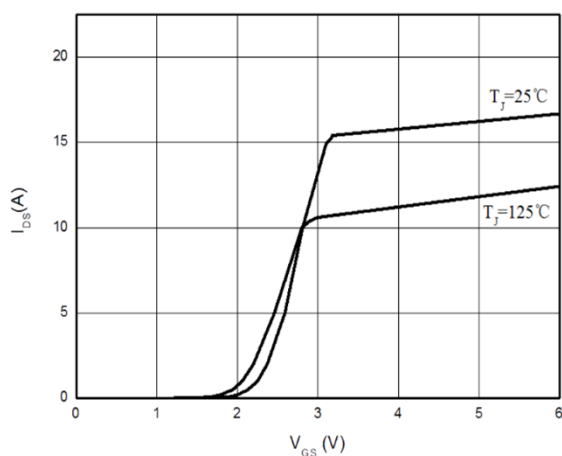
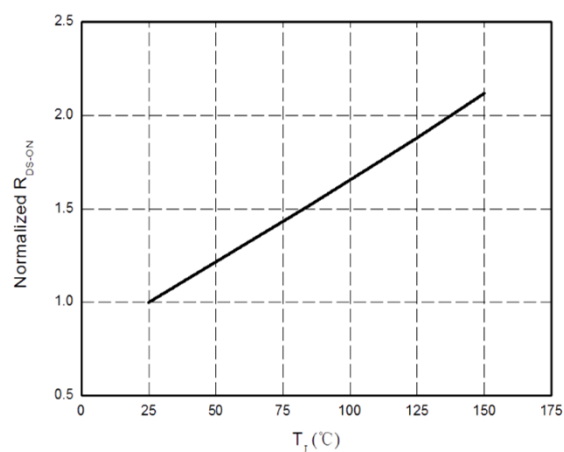
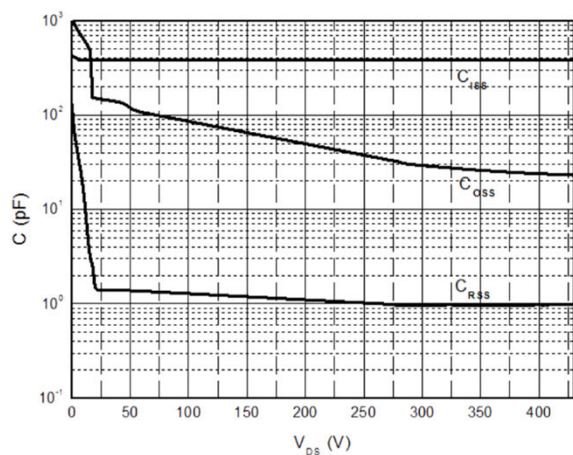
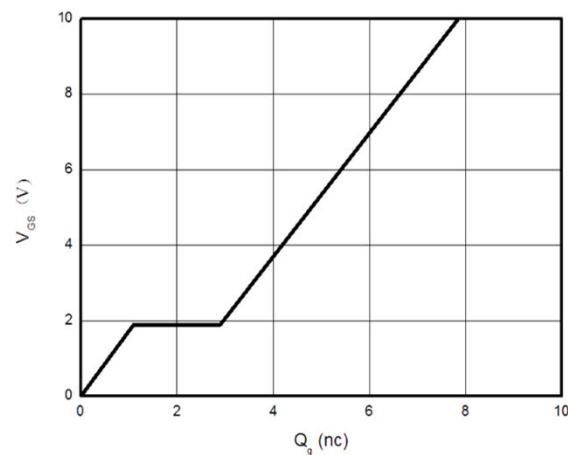
Figure 1. Typical Output Characteristics $T_j=25^\circ\text{C}$ Figure 2. Typical Output Characteristics $T_j=125^\circ\text{C}$ Figure 3. Typical Transfer Characteristics ($V_{DS}=5\text{V}$)

Figure 4. Normalized On-resistance

Figure 5. Typical Capacitance ($f=1\text{MHz}$)Figure 6. Typical Gate Charge ($V_{DS}=400\text{V}$, $I_D=1\text{A}$)

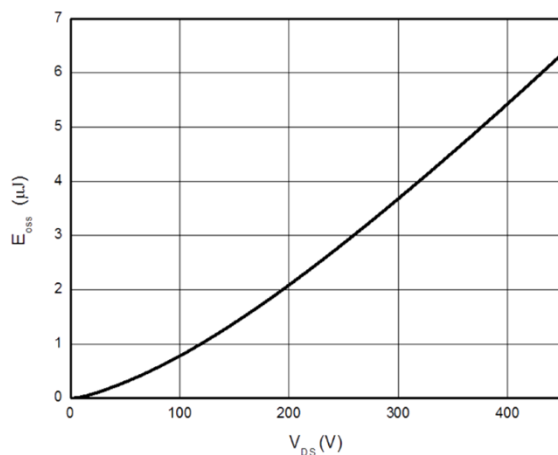


Figure 7. Typical Coss Stored Energy

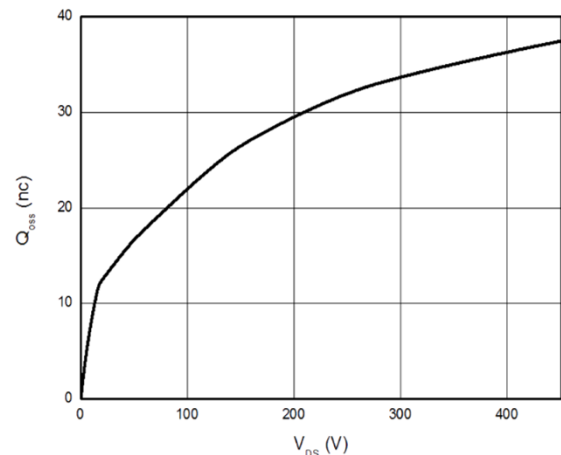


Figure 8. Typical Qoss

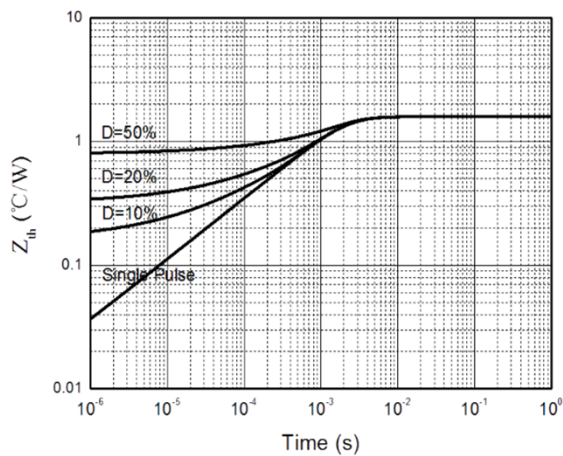


Figure 9. Transient Thermal Resistance

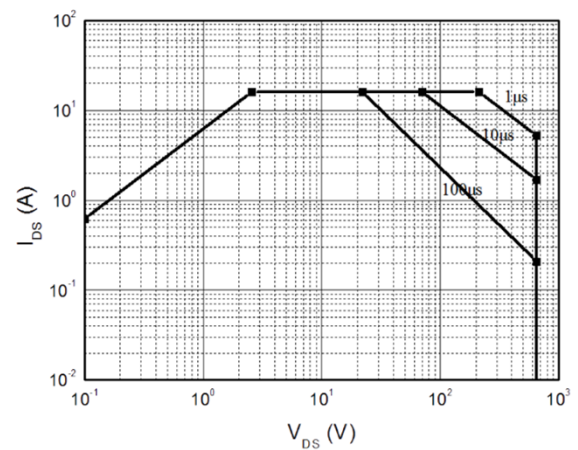


Figure 10. Safe Operating Area Tj=25°C

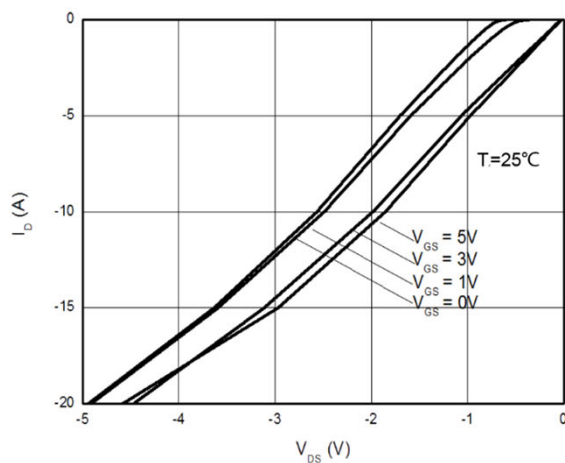


Figure 11. Channel Reverse Characteristics Tj=25°C

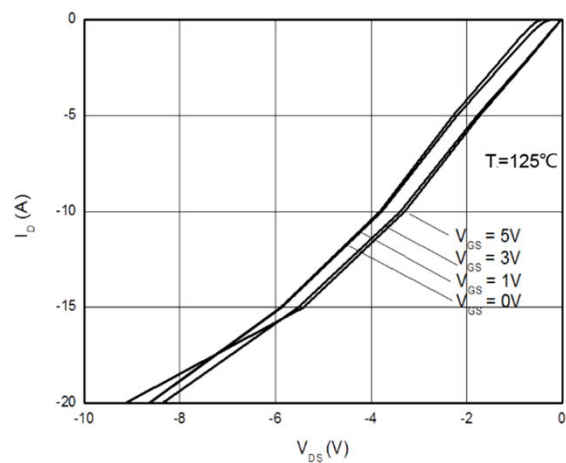
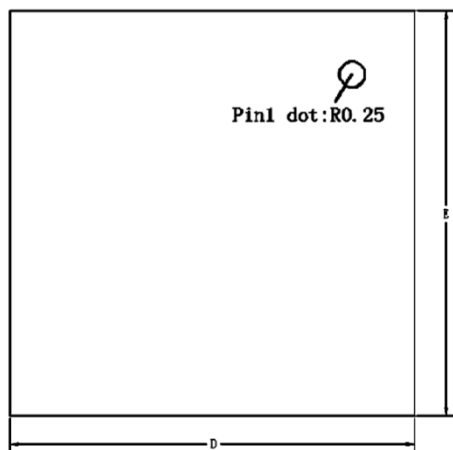


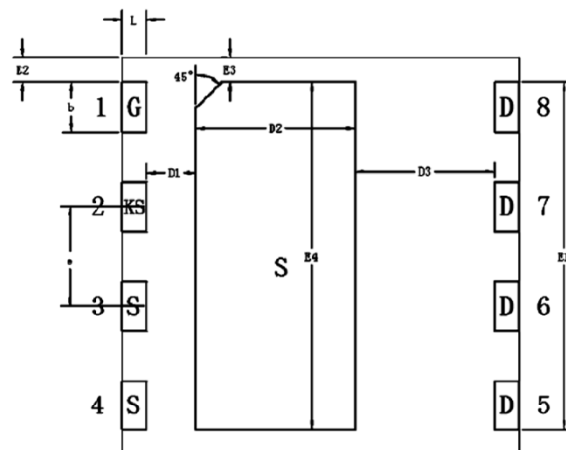
Figure 12 Channel Reverse Characteristics Tj=125°C

Product Dimension (DFN8*8-8L)

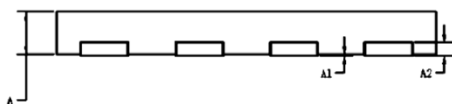
Top view



Bottom view



Side view(left/right)



Dim	Millimeters		Inches		Dim	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	1.05	1.15	0.041	0.045	E1	6.90	7.10	0.272	0.280
A1	0.00	0.05	0.000	0.002	E2	0.40	0.60	0.016	0.024
A2	0.203 Ref.		0.008 Ref.		E3	0.40	0.60	0.016	0.024
D	7.90	8.10	0.311	0.319	E4	6.90	7.10	0.272	0.280
E	7.90	8.10	0.311	0.319	b	0.90	1.10	0.035	0.043
D1	0.90	1.10	0.035	0.043	e	1.90	2.10	0.075	0.083
D2	3.10	3.30	0.122	0.130	L	0.40	0.60	0.016	0.024
D3	2.70	2.90	0.106	0.114					

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