

SOP-8 Plastic-Encapsulate MOSFET

60V N- and P-Channel MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
60V	30mΩ@10V	5A
	37mΩ@4.5V	
-60V	62mΩ@-10V	-3.8A
	75mΩ@-4.5V	

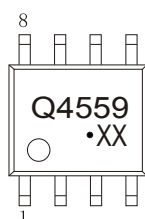
Feature

- Trench Technology Power MOSFET
- Low $R_{DS(ON)}$
- Low Gate Charge
- Low Gate Resistance

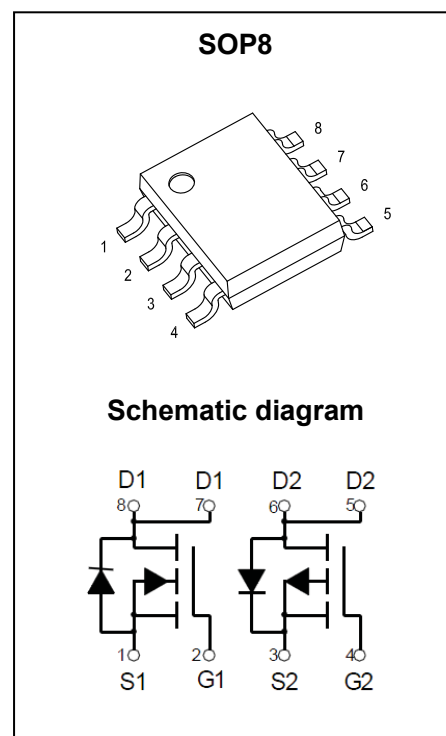
Application

- PWM Applications
- Loas Switch
- Power Management

MARKING:



Q4559 = Device Code
XX = Data Code
Solid Dot = Green Device Indicator



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	NMOS	PMOS	Unit
Drain - Source Voltage	V_{DS}	60	-60	V
Gate - Source Voltage	V_{GS}	±20	±20	V
Continuous Drain Current ^{1,5}	I_D	5	-3.8	A
Pulsed Drain Current ²	I_{DM}	20	-16	A
Power Dissipation ^{4,5}	P_D	2	1.25	W
Thermal Resistance from Junction to Ambient ⁵	$R_{\theta JA}$	62.5	100	°C/W
Junction Temperature	T_J	150	150	°C
Storage Temperature	T_{STG}	-55~ +150	-55~ +150	°C

Electrical Characteristics (T_A=25°C unless otherwise noted)

NMOS:

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain - Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	60			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 48V, V _{GS} = 0V			1	μA
Gate - Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			±100	nA
On Characteristics ³						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1	1.7	3	V
Drain-source On-resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 4.3A		30	40	mΩ
		V _{GS} = 4.5V, I _D = 3.9A		37	55	
Forward tranconductance	g _{FS}	V _{DS} = 6V, I _D = 5A	5			S
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = 30V, V _{GS} = 0V, f = 1MHz		974		pF
Output Capacitance	C _{oss}			62		
Reverse Transfer Capacitance	C _{rss}			53		
Gate Resistance	R _g	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz		1.8		Ω
Switching Characteristics						
Total Gate Charge	Q _g	V _{DS} = 30V, V _{GS} = 10V, I _D = 5A		15		pC
Gate-source Charge	Q _{gs}			2.5		
Gate-drain Charge	Q _{gd}			5.2		
Turn-on Delay Time	t _{d(on)}	V _{DD} = 30V, V _{GS} = 10V, R _L = 6Ω R _G = 2Ω		5.6		ns
Turn-on Rise Time	t _r			4.8		
Turn-off Delay Ttime	t _{d(off)}			26		
Turn-off Fall Time	t _f			3.5		
Source - Drain Diode Characteristics						
Diode Forward Voltage ³	V _{SD}	V _{GS} = 0V, I _S = 10A			1.2	V

Electrical Characteristics (T_A=25°C unless otherwise noted)

PMOS:

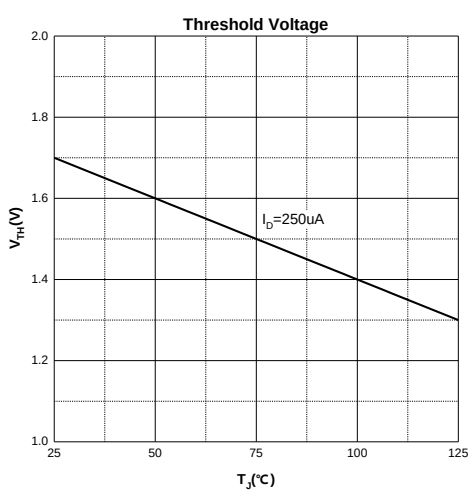
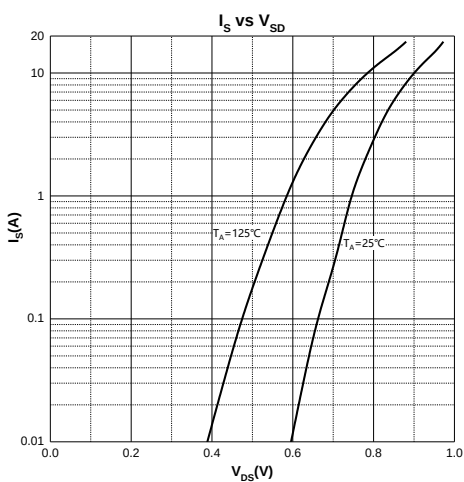
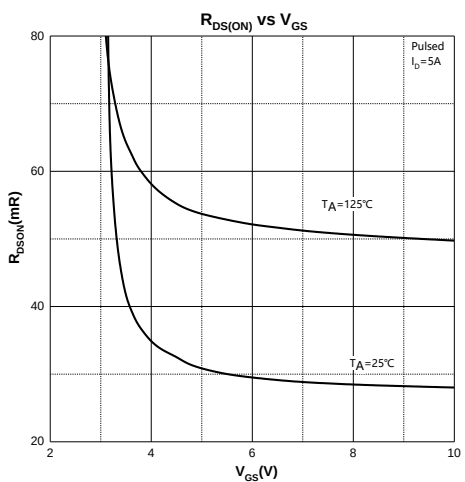
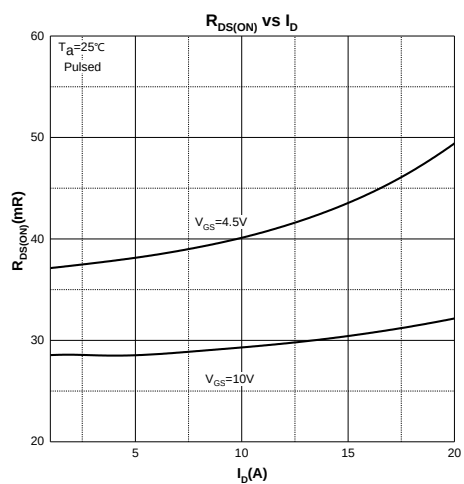
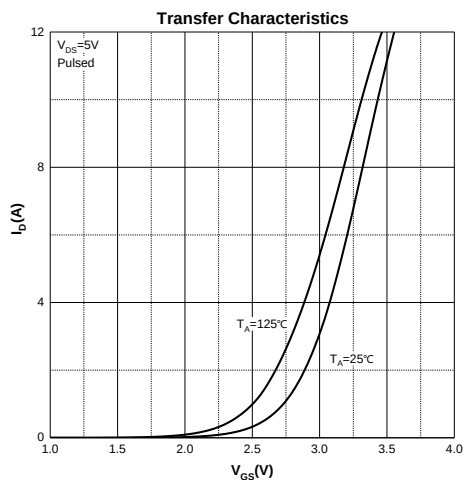
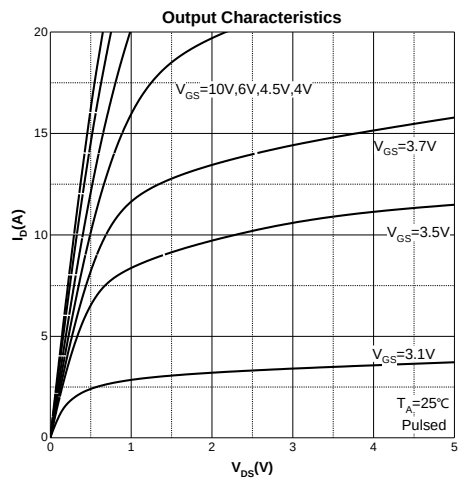
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain - Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-60			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -48V, V _{GS} = 0V			-1	μA
Gate - Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			±100	nA
On Characteristics ³						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-1	-2	-3	V
Drain-source On-resistance	R _{DS(on)}	V _{GS} = -10V, I _D = -3.1A		62	80	mΩ
		V _{GS} = -4.5V, I _D = -2.0A		75	110	
Forward tranconductance	g _{FS}	V _{DS} = -6V, I _D = -4A	5			S
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = -30V, V _{GS} = 0V, f = 1MHz		892		pF
Output Capacitance	C _{oss}			72		
Reverse Transfer Capacitance	C _{rss}			61		
Gate Resistance	R _g	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz		2.5		Ω
Switching Characteristics						
Total Gate Charge	Q _g	V _{DS} = -30V, V _{GS} = -10V, I _D = -4A		18		pC
Gate-source Charge	Q _{gs}			4		
Gate-drain Charge	Q _{gd}			5		
Turn-on Delay Time	t _{d(on)}	V _{DD} = -30V, V _{GS} = -10V, R _L = 7.5Ω R _G = 3Ω		10		ns
Turn-on Rise Time	t _r			12		
Turn-off Delay Ttime	t _{d(off)}			24		
Turn-off Fall Time	t _f			10		
Source - Drain Diode Characteristics						
Diode Forward Voltage ³	V _{SD}	V _{GS} = 0V, I _S = -6A			-1.2	V

Notes :

- 1.The maximum current rating is limited by package.
- 2.Pulse Test : Pulse Width ≤ 10μs, duty cycle ≤ 1%.
- 3.Pulse Test : Pulse Width ≤ 300μs, duty cycle ≤ 2%.
- 4.The power dissipation P_D is limited by T_{J(MAX)} = 150°C.
- 5.Device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A = 25°C.

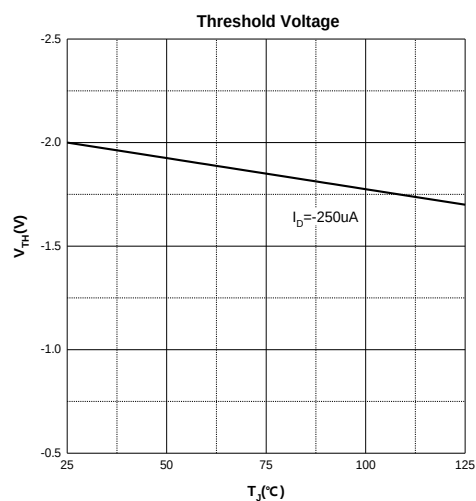
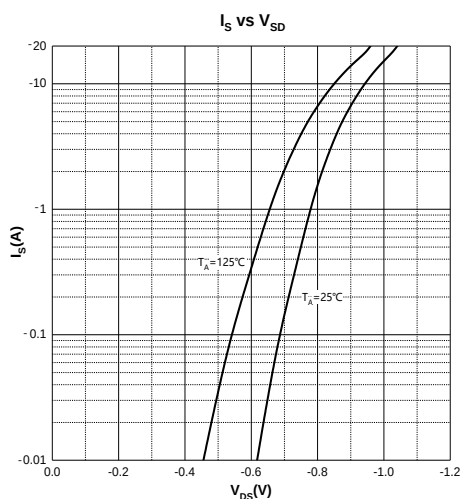
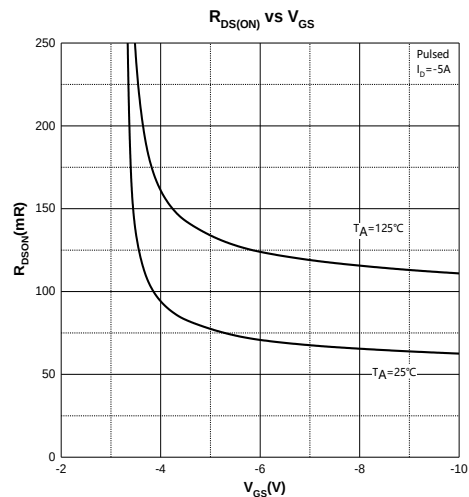
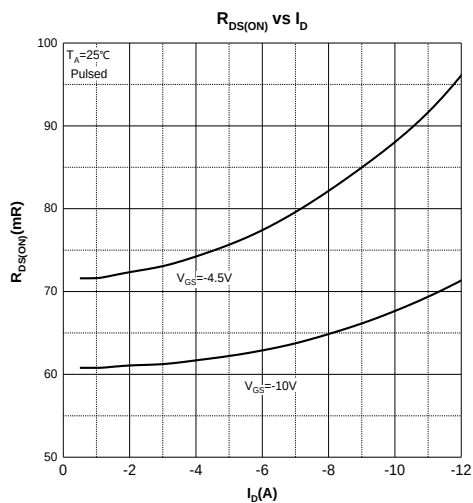
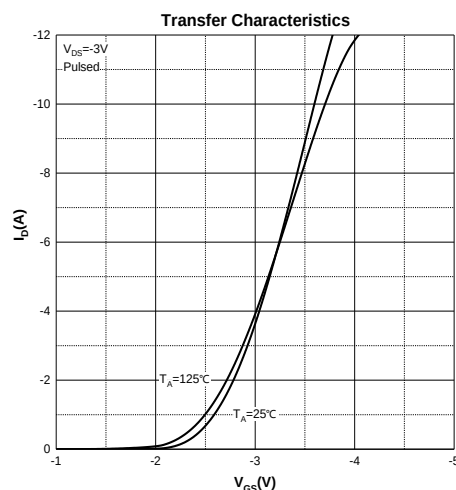
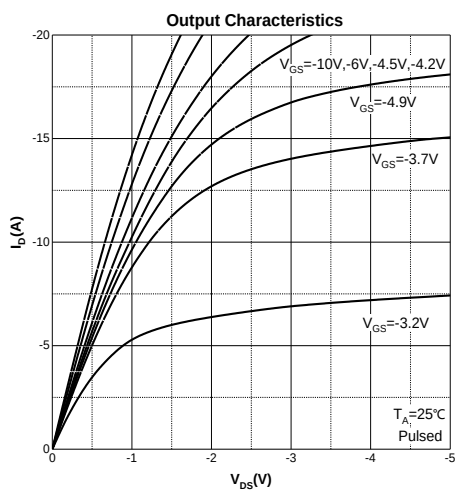
Typical Characteristics

NMOS:

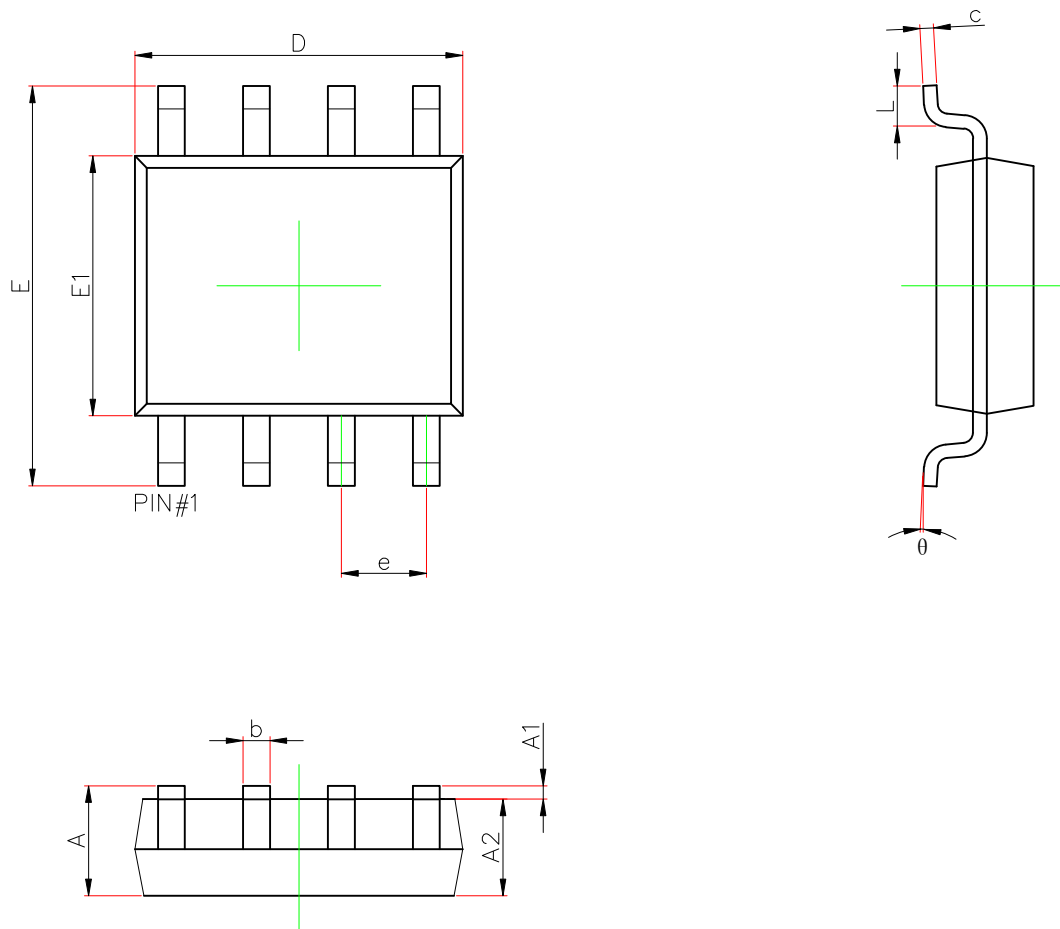


Typical Characteristics

PMOS:



SOP-8 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.156	0.250	0.006	0.010
D	4.700	5.100	0.185	0.201
e	1.270(BSC)		0.050(BSC)	
E	5.800	6.200	0.228	0.244
E1	3.700	4.100	0.146	0.161
L	0.400	1.270	0.016	0.05
θ	0°	8°	0°	8°

NOTICE

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