

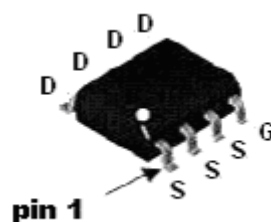
P-CHANNEL ENHANCEMENT MODE POWER MOSFET

Features:

- Simple drive requirement
- Low on-resistance
- Fast switching speed
- Pb-free and Halogen-free package

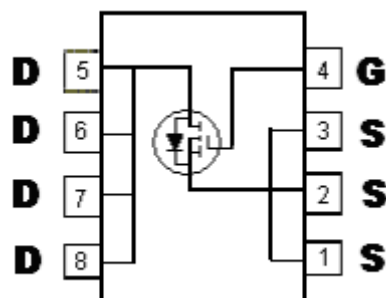
Outline

SOP-8



Equivalent Circuit

KWP4409Q8



G : Gate

S : Source

D : Drain

Ordering Information

Device	Package	Shipping
KWP4409Q8	SOP-8 (Pb-free lead plating and halogen-free package)	2500 pcs / tape & reel

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

Parameter		Symbol	Limits	Unit
Drain-Source Breakdown Voltage		BV _{DSS}	-30	V
Gate-Source Voltage		V _{GS}	±25	V
Continuous Drain Current @T _A =25 °C		I _D	-15	A
Continuous Drain Current @T _A =100 °C		I _D	-9.5	A
Pulsed Drain Current (Note 1)		I _{DM}	-160	A
Avalanche Current		I _{AS}	-15	A
Avalanche Energy @ L=0.1mH, I _D =-15A, R _G =25Ω		E _{AS}	11.25	mJ
Power Dissipation (Note 2)	T _A =25 °C	P _D	3.1	W
	T _A =100 °C		1.2	W
Operating Junction and Storage Temperature Range		T _j ; T _{stg}	-55~+150	°C

Note : 1.Pulse width limited by maximum junction temperature.

2.Surface mounted on 1 in² copper pad of FR-4 board, t≤10s.

Electrical Characteristics (T_c=25°C, unless otherwise noted)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV _{DSS}	-30	-	-	V	V _{GS} =0V, I _D =-250μA
V _{GS(th)}	-1	-1.5	-2.5	V	V _{DS} =V _{GS} , I _D =-250μA
I _{GSS}	-	-	±100	nA	V _{GS} =±25V, V _{DS} =0V
I _{DSS}	-	-	-1	μA	V _{DS} =-24V, V _{GS} =0V
I _{DSS}	-	-	-10	μA	V _{DS} =-20V, V _{GS} =0V, T _j =125°C
R _{DS(ON)} (Note 1)	-	7.7	9	m	I _D =-15A, V _{GS} =-10V
	-	11.4	18		I _D =-10A, V _{GS} =-4.5V
	-	20.3	40		I _D =-10A, V _{GS} =-3V
G _{FS} (Note 1)	-	28	-	S	V _{DS} =-5V, I _D =-15A
Dynamic					
C _{iss}	-	4022	-	pF	V _{DS} =-15V, V _{GS} =0, f=1MHz
C _{oss}	-	498	-		
C _{rss}	-	442	-		
t _{d(ON)} (Note 1&2)	-	21	-	ns	V _{DS} =-15V, I _D =-15A, V _{GS} =-10V, R _G =3Ω
t _r (Note 1&2)	-	19	-		
t _{d(OFF)} (Note 1&2)	-	57	-		
t _f (Note 1&2)	-	22	-		
Q _g (V _{GS} =10V) (Note 1&2)	-	56	-	nC	V _{DS} =-15V, I _D =-15A, V _{GS} =-10V
Q _g (V _{GS} =4.5V) (Note 1&2)	-	36	-		
Q _{gs} (Note 1&2)	-	15	-		
Q _{gd} (Note 1&2)	-	18	-		
R _g	-	3	-	Ω	V _{GS} =15mV, V _{DS} =0, f=1MHz

Electrical Characteristics(Cont.) (T_j=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Source-Drain Diode					
I _S	-	-	-10	A	
I _{SM} (Note 3)	-	-	-40		
V _{SD} (Note 1)	-	-0.81	-1.2	V	I _F =I _S , V _{GS} =0V
trr	-	32	-	ns	I _F =-10A, dI _F /dt=100A/μs
Q _{rr}	-	26	-	nC	

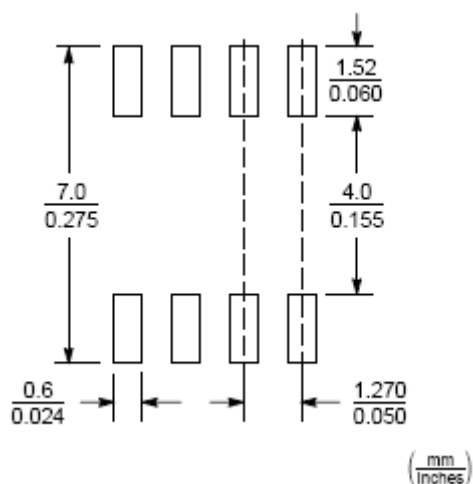
Note : 1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
2.Independent of operating temperature
3.Pulse width limited by maximum junction temperature

Thermal Resistance Ratings

Thermal Resistance	Symbol	Typical	Maximum	Unit
Junction-to-Case	R _{θJC}	22	25	°C / W
Junction-to-Ambient (Note)	R _{θJA}	33	40	

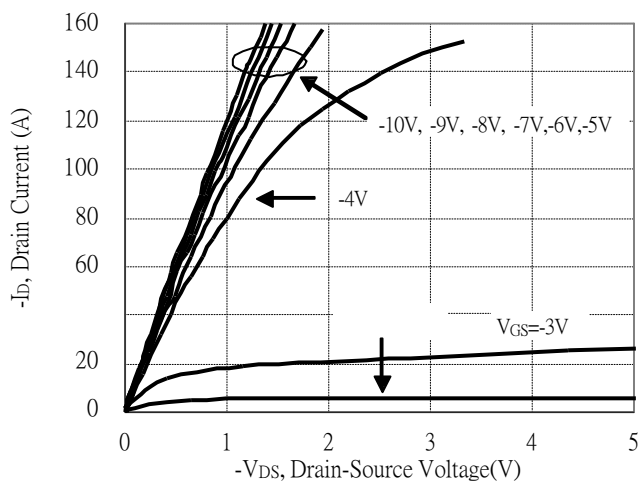
Note : W when mounted on a 1 in² pad of 2 oz copper, t≤10s; 125°C/W when mounted on minimum copper pad.

Recommended Soldering Footprint

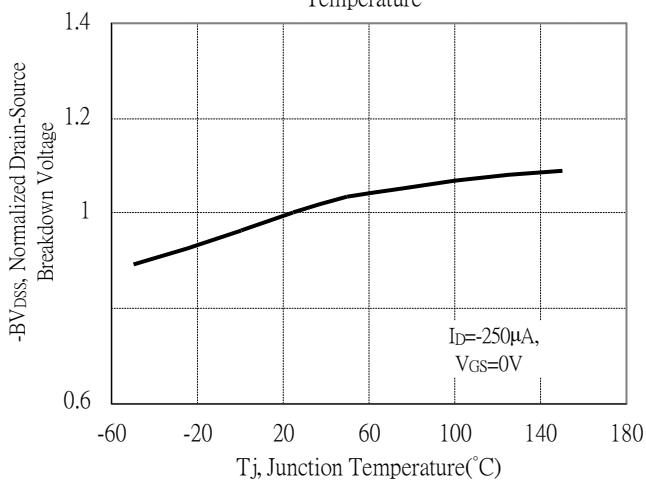


Typical Characteristics

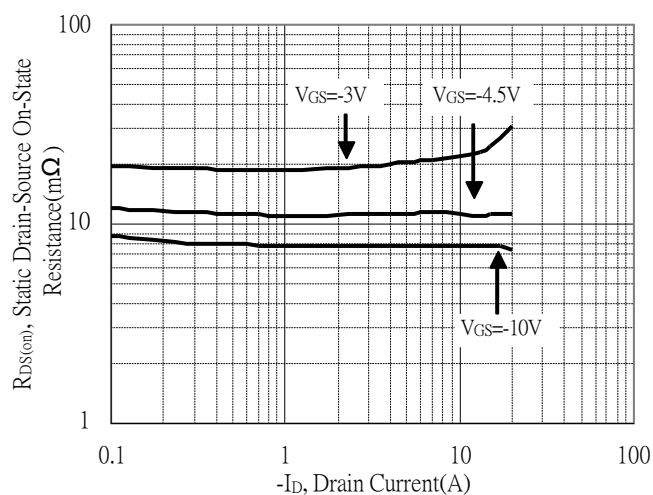
Typical Output Characteristics



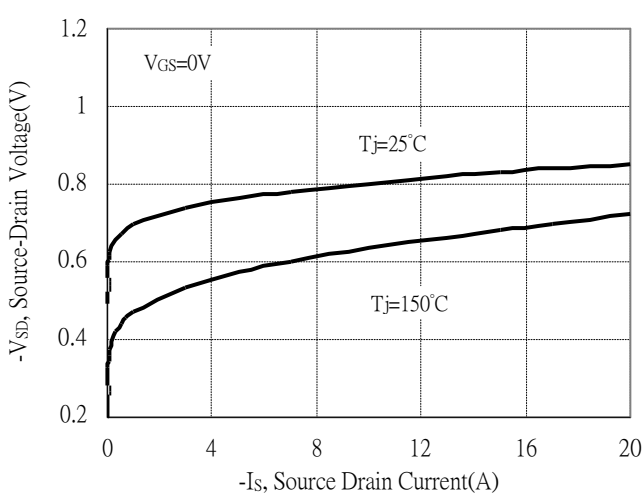
Normalized Breakdown Voltage vs Ambient Temperature



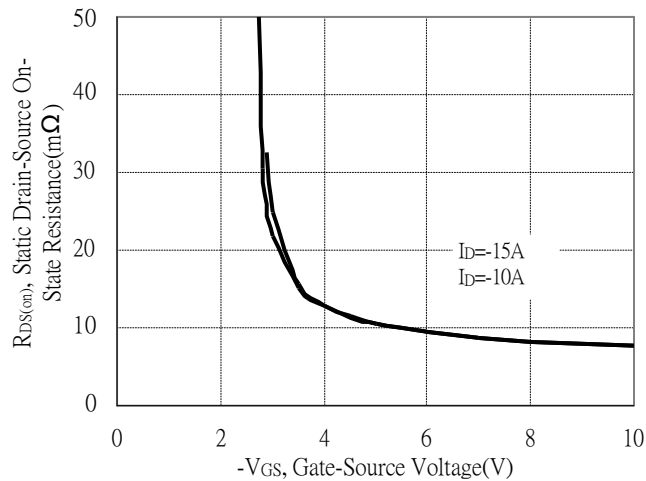
Static Drain-Source On-State resistance vs Drain Current



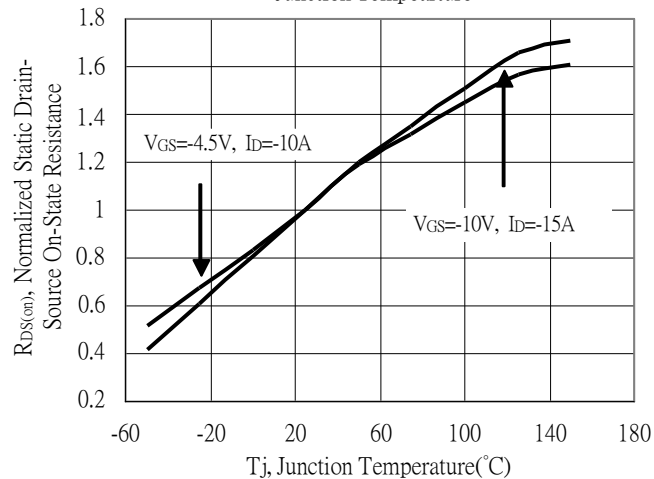
Source Drain Current vs Source-Drain Voltage



Static Drain-Source On-State Resistance vs Gate-Source Voltage

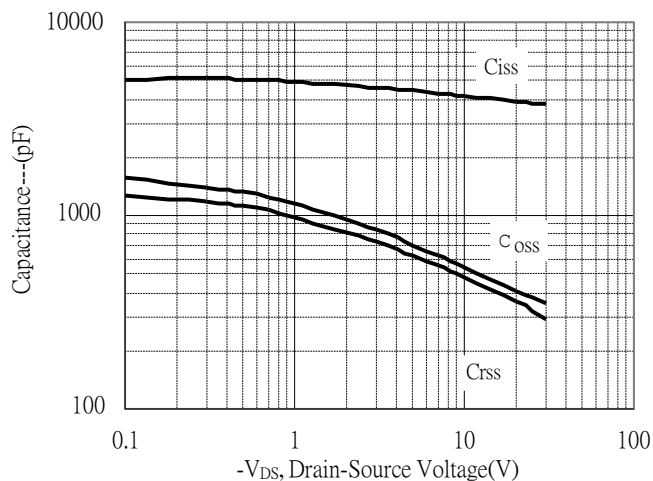


Normalized Drain-Source On-State Resistance vs Junction Temperature

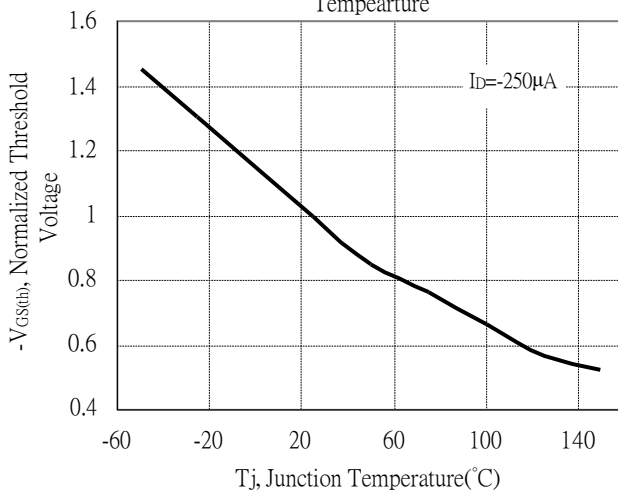


Typical Characteristics(Cont.)

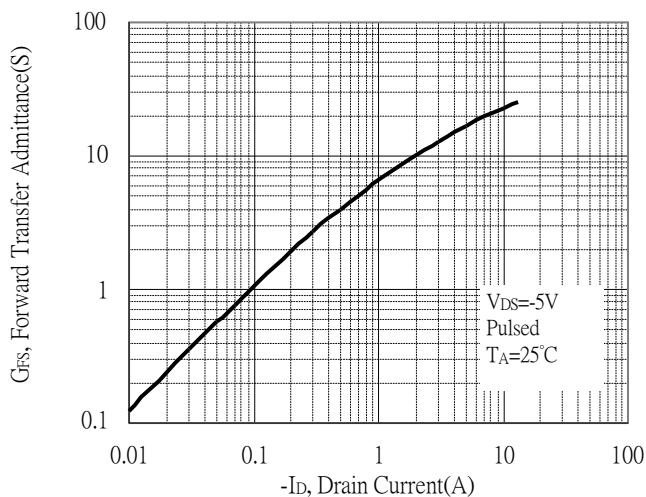
Capacitance vs Drain-to-Source Voltage



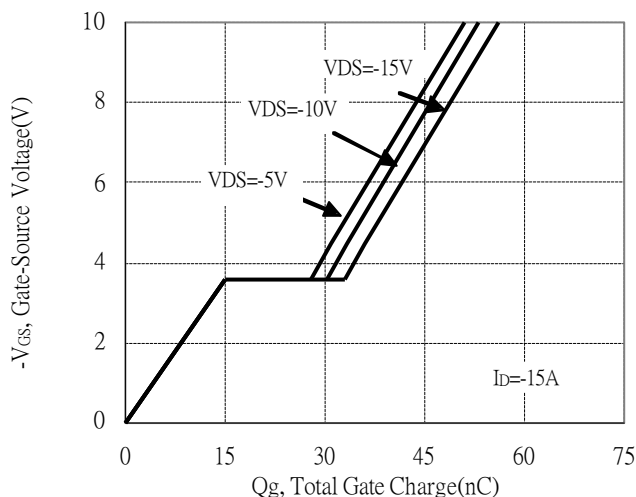
Normalized Threshold Voltage vs Junction Temperature



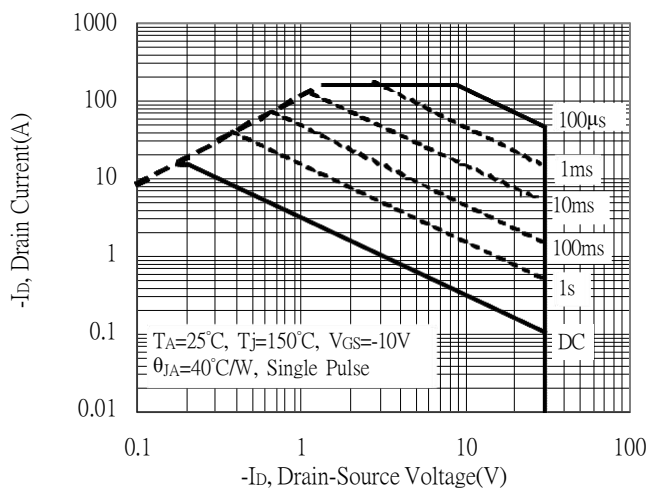
Forward Transfer Admittance vs Drain Current



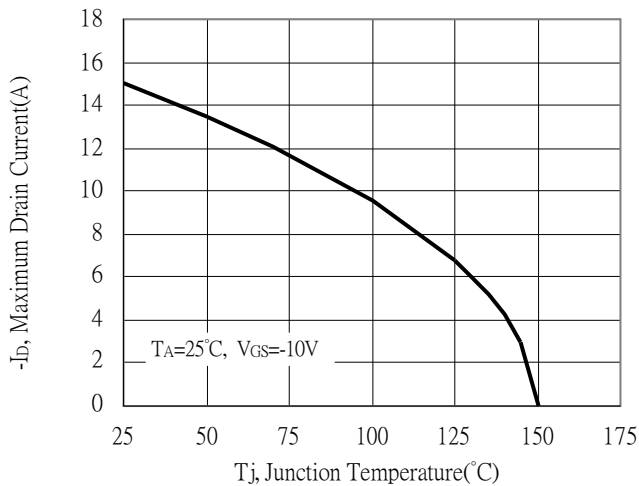
Gate Charge Characteristics



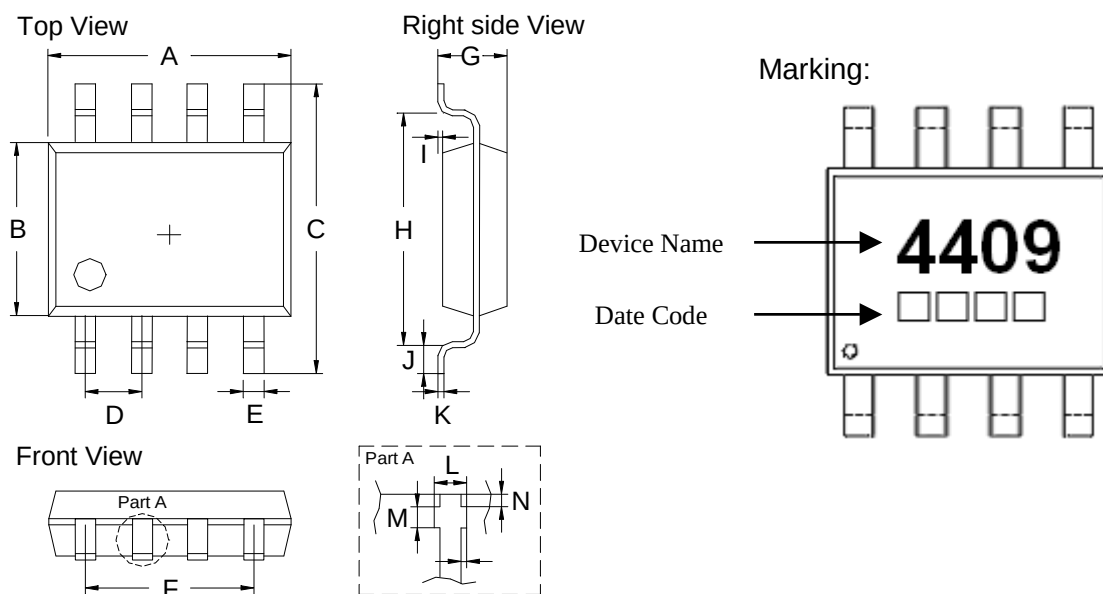
Maximum Safe Operating Area



Maximum Drain Current vs Junction Temperature



SOP-8 Dimension



*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1909	0.2007	4.85	5.10	I	0.0019	0.0078	0.05	0.20
B	0.1515	0.1555	3.85	3.95	J	0.0118	0.0275	0.30	0.70
C	0.2283	0.2441	5.80	6.20	K	0.0074	0.0098	0.19	0.25
D	0.0480	0.0519	1.22	1.32	L	0.0145	0.0204	0.37	0.52
E	0.0145	0.0185	0.37	0.47	M	0.0118	0.0197	0.30	0.50
F	0.1472	0.1527	3.74	3.88	N	0.0031	0.0051	0.08	0.13
G	0.0570	0.0649	1.45	1.65	O	0.0000	0.0059	0.00	0.15
H	0.1889	0.2007	4.80	5.10					