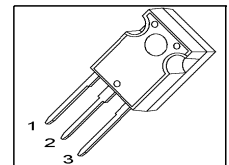


Cool MOS™ Power Transistor
Feature

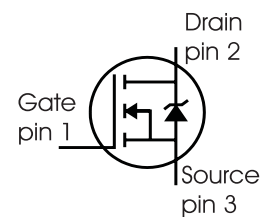
- New revolutionary high voltage technology
- Worldwide best $R_{DS(on)}$ in TO 247
- Ultra low gate charge
- Periodic avalanche rated
- Extreme dv/dt rated

V_{DS}	800	V
$R_{DS(on)}$	0.29	Ω
I_D	17	A

P-TO247



Type	Package	Ordering Code	Marking
SPW17N80C3	P-TO247	Q67040-S4359	17N80C3


Maximum Ratings

Parameter	Symbol	Value	Unit
Continuous drain current $T_C = 25\text{ °C}$ $T_C = 100\text{ °C}$	I_D	17 11	A
Pulsed drain current, t_p limited by T_{jmax}	$I_{D\text{ puls}}$	51	
Avalanche energy, single pulse $I_D = 3.4\text{ A}$, $V_{DD} = 50\text{ V}$	E_{AS}	670	mJ
Avalanche energy, repetitive t_{AR} limited by T_{jmax} ¹ $I_D = 17\text{ A}$, $V_{DD} = 50\text{ V}$	E_{AR}	0.5	
Avalanche current, repetitive t_{AR} limited by T_{jmax}	I_{AR}	17	A
Gate source voltage	V_{GS}	± 20	V
Gate source voltage AC ($f > 1\text{ Hz}$)	V_{GS}	± 30	
Power dissipation, $T_C = 25\text{ °C}$	P_{tot}	208	W
Operating and storage temperature	T_j, T_{stg}	-55... +150	$^{\circ}\text{C}$

Maximum Ratings

Parameter	Symbol	Value	Unit
Drain Source voltage slope $V_{DS} = 640 \text{ V}$, $I_D = 17 \text{ A}$, $T_j = 125 \text{ }^\circ\text{C}$	dv/dt	50	V/ns

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Thermal resistance, junction - case	R_{thJC}	-	-	0.6	K/W
Thermal resistance, junction - ambient, leaded	R_{thJA}	-	-	62	
Soldering temperature, 1.6 mm (0.063 in.) from case for 10s	T_{sold}	-	-	260	$^\circ\text{C}$

Electrical Characteristics, at $T_j=25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{V}$, $I_D=0.25\text{mA}$	800	-	-	V
Drain-Source avalanche breakdown voltage	$V_{(BR)DS}$	$V_{GS}=0\text{V}$, $I_D=17\text{A}$	-	870	-	
Gate threshold voltage	$V_{GS(th)}$	$I_D=1000\mu\text{A}$, $V_{GS}=V_{DS}$	2.1	3	3.9	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=800\text{V}$, $V_{GS}=0\text{V}$, $T_j=25^\circ\text{C}$, $T_j=150^\circ\text{C}$	-	0.5	25	μA
Gate-source leakage current	I_{GSS}	$V_{GS}=20\text{V}$, $V_{DS}=0\text{V}$	-	-	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10\text{V}$, $I_D=11\text{A}$, $T_j=25^\circ\text{C}$ $T_j=150^\circ\text{C}$	-	0.25	0.29	Ω
Gate input resistance	R_G	$f=1\text{MHz}$, open Drain	-	0.7	-	

Electrical Characteristics , at $T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Transconductance	g_{fs}	$V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$, $I_D = 11\text{A}$	-	15	-	S
Input capacitance	C_{iss}	$V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$	-	2320	-	pF
Output capacitance	C_{oss}		-	1250	-	
Reverse transfer capacitance	C_{rss}		-	60	-	
Effective output capacitance, ²⁾ energy related	$C_{o(er)}$	$V_{GS} = 0\text{V}$, $V_{DS} = 0\text{V to } 480\text{V}$	-	59	-	pF
Effective output capacitance, ³⁾ time related	$C_{o(tr)}$		-	124	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 400\text{V}$, $V_{GS} = 0/10\text{V}$, $I_D = 17\text{A}$, $R_G = 4.7\Omega$, $T_j = 125\text{ }^\circ\text{C}$	-	25	-	ns
Rise time	t_r		-	15	-	
Turn-off delay time	$t_{d(off)}$		-	72	82	
Fall time	t_f		-	6	9	

Gate Charge Characteristics

Gate to source charge	Q_{gs}	$V_{DD} = 640\text{V}$, $I_D = 17\text{A}$	-	12	-	nC
Gate to drain charge	Q_{gd}		-	46	-	
Gate charge total	Q_g	$V_{DD} = 640\text{V}$, $I_D = 17\text{A}$, $V_{GS} = 0\text{ to } 10\text{V}$	-	91	177	
Gate plateau voltage	$V_{(plateau)}$	$V_{DD} = 640\text{V}$, $I_D = 17\text{A}$	-	6	-	V

¹ Repetitive avalanche causes additional power losses that can be calculated as $P_{AV} = E_{AR} \cdot f$.

² $C_{o(er)}$ is a fixed capacitance that gives the same stored energy as C_{oss} while V_{DS} is rising from 0 to 80% V_{DSS} .

³ $C_{o(tr)}$ is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 80% V_{DSS} .

Electrical Characteristics, at $T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Inverse diode continuous forward current	I_S	$T_C=25^\circ\text{C}$	-	-	17	A
Inverse diode direct current, pulsed	I_{SM}		-	-	51	
Inverse diode forward voltage	V_{SD}	$V_{GS}=0\text{V}, I_F=I_S$	-	1	1.2	V
Reverse recovery time	t_{rr}	$V_R=400\text{V}, I_F=I_S,$	-	550	-	ns
Reverse recovery charge	Q_{rr}	$di_F/dt=100\text{A}/\mu\text{s}$	-	15	-	μC
Peak reverse recovery current	I_{rrm}		-	51	-	A
Peak rate of fall of reverse recovery current	di_{rr}/dt		-	1200	-	$\text{A}/\mu\text{s}$

Typical Transient Thermal Characteristics

Symbol	Value	Unit	Symbol	Value	Unit
	typ.			typ.	
Thermal resistance			Thermal capacitance		
R_{th1}	0.00812	K/W	C_{th1}	0.0003562	Ws/K
R_{th2}	0.016		C_{th2}	0.001337	
R_{th3}	0.031		C_{th3}	0.001831	
R_{th4}	0.114		C_{th4}	0.005033	
R_{th5}	0.135		C_{th5}	0.012	
R_{th6}	0.059		C_{th6}	0.092	

