



DESCRIPTION

The AM65R380 is available in TO-220, TO220F, TO-251, TO-252, TO-263 Packages.

BVDSS	RDSON	ID
700V	330mΩ	11A

APPLICATION

- SMPS
- Power Supply
- General Purpose Applications

ORDERING INFORMATION

Package Type	Part Number	
TO-220 SPQ: 50pcs/Tube	T3	AM65R380T3VU
TO220F SPQ: 50pcs/ Tube	T3F	AM65R380T3FVU
TO-251 SPQ:75pcs / Tube	TS3	AM65R380TS3VU
TO-252 SPQ:2,500pcs /Reel	D	AM65R380DVR
TO-263 SPQ:800pcs /Reel	S2	AM65R380S2VR
Note	V: Halogen free Package R: Tape & Reel U: Tube	
AiT provides all RoHS products		

FEATURE

- Advanced Super Junction Technology
- Fast Switching
- $R_{DS(ON)typ.}=330m\Omega @ V_{GS}=10V$
- Excellent dv/dt effect decline

PIN DESCRIPTION

Pin#	Symbol	Function
1	G	Gate
2	D	Drain
3	S	Source



ABSOLUTE MAXIMUM RATINGS

T_A = 25°C, unless otherwise specified.

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	BV _{DSS}	650	V
Continuous Drain Current	I _D	11	A
Continuous Drain Current T _A = 100 °C		6.93	A
Pulsed Drain Current ⁽¹⁾	I _{DM}	33	A
Gate-to-Source Voltage	V _{GS}	±30	V
Single Pulse Avalanche Energy ⁽²⁾	E _{AS}	250	mJ
Peak Diode Recovery dv/dt ⁽³⁾	dv/dt	15	V/ns
Power Dissipation (TO-251\TO-252\TO-220\TO-263)	P _D	100	W
Derating Factor above 25°C		0.8	W/°C
Power Dissipation (TO-220F)	P _D	31	W
Derating Factor above 25°C		0.25	W/°C
Operating Junction and Storage Temperature Range	T _J , T _{stg}	150 , −55 to 150	°C
Maximum Temperature for Soldering	T _L	300	°C
THERMAL RESISTANCE (TO-251 / TO-252 / TO-220 / TO-263)			
Junction-to-Case	R _{θJC}	1.25	°C/W
Junction-to-Ambient	R _{θJA}	62.5	
THERMAL RESISTANCE (TO-220F)			
Junction-to-Case	R _{θJC}	4	°C/W
Junction-to-Ambient	R _{θJA}	80	

(1) Pulse width limited by maximum junction temperature

(2) L=20mH, V_{DS}=50V, Start T_A=25°C

(3) I_{SD} =4.8A, di/dt ≤100A/us, V_{DD}≤BV_{DSS}, Start T_A=25°C

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**ELECTRICAL CHARACTERISTICS**T_A = 25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain to Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	650			V
BV _{DSS} Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D =250uA, Reference25°C		0.7		V/°C
Drain to Source Leakage Current	I _{DSS}	V _{DS} =650V, V _{GS} = 0V, T _j = 25°C			1	μA
		V _{DS} =520V, V _{GS} = 0V, T _j = 125°C			100	μA
Gate to Source Forward Leakage	I _{GSS(F)}	V _{GS} =+30V			100	nA
Gate to Source Reverse Leakage	I _{GSS(R)}	V _{GS} =-30V			-100	nA
ON CHARACTERISTICS						
Drain-to-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =3.8A ⁽⁴⁾		0.33	0.38	Ω
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} = V _{GS} , I _D = 250μA ⁽⁴⁾	2.0		4.0	V
Dynamic CHARACTERISTICS						
Gate resistance	R _g	f = 1.0MHz		10		Ω
Input Capacitance	C _{iss}	V _{GS} = 0V		770		PF
Output Capacitance	C _{oss}	V _{DS} = 25V		560		
Reverse Transfer Capacitance	C _{rss}	f = 1.0MHz		25		
Switching CHARACTERISTICS						
Turn-on Delay Time	t _{d(ON)}	ID =4.8A V _{DD} = 400V V _{GS} = 10V R _G =5Ω		11		ns
Rise Time	t _r			9		
Turn-Off Delay Time	t _{d(OFF)}			38		
Fall Time	t _f			8		
Total Gate Charge	Q _g	I _D =4.8A V _{DD} =520V V _{GS} = 10V		21.8		nC
Gate to Source Charge	Q _{gs}			4.5		
Gate to Drain (“Miller”) Charge	Q _{gd}			8		
Source-Drain Diode CHARACTERISTICS						
Continuous Source Current (Body Diode)	I _S	T _A =25 °C			11	A
Maximum Pulsed Current (Body Diode)	I _{SM}				33	A
Diode Forward Voltage	V _{SD}	I _S =4.8A, V _{GS} =0V ⁽⁴⁾			0.9	V
Reverse Recovery Time	T _{rr}	I _S =4.8A, T _j = 25°C dIF/dt=100A/us, V _{GS} =0V		285		ns
Reverse Recovery Charge	Q _{rr}			3135		nC
Reverse Recovery Current	I _{rrm}			22		A

(4) : Pulse width tp≤300μs, δ≤2%



TYPICAL PERFORMANCE CHARACTERISTICS

Fig 1. Safe Operating Area (No Full PAK)

Fig 2. Safe Operating Area (Full PAK)

Fig 3. Power Dissipation (No Full PAK)

Fig 4. Power Dissipation (Full PAK)

Fig 5. Max Thermal Impendence (No Full PAK)

Fig 6. Max Thermal Impendence (Full PAK)



Fig 7. Typical Output Characteristics

Fig 8. Typical Transfer Characteristics

Fig 9. Typical Drain to Source ON Resistance
vs Drain Current

Fig 10. Typical Drain to Source on Resistance
vs Junction Temperature

Fig 11. Typical Threshold Voltage
vs Junction Temperature

Fig 12. Typical Breakdown Voltage
vs Junction Temperature



Fig 13. Typical Capacitance vs Drain to Source Voltage

Fig 14. Typical Gate Charge vs Gate to Source Voltage



Fig 15. Gate Charge Test Circuit

Fig 16. Gate Charge Waveforms

Fig 17. Resistive Switching Test Circuit

Fig 18. Resistive Switching Waveforms



Fig 19. Typical Capacitance vs Drain to Source Voltage

Fig 20. Typical Gate Charge vs Gate to Source Voltage

Fig 21. Gate Charge Test Circuit

Fig 22. Gate Charge Waveforms



PACKAGE INFORMATION

Dimension in TO-220 (Unit: mm)

Symbol	Min.	Max.
A	9.60	10.6
B	15.0	16.0
B1	8.90	9.50
C	4.30	4.80
C1	2.30	3.10
D	1.20	1.40
E	0.70	0.90
F	0.30	0.60
G	1.17	1.37
H	2.70	3.80
L	12.6	14.8
N	2.34	2.74
Q	2.40	3.00
ΦP	3.50	3.90



Dimension in TO-220F (Unit: mm)

Symbol	Min.	Max.
A	9.60	10.4
B	15.4	16.2
B1	8.90	9.50
C	4.30	4.90
C1	2.10	3.00
D	2.40	3.00
E	0.60	1.00
F	0.30	0.60
G	1.12	1.42
H	3.40	3.80
	1.60	2.90
L	12.0	14.0
N	2.34	2.74
Q	3.15	3.55
ΦP	2.90	3.30



Dimension in TO-251 (Unit: mm)

Symbol	Min.	Max.
A	6.30	6.90
B	5.70	6.30
B1	1.00	1.20
B2	6.80	7.40
C	2.10	2.50
D	0.30	0.60
E	0.50	0.70
F	0.30	0.60
G	0.70	1.00
H	1.60	2.40
L	3.90	4.3
M	5.10	5.50
N	2.09	2.49



Dimension in TO-252 (Unit: mm)

Symbol	Min.	Max.
A	6.30	6.90
A1	0.00	0.13
B	5.70	6.30
C	2.10	2.50
D	0.30	0.60
E1	0.60	0.90
E2	0.70	1.00
F	0.30	0.60
G	0.70	1.20
L1	9.60	10.50
L2	2.70	3.10
H	0.60	1.00
M	5.10	5.50
N	2.09	2.49
R	0.30	
T	1.40	1.60
Y	5.10	6.30



Dimension in TO-252 (Unit: mm)

Symbol	Min.	Max.
A	9.800	10.40
B	8.900	9.500
B1	0	0.100
C	4.400	4.800
D	1.160	1.370
E	0.700	0.950
F	0.300	0.600
G	1.070	1.470
H	1.300	1.800
K	0.950	1.370
L1	14.50	16.50
L2	1.600	2.300
I	0	0.2
Q	0°	8°
R	0.4	
N	2.390	2.690



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