PTD20N06

60V/20A N-Channel Advanced Power MOSFET

Features

- ♦ Low On-Resistance
- ♦ Fast Switching
- ♦ 100% Avalanche Tested
- ♦ Repetitive Avalanche Allowed up to Tjmax
- ♦ Lead-Free, RoHS Compliant

General Features

♦ V_{DS} =60V,I_D =20A

$R_{DS(ON)}$ <44mΩ @ V_{GS}=10V

Description

PTD20N06 designed by the trench process techniques to achieve extremely low on-resistance. Additional features of this design can operate at high junction temperature, fast switching speed and improved repetitive avalanche rating.These features combine to make this design an extremely efficient and reliable device for use in Motor applications and a wide variety of other applications.

TO-252-2L

Absolute Maximum Ratings

Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only;and functional operation of the device at these or any other condition beyond those indicated in the specifications is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions. Ambient temperature (Ta) is 25°C, unless otherwise specified.

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	20	A
Drain Current-Continuous(T_C=100)	I_D (100)	14	A
Pulsed Drain Current	I_{DM}	60	A
Maximum Power Dissipation	P_D	40	W
Derating factor		0.27	W/
Single pulse avalanche energy (Note 5)	E_{AS}	72	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	
Thermal Resistance,Junction-to-Case(Note 2)	R_{JC}	3.7	/W

Electrical Characteristics (T_C=25 unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250 A	60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V	-	-	1	A
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250 A	1.0	2.0	3.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	37	44	m
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=4.5A	11	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=30V,V_{GS}=0V, F=1.0MHz	-	500	-	PF
Output Capacitance	C_{oss}		-	60	-	PF
Reverse Transfer Capacitance	C_{rss}		-	25	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=30V,I_D=2A,R_L=6.7 V_{GS}=10V,R_G=3	-	5	-	nS
Turn-on Rise Time	t_r		-	2.6	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	16.1	-	nS
Turn-Off Fall Time	t_f		-	2.3	-	nS
Total Gate Charge	Q_g	V_{DS}=30V,I_D=4.5A, V_{GS}=10V	-	14		nC
Gate-Source Charge	Q_{gs}		-	2.9		nC
Gate-Drain Charge	Q_{gd}		-	5.2		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=20A	-		1.2	V
Diode Forward Current (Note 2)	I_S		-	-	20	A
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF =20A di/dt = 100A/ s (Note3)	-	35	-	nS
Reverse Recovery Charge	Qrr		-	53	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Typical Electrical and The rmal Characteristics (Curves)

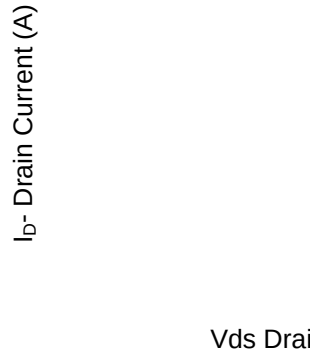

Figure 1 Output Characteristics

Figure 4 Rdson-Junction Temperature

Figure 2 Transfer Characteristics

Figure 5 Gate Charge

Figure 3 Rdson- Drain Current

Figure 6 Source- Drain Diode Forward

C Capacitance (pF)

Vds Drain-Source Voltage (V)

Figure 7 Capacitance vs Vds

T_J-Junction Temperature( )

Figure 9 BV_{DSS} vs Junction Temperature

I_D- Drain Current (A)

Vds Drain-Source Voltage (V)

Figure 8 Safe Operation Area

T_J-Junction Temperature( )

Figure 10 $V_{GS(th)}$ vs Junction Temperature

r(t),Normalized Effective Transient Thermal Impedance

Square Wave Pluse Duration(sec)

Figure 11 Normalized Maximum Transient Thermal Impedance