

PSM11N60CTF

PFC Device Corporation

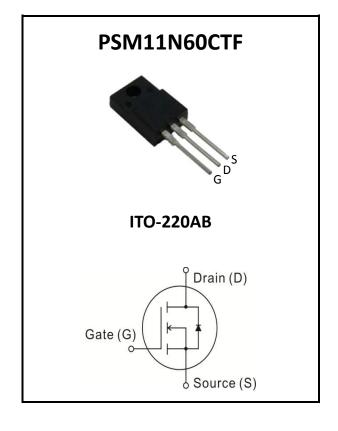
11A 600V Single N-Channel Power MOSFET

Major ratings and characteristics

Characteristics	Values	Units
$V_{DS}@T_Jmax$	600	V
R _{DS(ON)} , V _{GS} =10V	0.34	Ω
Ι _D	11	Α

General Description

PFC MLSJ (Multi-Layer Super Junction) MOSFET technology is the ideal choice for the PFC and PWM application. PFC device provides practical advantages of higher pressure-resistance, lower on-resistance to achieve the ideal balance between the switching speed and on-resistance.



Typical Applications

PFC stages, hard switching PWM stages and resonant switching stages for PC, Adapter, LCD & PDP TV, Lighting, Server, Telecom and UPS.

Please note: For MOSFET paralleling the use of ferrite beads on the gate or separate totem poles is generally recommended.

Features

- Advanced High Voltage Technology
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Lead Free Finish, RoHS Compliant

Oct-2016	
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Version 4.0

1. Characteristics

Maximum Ratings Characteristics $(T_A = 25 \degree C \text{ unless otherwise specified})$

Symbol	Parameter	Rating	Units	
V _{DSS}	Drain-Source Voltage	600	V	
I _D	Drain Current – Continuous (T _c =25°C)	11	А	
١D	Drain Current – Continuous (T _c =100°C)	7	А	
I_D pulsed	Pulsed Drain Current tp limited by TJ max (Note 1)	33	А	
E _{AS}	Single Pulse Avalanche Energy (Noted 2)	340	mJ	
-	Avalanche Energy, repetitive t_{AR} limited by T_J max (Note 3)	0.0		
E _{AR}	I _D =11A, V _{DD} =50V	0.6	mJ	
I _{AR}	Avalanche Current, repetitive t_{AR} limited by T_J max	11	А	
V_{GS}	Gate-Source Voltage Static	±20	V	
V_{GS}	Gate-Source Voltage AC (f>1Hz)	±30	V	
P _{tot}	Power Dissipation	31	W	
T _{STG}	Storage Temperature Range	-55 to 150	°C	
TJ	Operating Junction Temperature Range	-55 to 150	°C	

Thermal Characteristics

Symbol	Parameter	Тур.	Max.	Unit
$R_{ extsf{ heta}JA}$	Thermal Resistance Junction to ambient		80	°C/W
$R_{ extsf{ heta}JC}$	Thermal Resistance Junction to case (Drain)		4.0	°C/W



Electrical Characteristics

($T_J = 25$ °C unless otherwise specified)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Тур.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	600			V
	Durin Course Lookana Courset	V _{DS} =600V,V _{GS} =0V, T _J =25°C		0.1	1	uA
I _{DSS}	Drain-Source Leakage Current	V _{DS} =600V,V _{GS} =0V, T _J =150°C			100	uA
I _{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 30V$, $V_{DS}=0V$			±100	nA

On Characteristics

R _{DS(ON)} Static Drain-Source On-Resistance	V _{GS} =10V ,I _D =7A, T _J =25°C		0.29	0.34	Ω	
R _{DS(ON)}		V _{GS} =10V ,I _D =7A, T _J =150°C		0.88		Ω
V _{GS(th)}	Gate-Source Threshold Voltage	$V_{GS}=V_{DS}$, $I_{D}=500$ uA	2.1	3.0	3.9	V
R_{G}	Gate input resistance	f=1MHz, open Drain		0.7		Ω

Dynamic and switching Characteristics

Q _{qs}	Gate-Source Charge	V _{DD} =480V, I _D =11A,	 8		
Q _{gd}	Gate-Drain Charge		 18		nC
Q _q	Gate charge total	V _{GS} =0 to 10V	 40	60	
V (plateau)	Gate plateau voltage		 6.0		V
gfs	Transconductance	$V_{DS} \geqq 2^* I_D * R_{DS(on)} max, I_D = 7A$	 11		S
C _{iss}	Input Capacitance		 1240		
C _{oss}	Output Capacitance	V _{GS} =0V, V _{DS} =25V, f=1MHz	 790		pF
C _{rss}	Reverse Transfer Capacitance		 67		

Drain-Source Diode Characteristics and Maximum Ratings

V _{SD}	Inverse diode forward voltage	I _S =11A, V _{GS} =0V	 0.86	1.2	V
t _{rr}	Reverse Recovery Time		 366		nS
Q _{rr}	Reverse Recovery Charge	V _R =330V , I _F = 11A, di _F / dt = 100A / uS	 6		uC
Irrm	Peak reverse recovery current		 31		А

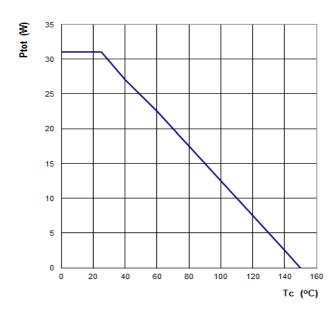
Note :

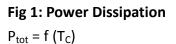
1. Repetitive Rating: Pulsed width limited by maximum junction temperature. 2. V_{DD} =50V, I_D=5.5A, Starting T_J=25°C.

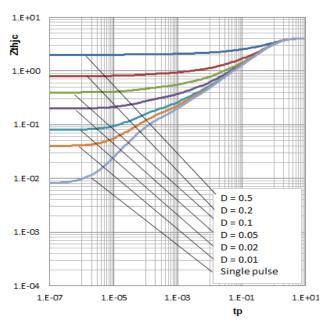
2. $V_{DD}=50V$, $I_D=5.5A$, Starting $T_J=25$ °C. 3. Repetitive avalanche cause additional power loss that can be calculated as $P_{AV}=E_{AR}$ *f.

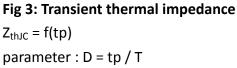


2. Characteristics Curves









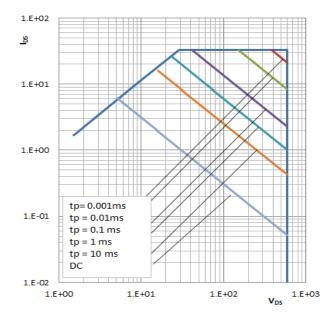


Fig 2: Safe operating area

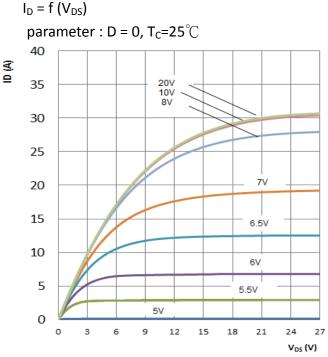


Fig 4: Typ. Output Characteristics

 $I_{D} = f(V_{DS}) ; Tj = 25^{\circ}C$ parameter : tp = 100uS, V_{GS}



Characteristics

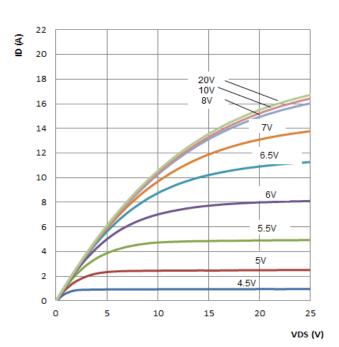


Fig 5: Typ. Output Characteristics $I_D = f(V_{DS}) ; Tj = 150^{\circ}C$ parameter : tp = 100uS, V_{GS}

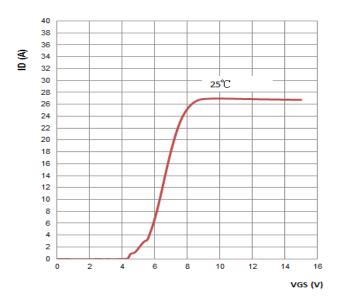


Fig 7: Typ. Transfer Characteristics

 $I_D = f$ (VGS); VDS $\geq 2 \times ID \times RDS(on) \max$

parameter : tp = 100 uS



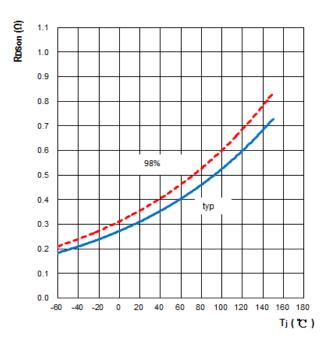


Fig 6: Drain-Source On-state Resistance

 $R_{DS(on)} = f(Tj)$ parameter : $I_D = 7A$, $V_{GS} = 10V$

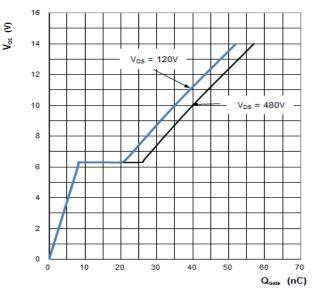


Fig 8: Typ. Gate Charge

 $V_{GS} = f(Q_{GATE})$

parameter : I_D = 11A pulsed



Characteristics

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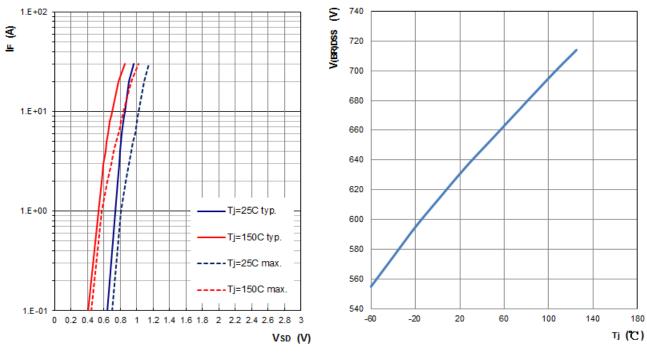


Fig 9: Forward characteristics of body diode $I_F = f(V_{SD})$ parameter : Tj , tp =100us

Ciss

Coss

Crss

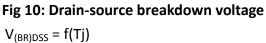
200

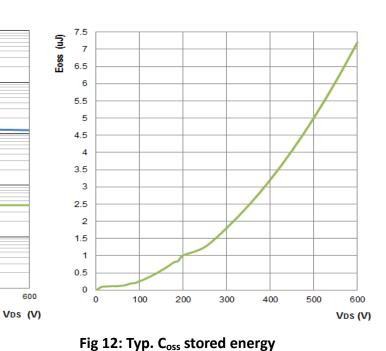
300

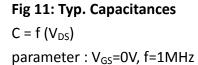
400

500

600







100



1.E+05

1.E+04

1.E+03

1.E+02

1.E+01

1.E+00

0

C (pF)

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3. Test Circuits and Waveforms

Test Circuits and Waveforms

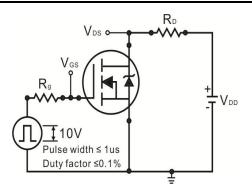


Figure 1: Switching times test circuit

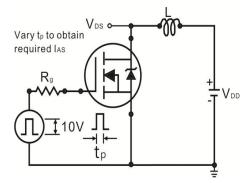


Figure 3: Unclamped test circuit

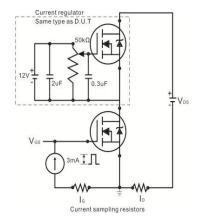


Figure 5:Gate charge test circuit

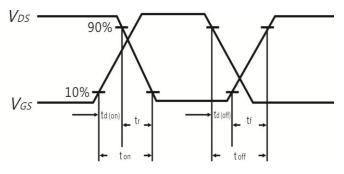


Figure 2: Switching time waveform

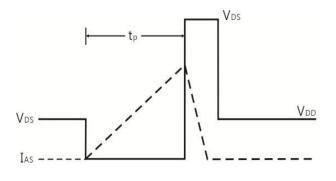


Figure 4: Unclamped test waveform

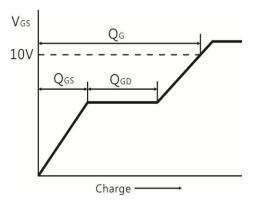
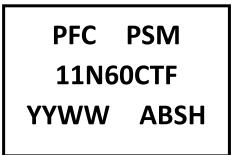


Figure 6: Basic gate charge waveform



4. Marking information

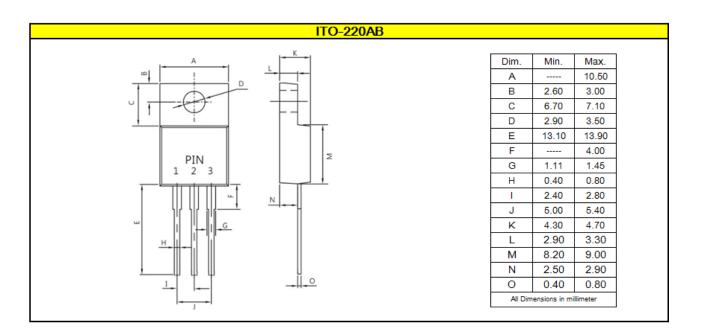
Top Marking Rule



PSM11N60CTF = Product Type Marking Code YY = Last two digits of year WW = Week code ABS = Assembly code H = Halogen Free (N/A = common molding compound)

5. Package information

Package Outline Dimensions millimeters





6. Ordering information

Part Number	Package	Delivery mode
PSM11N60CTF	ITO-220AB	50 pieces / tube

Note: For Halogen Free molding compound, add "H" suffix to part number above.

Mechanical

- Molder Plastic: UL Flammability Classification Rating 94V-0
- Device Weight : 0.06 ounces (1.74grams) ITO-220AB
- Mounting Torque : Recommended 10 in-lbs maximum

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