

# MT30G10N5

N-Channel Enhancement Mode Power MOSFET



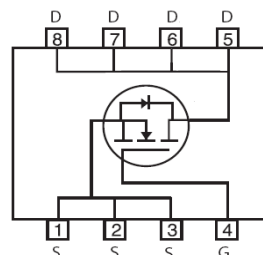
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## Feature Description

- 30V/220A  
 $R_{DS(ON)} = 1.0m\Omega(\text{typ.}) @ V_{GS} = 10V$   
 $R_{DS(ON)} = 1.3m\Omega(\text{typ.}) @ V_{GS} = 4.5V$
- 100% Avalanche Tested
- Reliable and Rugged
- Halogen- Free Devices Available
- SGT MOSFET

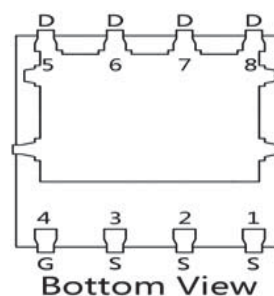
## Simplified Schematic



## Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Power Tool Application
- Networking DC-DC Power System

## MARKING DIAGRAM & PIN ASSIGNMENT



## Absolute Maximum Ratings (T<sub>A</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Rating	Unit
<b>Common Ratings (T<sub>c</sub>=25°C Unless Otherwise Noted)</b>			
V <sub>DSS</sub>	Drain-Source Voltage	30	V
V <sub>GSS</sub>	Gate-Source Voltage	±16	V
T <sub>J</sub>	Maximum Junction Temperature	150	°C
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
I <sub>S</sub>	Source Current-Continuous(Body Diode)	T <sub>c</sub> =25°C 220	A
<b>Mounted on Large Heat Sink</b>			
I <sub>DM</sub>	Pulsed Drain Current *	T <sub>c</sub> =25°C 750	A
I <sub>D</sub>	Continuous Drain Current	T <sub>c</sub> =25°C 220	A
		T <sub>c</sub> =100°C 134	A
P <sub>D</sub>	Maximum Power Dissipation	T <sub>c</sub> =25°C 121	W
		T <sub>c</sub> =100°C 50	W
R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case	1.2	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient **	72	°C/W
E <sub>AS</sub>	SinglePulsed-Avalanche Energy ***	L=0.3mH 425.2	mJ

Note: \* Repetitive rating; pulse width limited by max.junction temperature.  
 \*\* Surface mounted on FR-4 board.  
 \*\*\* Limited by  $T_{Jmax}$ , starting  $T_J=25^{\circ}C$ ,  $L = 0.1mH$ ,  $R_G = 25\Omega$ ,  $V_{GS} = 10V$ .

## Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
<b>Common Ratings</b> ( $T_c=25^{\circ}C$ Unless Otherwise Noted)				
$V_{DSS}$	Drain-Source Voltage		30	V
$V_{GSS}$	Gate-Source Voltage		$\pm 16$	V
$T_J$	Maximum Junction Temperature		150	$^{\circ}C$
$T_{STG}$	Storage Temperature Range		-55 to 150	$^{\circ}C$
$I_S$	Source Current-Continuous(Body Diode)	$T_c=25^{\circ}C$	220	A
<b>Mounted on Large Heat Sink</b>				
$I_{DM}$	Pulsed Drain Current *	$T_c=25^{\circ}C$	750	A
$I_D$	Continuous Drain Current	$T_c=25^{\circ}C$	220	A
		$T_c=100^{\circ}C$	134	A
$P_D$	Maximum Power Dissipation	$T_c=25^{\circ}C$	121	W
		$T_c=100^{\circ}C$	50	W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		1.2	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient **		72	$^{\circ}C/W$
$E_{AS}$	SinglePulsed-Avalanche Energy ***	$L=0.3mH$	425.2	mJ

## Electrical Characteristics ( $T_c = 25^{\circ}C$ Unless Otherwise Noted)

Symbol	Parameter	Test Conditions				Unit
			Min	Typ.	Max	
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	30	-	-	V
$I_{DSS}$	Drain-to-Source Leakage Current	$V_{DS}=24V, V_{GS}=0V$	-	-	1	$\mu A$
		$T_J=55^{\circ}C$	-	-	5	$\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	1	1.5	3	V
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 16V, V_{DS}=0V$	-	-	$\pm 100$	nA
$R_{DS(ON)*}$	Drain-Source On-State Resistance	$V_{GS}=10V, I_{DS}=20A$	-	1.0	2.0	m $\Omega$
		$V_{GS}=4.5V, I_{DS}=20A$	-	1.3	2.5	
<b>Diode Characteristics</b>						
$V_{SD}^*$	Diode Forward Voltage	$I_{SD}=20A, V_{GS}=0V$	-	0.7	1.0	V
$t_{rr}$	Reverse Recovery Time	$I_{SD}=20A, dI_{SD}/dt=100A/\mu s$	-	32	-	ns
$Q_{rr}$	Reverse Recovery Charge		-	70	-	nC

**Electrical Characteristics (Cont.)** (T<sub>c</sub> =25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions				Unit
			Min	Typ.	Max	
<b>Dynamic Characteristics</b>						
R <sub>G</sub>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1 MHz	-	0.9	-	Ω
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, Frequency=1.0MHz	-	4465	-	pF
C <sub>oss</sub>	Output Capacitance					
C <sub>rss</sub>	Reverse Transfer Capacitance					
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> =20V, R <sub>G</sub> =3.3Ω, I <sub>DS</sub> =20A, V <sub>GS</sub> =10V	-	30	-	ns
T <sub>r</sub>	Turn-on Rise Time					
t <sub>d(OFF)</sub>	Turn-off Delay Time					
T <sub>f</sub>	Turn-off Fall Time					
<b>Gate Charge Characteristics</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =24V, V <sub>GS</sub> =10V, I <sub>D</sub> =20A	-	70	-	nC
Q <sub>gs</sub>	Gate-Source Charge					
Q <sub>gd</sub>	Gate-Drain Charge					

Note: \*Pulse test, pulse width ≤ 300us, duty cycle ≤ 2%

## Typical Operating Characteristics

Figure 1: Power Dissipation

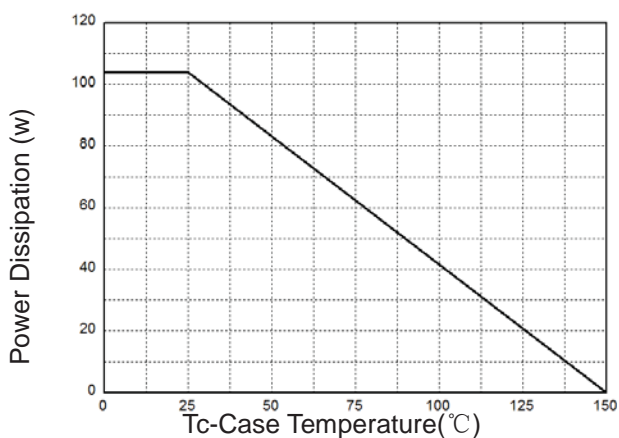


Figure 2: Drain Current

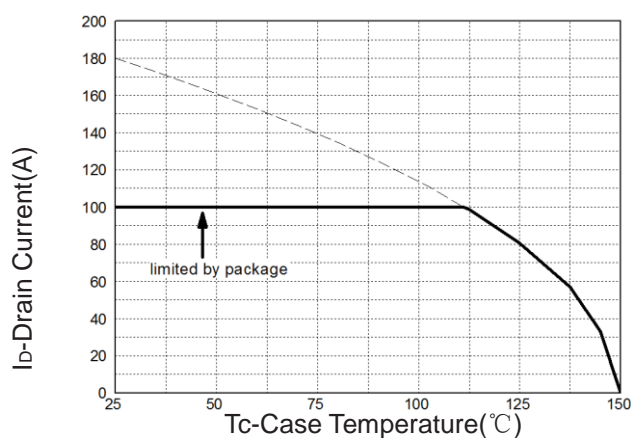


Figure 3: Safe Operation Area

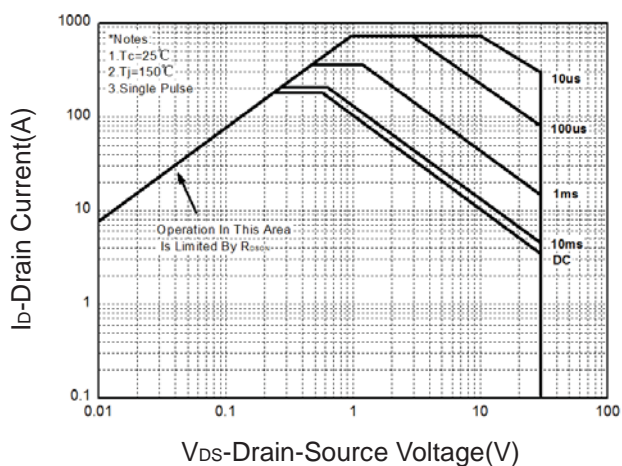


Figure 4: Thermal Transient Impedance

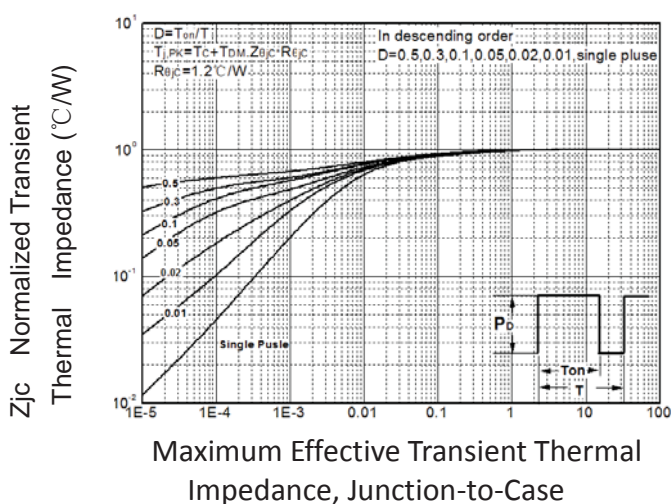


Figure 5: Output Characteristics

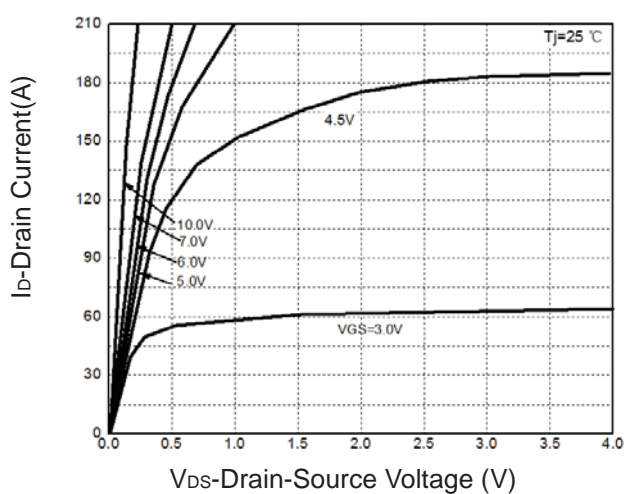
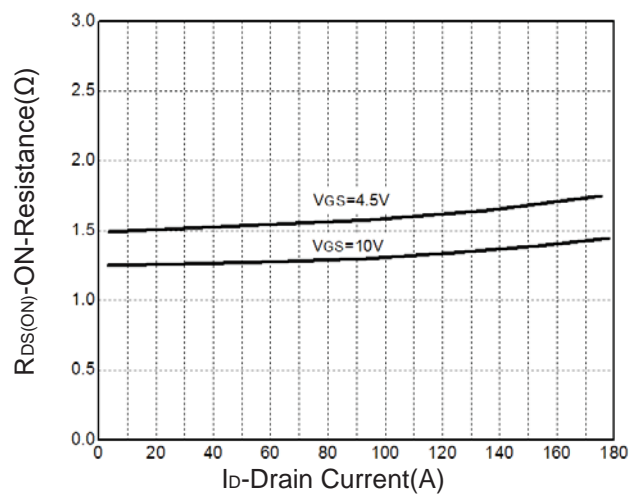


Figure 6: Drain-Source On Resistance



## Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature

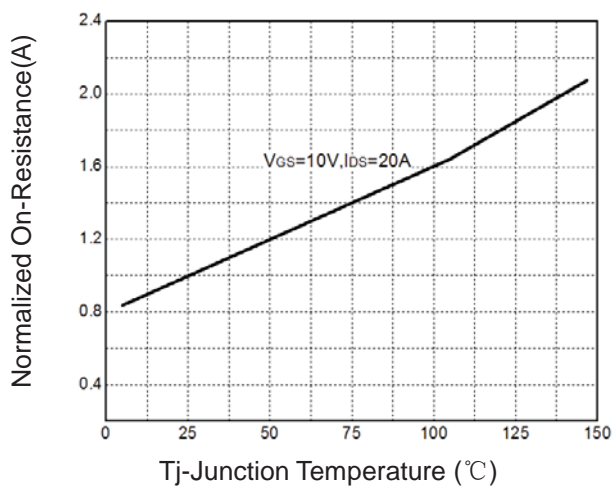


Figure 8: Source-Drain Diode Forward

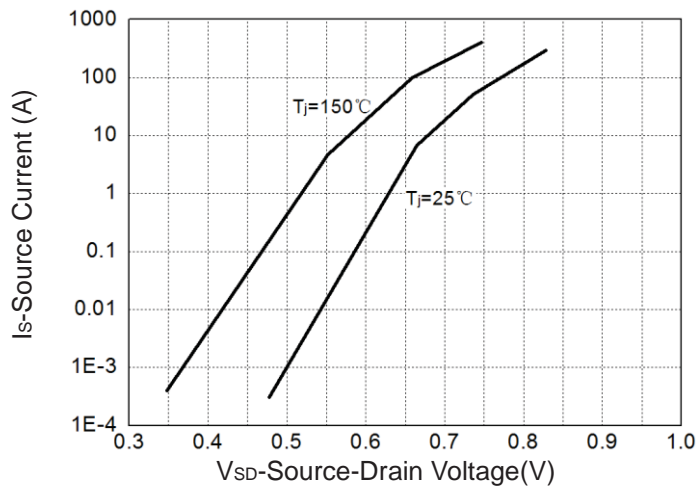


Figure 9: Capacitance Characteristics

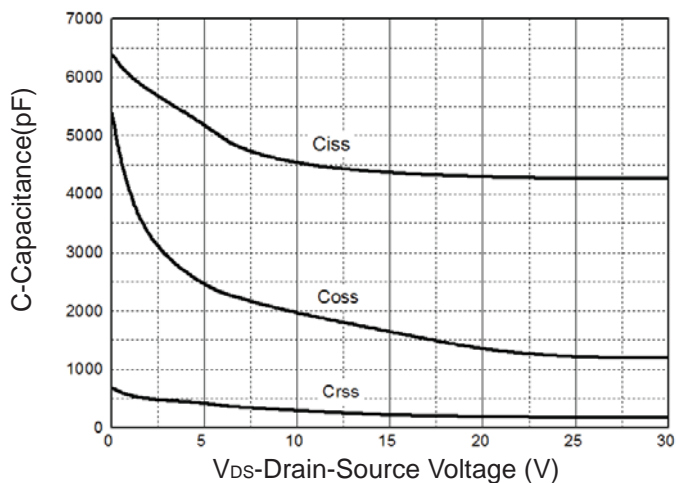
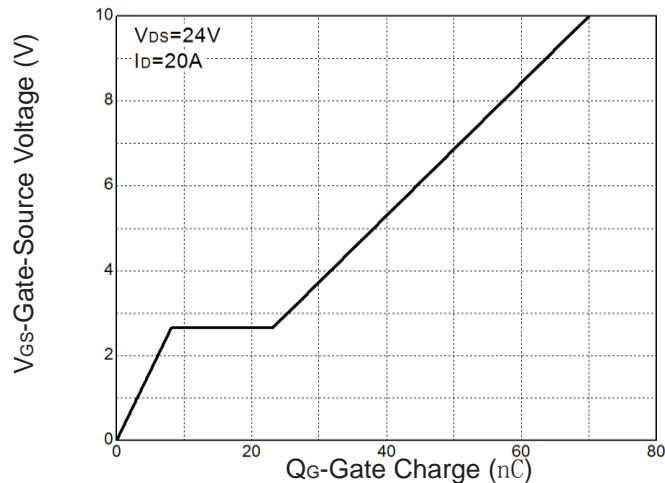
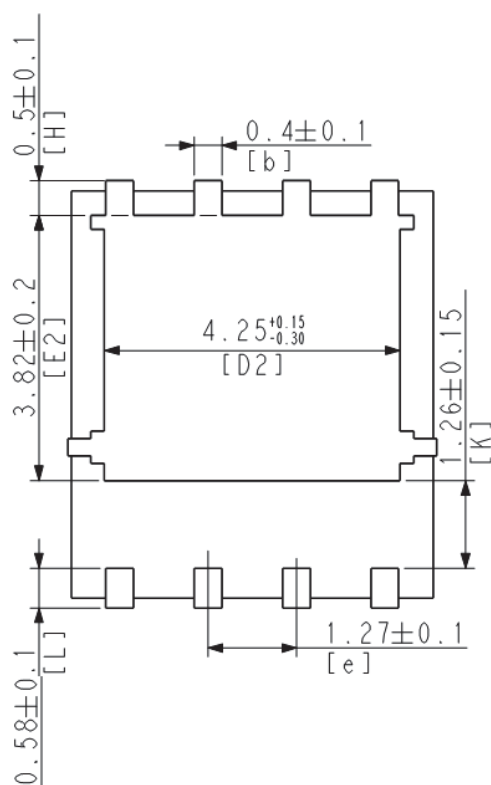
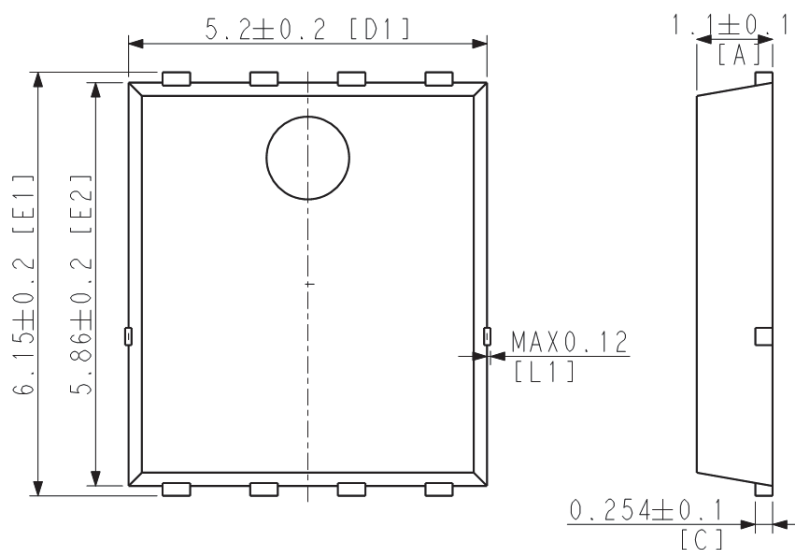


Figure 10: Gate Charge Characteristics



## Package Information

PDFN5\*6-8L



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