

MT12G03N5

N-Channel Enhancement Mode Power MOSFET



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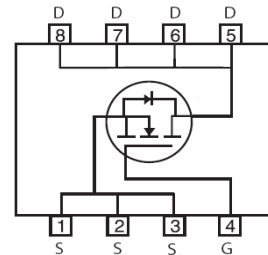
Feature Description

- 30V/190A
 $R_{DS(ON)} = 1.3m\Omega (typ.) @ V_{GS} = 10V$
 $R_{DS(ON)} = 1.6m\Omega (typ.) @ V_{GS} = 4.5V$
- 100% Avalanche Tested
- Reliable and Rugged
- Halogen- Free Devices Available
- SGT MOSFET

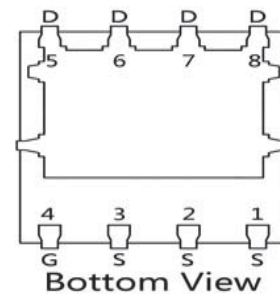
Applications

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

Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT



Absolute Maximum Ratings (T_A = 25°C unless otherwise noted)

Symbol	Parameter		Rating	Unit
Common Ratings (Tc=25°C Unless Otherwise Noted)				
V _{DSS}	Drain-Source Voltage		30	V
V _{GSS}	Gate-Source Voltage		±20	V
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	°C
I _S	Source Current-Continuous(Body Diode)	Tc=25°C	190	A
Mounted on Large Heat Sink				
I _{DM}	Pulsed Drain Current *	Tc=25°C	720	A
I _D	Continuous Drain Current	Tc=25°C	190	A
		Tc=100°C	114	A
P _D	Maximum Power Dissipation	Tc=25°C	104	W
		Tc=100°C	42	W
R _{θJC}	Thermal Resistance, Junction-to-Case		1.2	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient **		62	°C/W
E _{AS}	SinglePulsed-Avalanche Energy ***	L=0.3mH	388.2	mJ

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

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

Symbol	Parameter	Test Conditions					Unit
				Min	Typ.	Max	
Static Characteristics							
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA		30	-	-	V
I _{DSS}	Drain-to-Source Leakage Current	V _{DS} =30V, V _{GS} =0V		-	-	1	μA
			T _J =55°C	-	-	5	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA		1	1.5	3	V
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 20V, V _{DS} =0V		-	-	±100	nA
R _{DS(ON)} *	Drain-Source On-State Resistance	V _{GS} =10V, I _{DS} =20A		-	1.3	1.6	mΩ
		V _{GS} =4.5V, I _{DS} =20A		-	1.6	2.0	
Diode Characteristics							
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/μs		-	32	-	ns
Q _{rr}	Reverse Recovery Charge			-	70	-	nC

Electrical Characteristics (Cont.) ($T_C = 25^{\circ}C$ Unless Otherwise Noted)

Symbol	Parameter	Test Conditions				Unit
			Min	Typ.	Max	
Dynamic Characteristics						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1 MHz	-	0.9	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, Frequency=1.0MHz	-	4265	-	pF
C _{oss}	Output Capacitance		-	1199	-	
C _{rss}	Reverse Transfer Capacitance		-	171	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =20V, R _G =3.3Ω, I _{DS} =20A, V _{GS} =10V	-	30	-	ns
T _r	Turn-on Rise Time		-	85	-	
t _{d(OFF)}	Turn-off Delay Time		-	52	-	
T _f	Turn-off Fall Time		-	40	-	
Gate Charge Characteristics						
Q _g	Total Gate Charge	V _{DS} =24V, V _{GS} =10V, I _D =20A	-	70	-	nC
Q _{gs}	Gate-Source Charge		-	8.1	-	
Q _{gd}	Gate-Drain Charge		-	15	-	

Note: *Pulse test, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

Typical Operating Characteristics

Figure 1: Power Dissipation

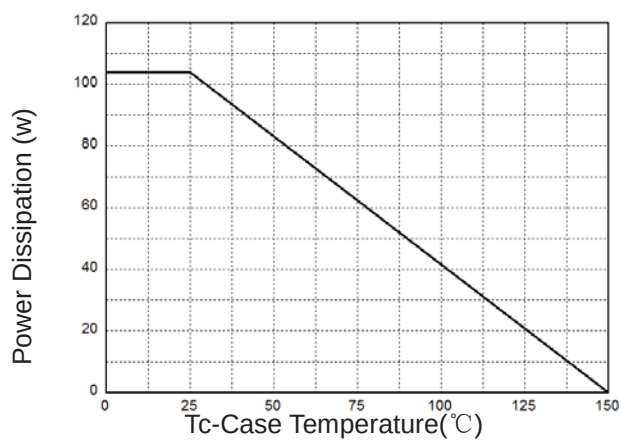


Figure 2: Drain Current

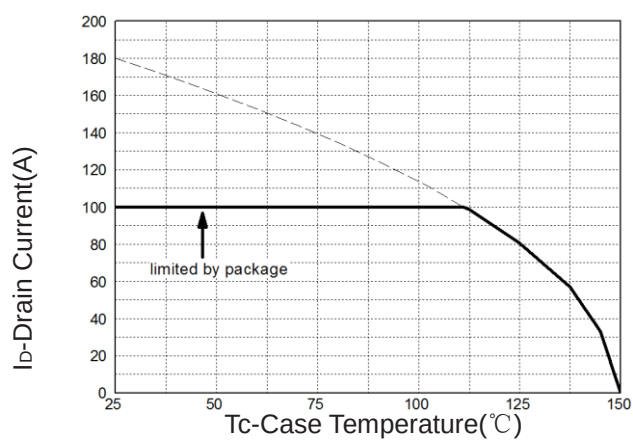


Figure 3: Safe Operation Area

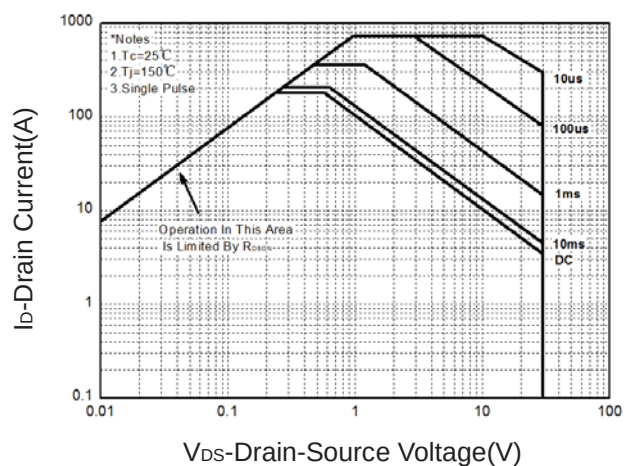


Figure 4: Thermal Transient Impedance

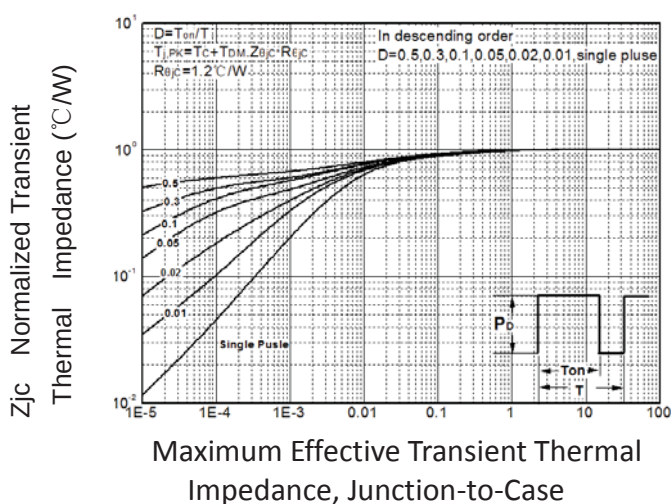


Figure 5: Output Characteristics

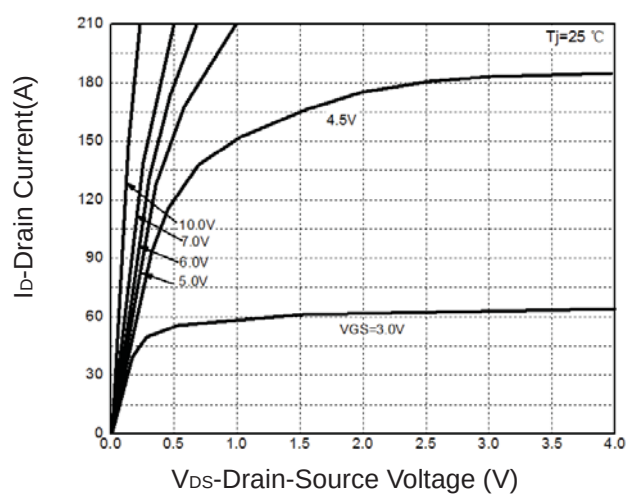
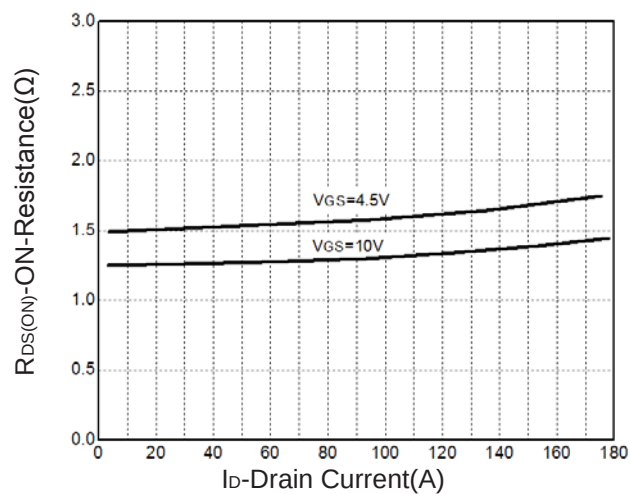


Figure 6: Drain-Source On Resistance



Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature

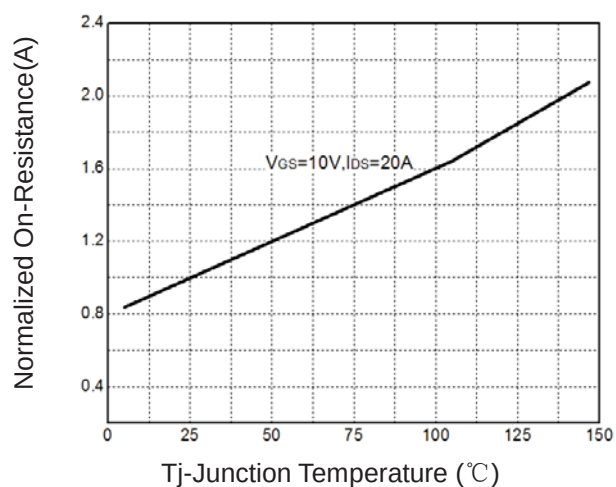


Figure 8: Source-Drain Diode Forward

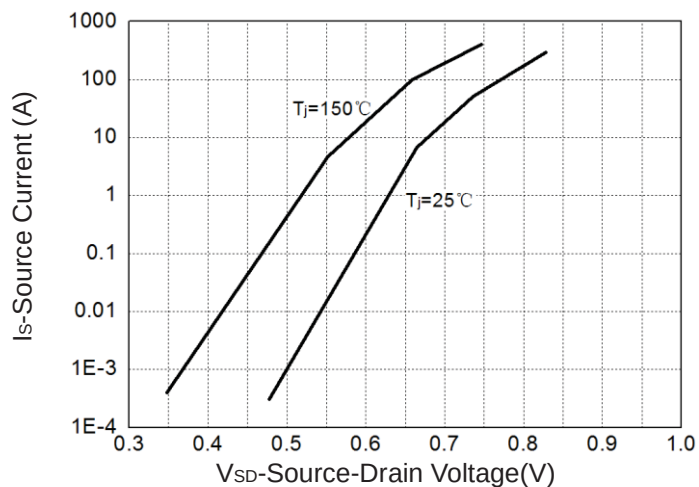


Figure 9: Capacitance Characteristics

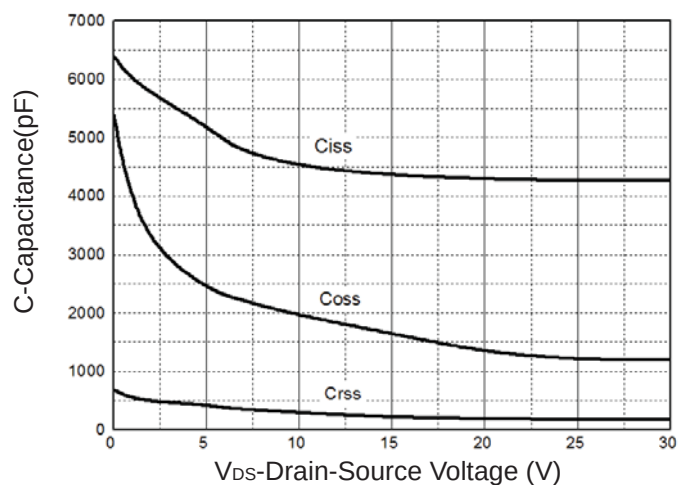
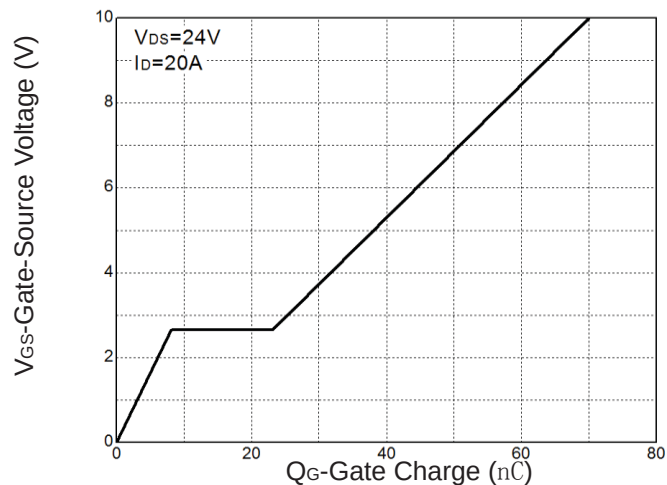
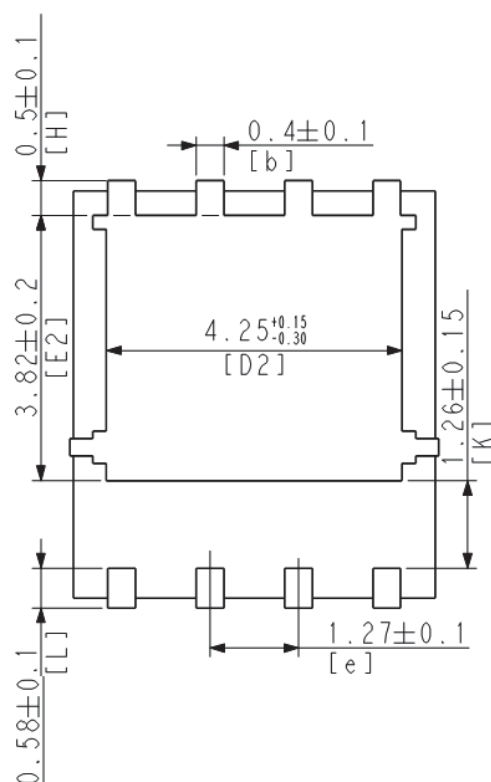
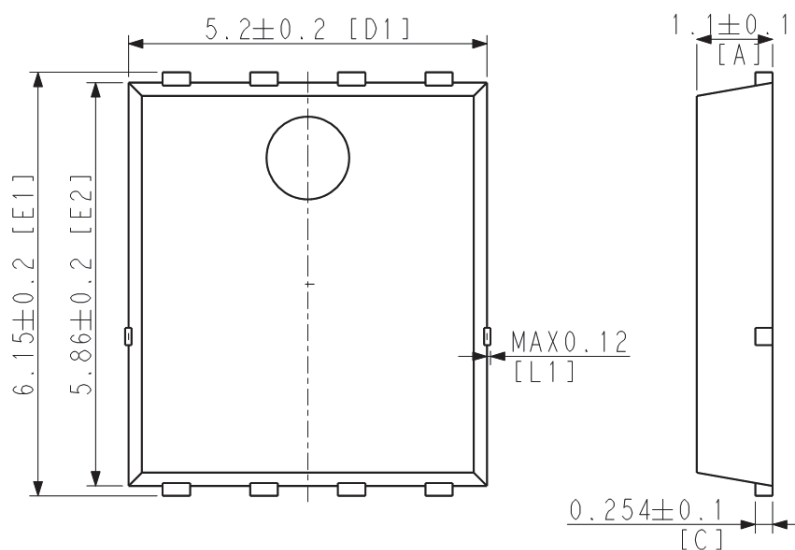


Figure 10: Gate Charge Characteristics



Package Information

PDFN5*6-8L



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