

MT40G010N5

N-Channel Enhancement Mode Power MOSFET



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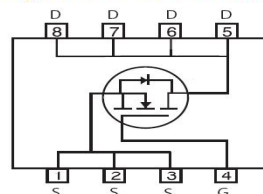
Feature Description

- 40V/245A
 $R_{DS(ON)} = 0.9m\Omega (typ.) @ V_{GS} = 10V$
 $R_{DS(ON)} = 1.6m\Omega (typ.) @ V_{GS} = 4.5V$
- 100% Avalanche Tested
- Reliable and Rugged
- Halogen- Free Devices Available
- SGT MOSFET

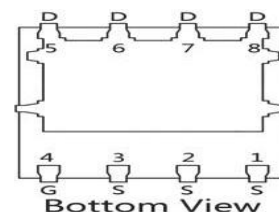
Applications

- 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		40	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	168	A
Mounted on Large Heat Sink				
I _{DM}	Pulsed Drain Current *	Tc=25°C	656	A
I _D	Continuous Drain Current	Tc=25°C	245	A
		Tc=100°C	153	A
P _D	Maximum Power Dissipation	Tc=25°C	109	W
		Tc=100°C	38	W
R _{θJC}	Thermal Resistance, Junction-to-Case		1.3	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient **		72	°C/W
E _{AS}	SinglePulsed-Avalanche Energy ***	L=0.3mH	480.2	mJ

Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
R _{θJC}	Thermal Resistance, Junction-to-Case		1.3	°C/W

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =250μA	40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V T _J =25℃			1	μA
		V _{DS} =40V, V _{GS} =0V T _J =125℃			100	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1		2.5	V
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =20A		61		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =20A T _J =25℃		0.9	1.6	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =20A T _J =25℃		1.6	2.2	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =20V,V _{GS} =0V, f=1.0MHz		3565		pF
C _{oss}	Output Capacitance			1712		pF
C _{rss}	Reverse Transfer Capacitance			108		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1.0MHz		1.9		Ω
Switching Parameters						
t _{d(on)}	Turn-on Delay Time	V _{GS} =10V, V _{DS} =20V, R _L =1Ω, R _{GEN} =3Ω		15.2		nS
t _r	Turn-on Rise Time			7.6		nS
t _{d(off)}	Turn-Off Delay Time			48.4		nS
t _f	Turn-Off Fall Time			13.6		nS
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =20V, I _D =20A		53.8		nC
Q _{gs}	Gate-Source Charge			11		nC
Q _{gd}	Gate-Drain Charge			7.9		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current (Body Diode)				240	A
V _{SD}	Forward on Voltage (Note 3)	V _{GS} =0V, I _S =20A			1.2	V
t _{rr}	Reverse Recovery Time	I _F =20A, dI/dt=100A/μs		43.8		ns
Q _{rr}	Reverse Recovery Charge	I _F =20A, dI/dt=100A/μs		32.6		nC

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.

Notes 2.E_{AS} condition: T_J=25°C, V_{DD}=40V, V_G=10V, R_g=25Ω, L=0.5mH.

Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

Typical Operating Characteristics

Figure 1: Power Dissipation

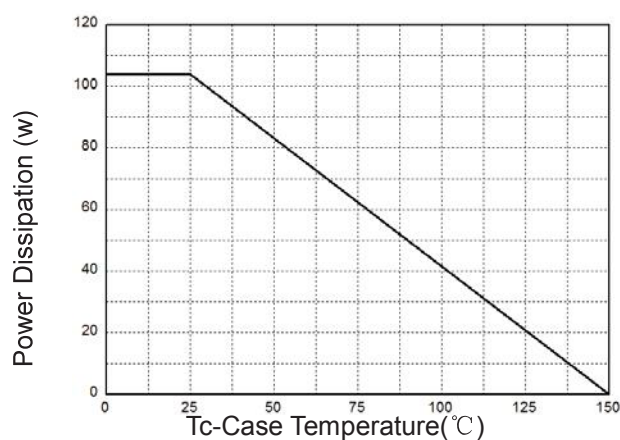


Figure 2: Drain Current

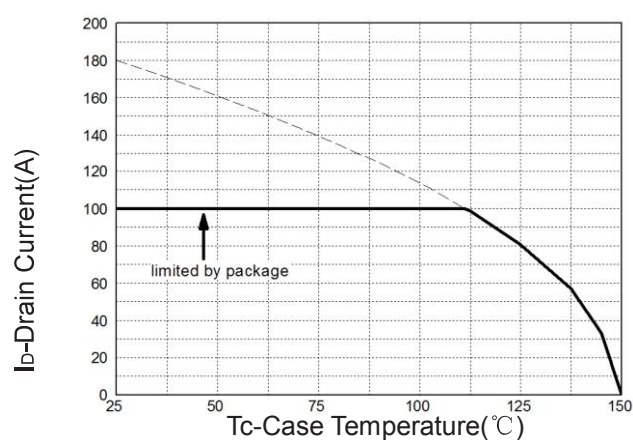


Figure 3: Safe Operation Area

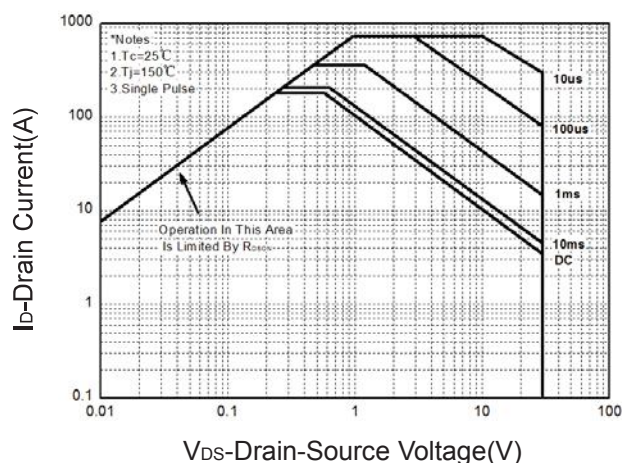


Figure 4: Thermal Transient Impedance

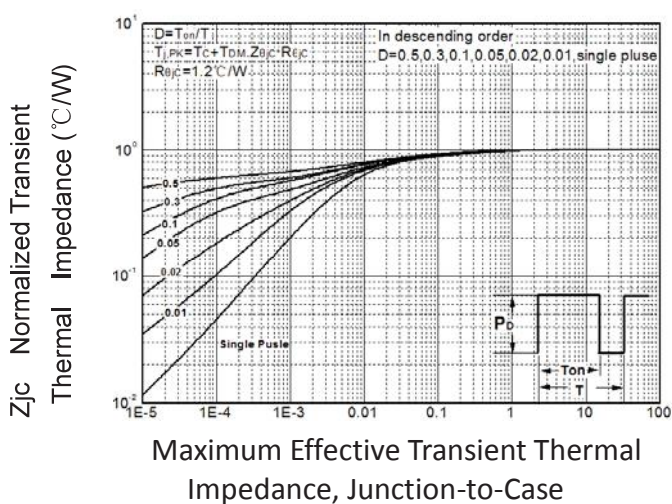


Figure 5: Output Characteristics

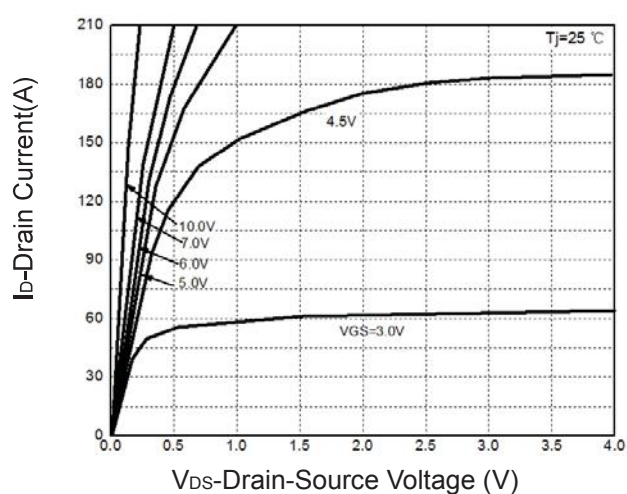
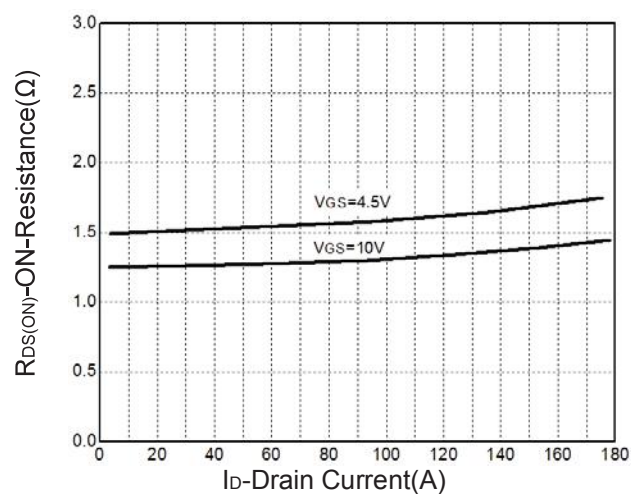


Figure 6: Drain-Source On Resistance



Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature

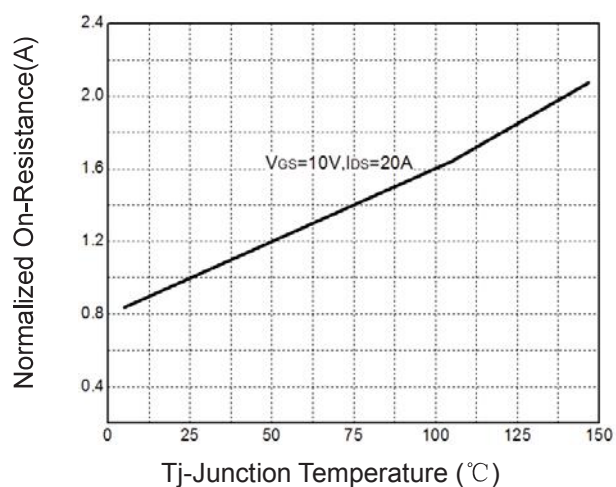


Figure 8: Source-Drain Diode Forward

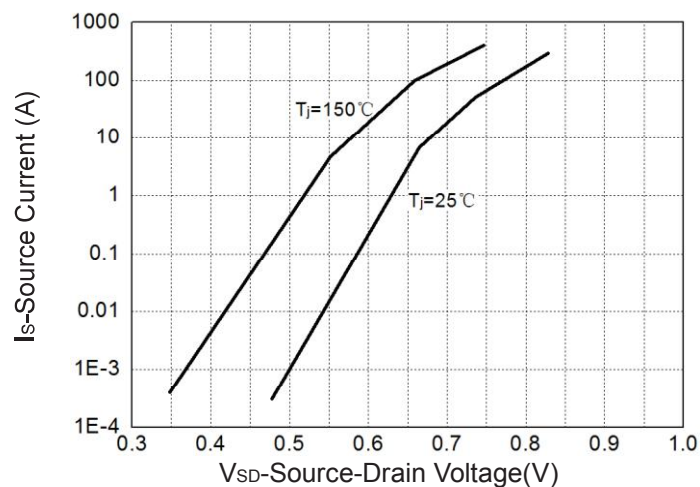


Figure 9: Capacitance Characteristics

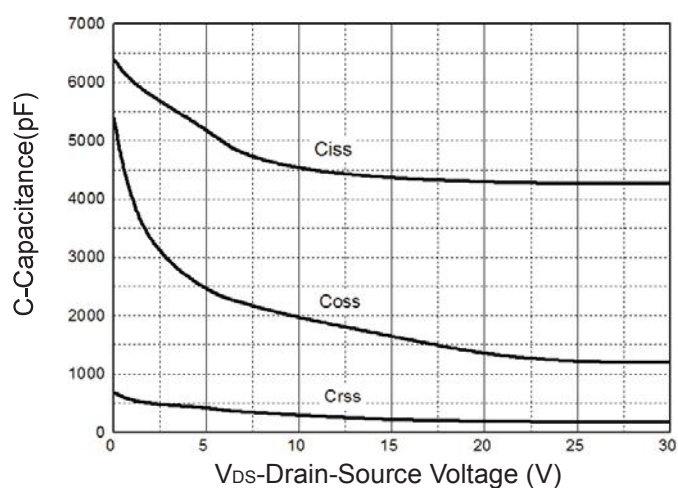
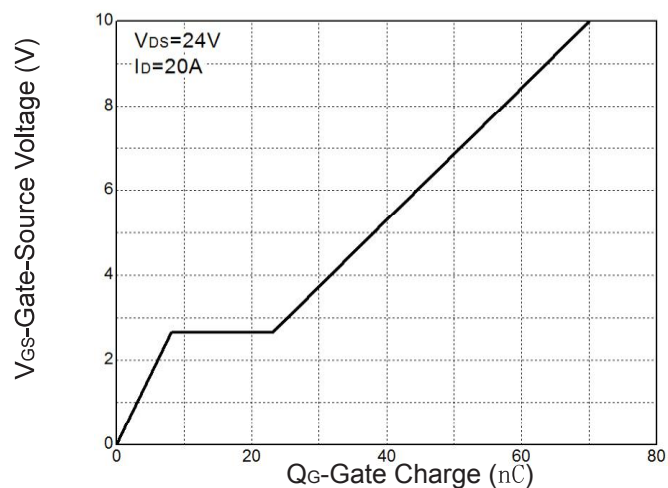
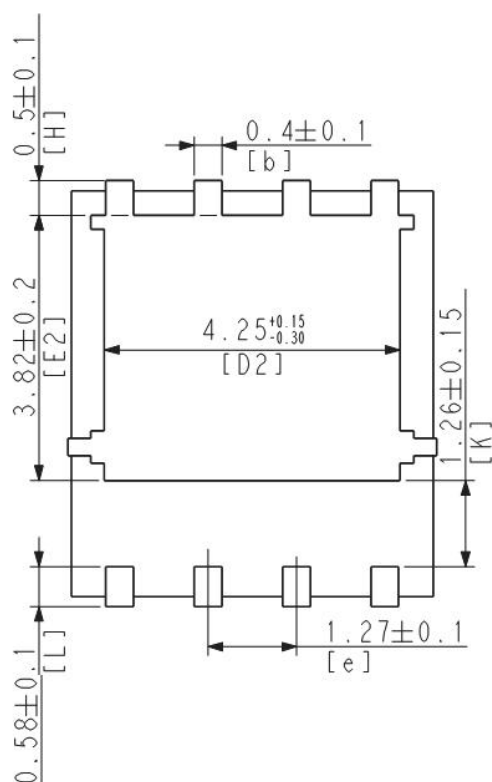
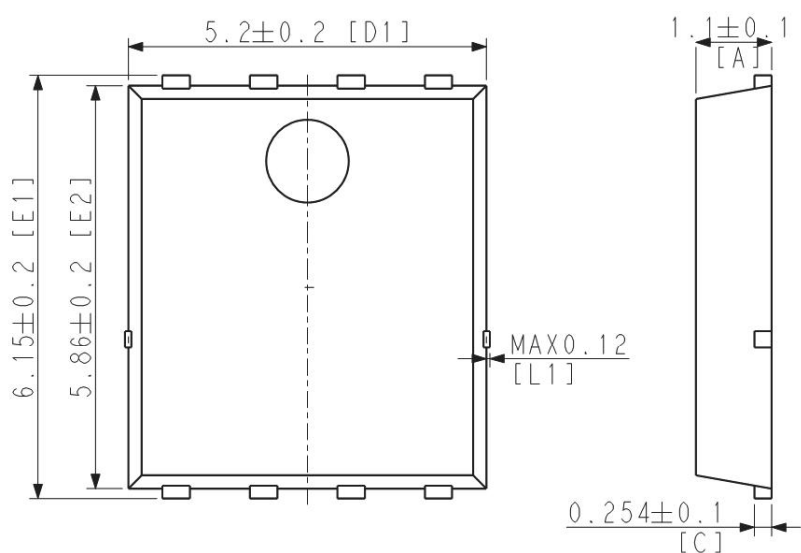


Figure 10: Gate Charge Characteristics



Package Information

PDFN5*6-8L



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