

MT60G007T

N-Channel Enhancement Mode Power MOSFET



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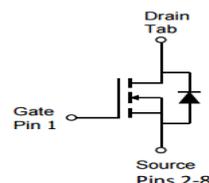
Feature Description

- 60V/480A
 $R_{DS(ON)} = 0.8m\Omega(\text{typ.}) @ V_{GS} = 10V$
- 100% Avalanche Tested
- Reliable and Rugged
- Halogen- Free Devices Available
- SGT MOSFET

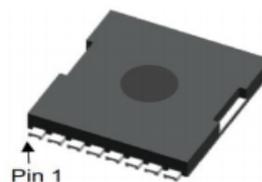
Applications

- 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 ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Unit
Common Ratings ($T_c=25^\circ\text{C}$ Unless Otherwise Noted)			
V_{DSS}	Drain-Source Voltage	60	V
V_{GSS}	Gate-Source Voltage	± 20	V
T_J	Maximum Junction Temperature	150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
I_S	Source Current-Continuous(Body Diode)	$T_c=25^\circ\text{C}$ 480	A
Mounted on Large Heat Sink			
I_{DM}	Pulsed Drain Current *	$T_c=25^\circ\text{C}$ 856	A
I_D	Continuous Drain Current	$T_c=25^\circ\text{C}$ 480	A
		$T_c=100^\circ\text{C}$ 293	A
P_D	Maximum Power Dissipation	$T_c=25^\circ\text{C}$ 191	W
		$T_c=100^\circ\text{C}$ 68	W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.3	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient **	72	$^\circ\text{C/W}$
E_{AS}	SinglePulsed-Avalanche Energy ***	$L=0.3mH$ 1180.2	mJ

Therma Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		1.3	$^\circ\text{C/W}$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
B _{VDSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	60			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V T _J =25°C			1	μA
		V _{DS} =40V, V _{GS} =0V T _J =125°C			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	2		4.5	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°C		0.8	1.4	mΩ
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, f=1.0MHz		6565		pF
C _{OSS}	Output Capacitance			2712		pF
C _{RSS}	Reverse Transfer Capacitance			208		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1.0MHz		0.9		Ω
Switching Parameters						
t _{d(on)}	Turn-on Delay Time	V _{GS} =10V, V _{DS} =20V, R _L =1Ω, R _{GEN} =3Ω		35.2		nS
t _r	Turn-on Rise Time			14.6		nS
t _{d(off)}	Turn-Off Delay Time			88.4		nS
t _f	Turn-Off Fall Time			23.6		nS
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =20V, I _D =20A		101.8		nC
Q _{gs}	Gate-Source Charge			20		nC
Q _{gd}	Gate-Drain Charge			13.8		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current (Body Diode)				480	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		73.8		ns
Q _{rr}	Reverse Recovery Charge	I _F =20A, di/dt=100A/μs		72.6		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

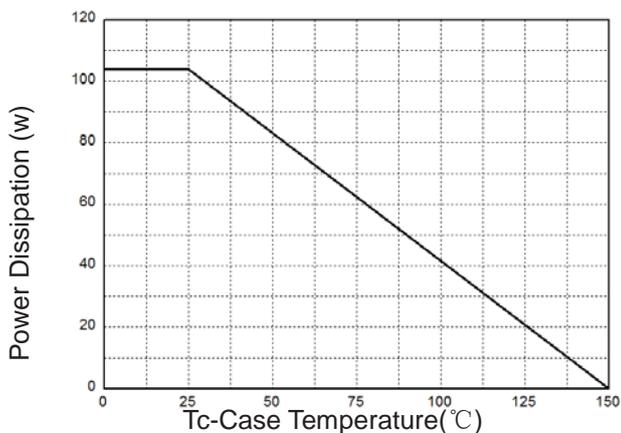


Figure 2: Drain Current

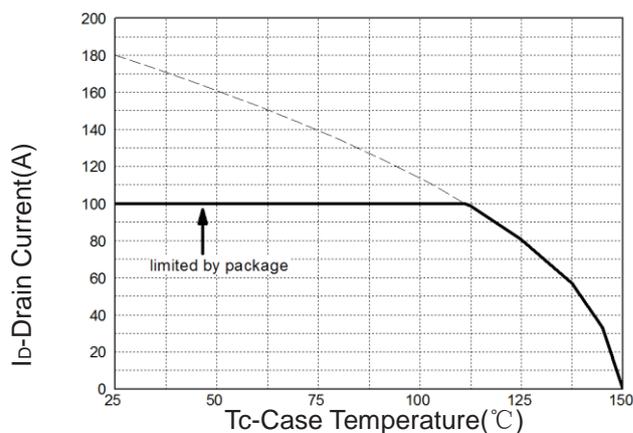


Figure 3: Safe Operation Area

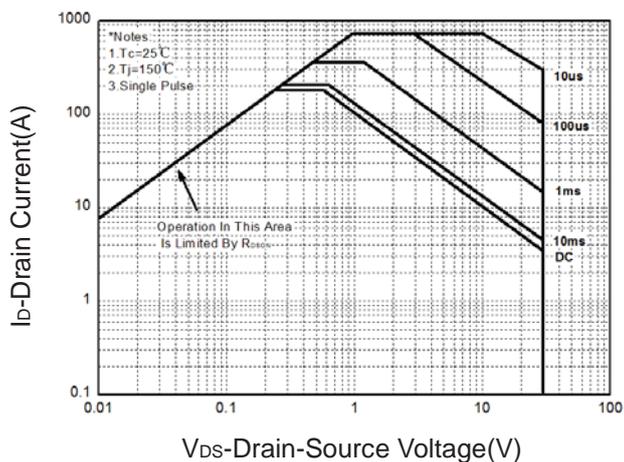


Figure 4: Thermal Transient Impedance

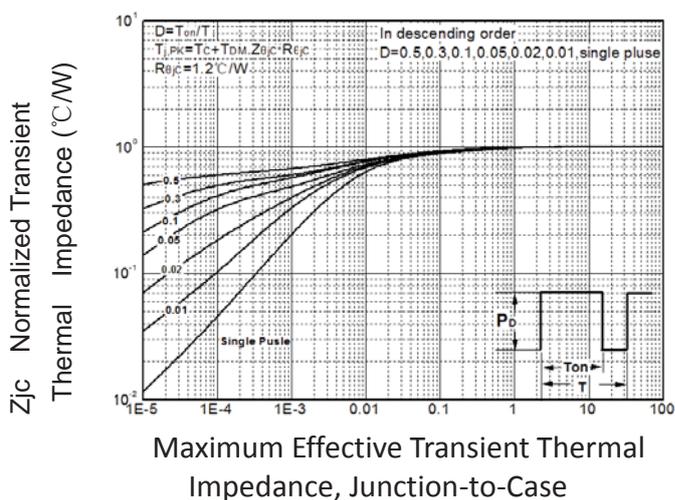


Figure 5: Output Characteristics

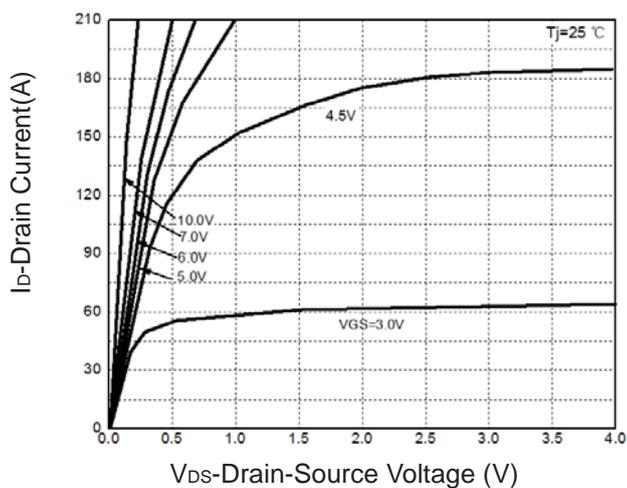
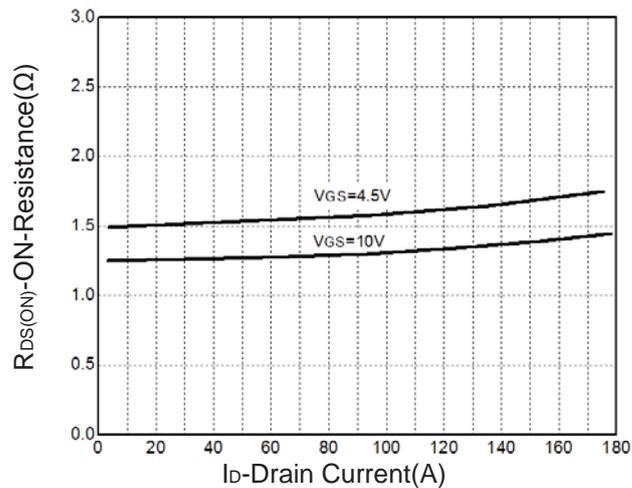


Figure 6: Drain-Source On Resistance



Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature

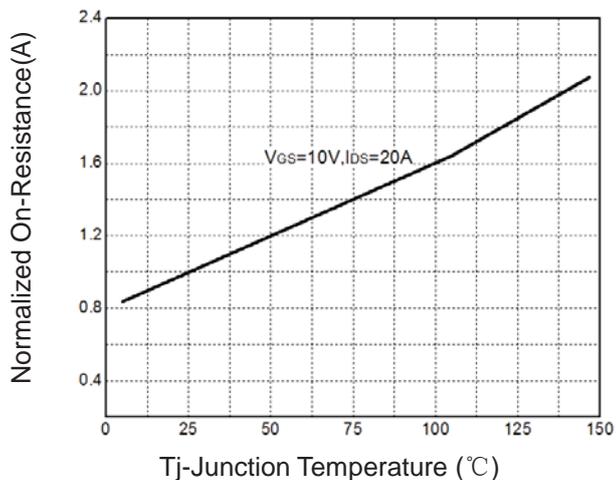


Figure 8: Source-Drain Diode Forward

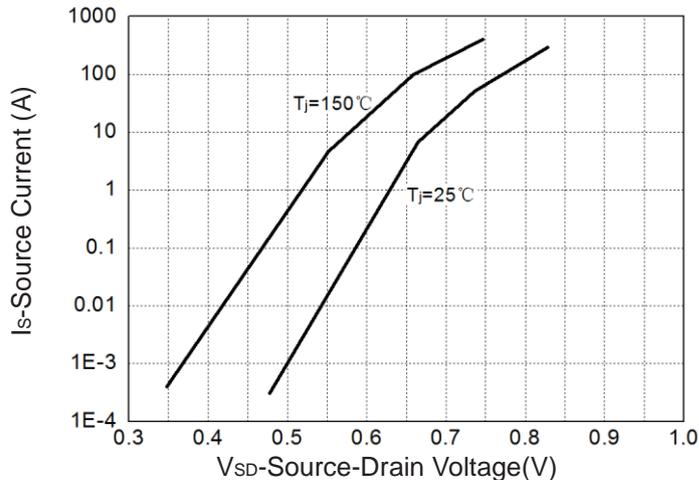


Figure 9: Capacitance Characteristics

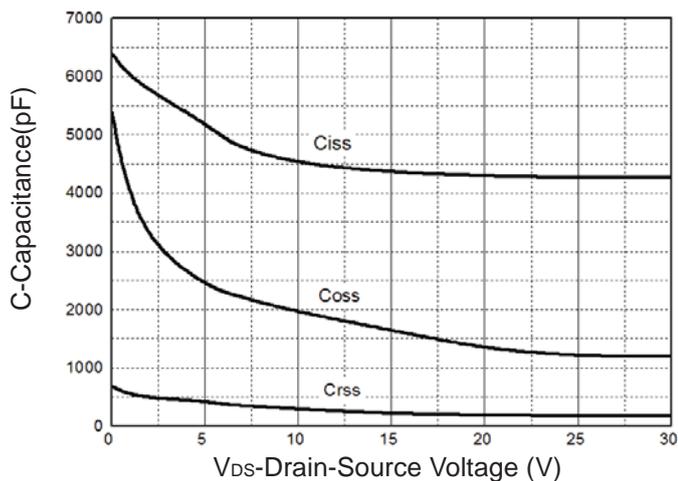
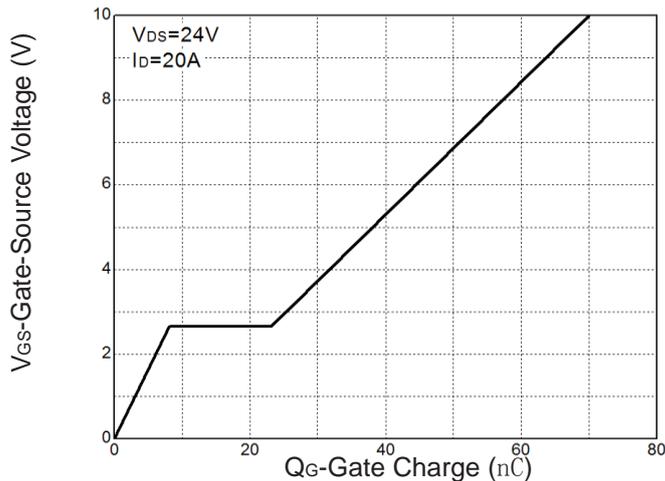
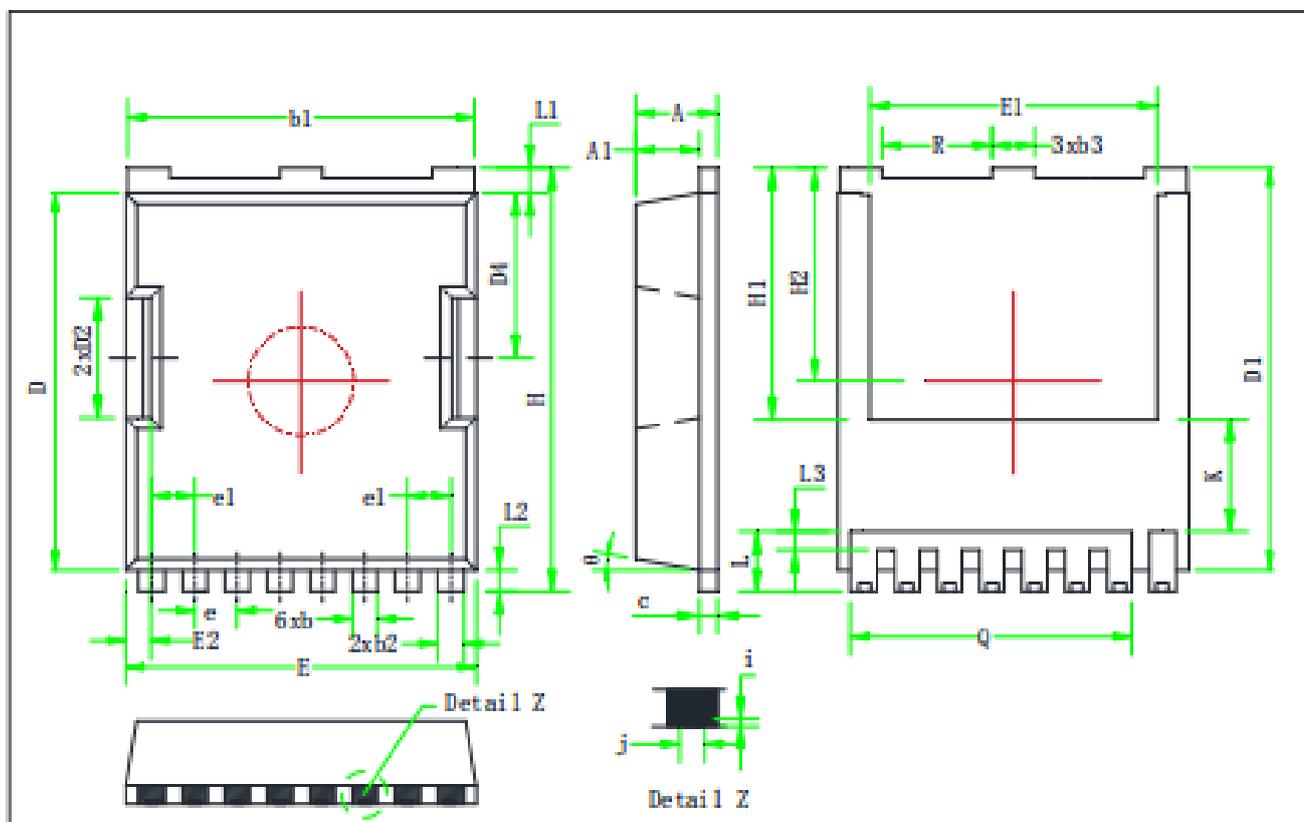


Figure 10: Gate Charge Characteristics



Package Mechanical Data(TOLL)



Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	2.25	2.30	2.35	E2	0.65	0.70	0.75
A1	1.75	1.80	1.85	H	11.60	11.70	11.80
b	0.65	0.70	0.75	H1	6.95 BSC		
b1	9.75	9.80	9.85	H2	5.90 BSC		
b2	0.70	0.75	0.80	i	0.10 REF		
b3	1.15	1.20	1.25	j	0.35 REF		
c	0.45	0.50	0.55	K	3.10 REF		
D	10.35	10.40	10.45	L	1.55	1.65	1.75
D1	11.00	11.10	11.20	L1	0.65	0.70	0.75
D2	3.25	3.30	3.35	L2	0.50	0.60	0.70
D4	4.50	4.55	4.60	L3	0.40	0.50	0.60
e	1.20 BSC			Q	7.95 REF		
e1	1.225 BSC			R	3.05	3.10	3.15
E	9.85	9.90	9.95	θ	10°REF		
E1	8.00	8.10	8.20				

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