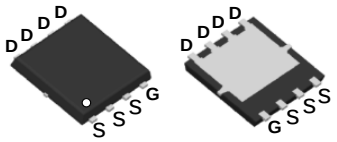
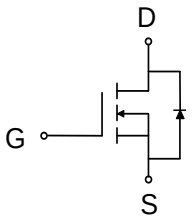
SGT N-channel Power MOSFET

MTR005N04D33

PDFN3*3





V_{DS}	40	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	4.5	mΩ
I_D	60	A

Features

- Low on – resistance
- Package PDFN3*3
- SGT N-channel Power MOSFET

Applications

- Load Switch for Portable Devices
- DC/DC Converter

Maximum ratings, at T_A =25°C, unless otherwise specified

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		40	V
V_{GS}	Gate-Source voltage		±20	V
I_S	Diode continuous forward current	T_C =25°C	60	A
I_D	Continuous drain current @VGS=10V	T_C =25°C	60	A
		T_C =100°C	48	A
I_{DM}	Pulse drain current tested ①	T_C =25°C	220	A
EAS	Avalanche energy, single pulsed ②		110	mJ
P_D	Maximum power dissipation	T_C =25°C	52	W
T_{STG},T_J	Storage and Junction Temperature Range		-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typical	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	2.4	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	60	°C/W

Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T_j=25°C (unless otherwise stated)						
$V_{(BR)DSS}$	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	--	--	1	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	1.0	1.7	2.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance ④	V_{GS}=10V, I_D=20A	--	4.5	5.0	mΩ
		V_{GS}=4.5V, I_D=15A	--	6.5	7.5	mΩ
Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=20V,V_{GS}=0V , f=1MHz	--	1130	--	pF
C_{oss}	Output Capacitance		--	383	--	pF
C_{rss}	Reverse Transfer Capacitance		--	63	--	pF
Q_g (10V)	Total Gate Charge	V_{DS}=20V,I_D=20A , V_{GS}=10V	--	25	--	nC
Q_{gs}	Gate-Source Charge		--	2.4	--	nC
Q_{gd}	Gate-Drain Charge		--	6.9	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	V_{DS}=20V, VGS=10V, R_L=3.3Ω, I_D=1A	--	10	--	ns
Tr	Turn-on Rise Time		--	21	--	ns
Td(off)	Turn-Off Delay Time		--	32	--	ns
Tf	Turn-Off Fall Time		--	12	--	ns

Source- Drain Diode Characteristics@ T_j = 25°C (unless otherwise stated)

I_{SD}	Source drain current(Body Diode)	T_A=25℃	--	--	60	A
V_{SD}	Forward on voltage	I_{SD}=5A,V_{GS}=0V	--	0.84	1.2	V

NOTE: ① Repetitive rating; pulse width limited by max junction temperature.

② Limited by T_{Jmax}, starting T_J = 25°C, L = 0.5mH, R_G = 25Ω, I_{AS} = 9A, V_{GS} =10V. Part not recommended for use above this value

③ The power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C.

④ Pulse width ≤ 380μs; duty cycle≤ 2%.

Typical Characteristics

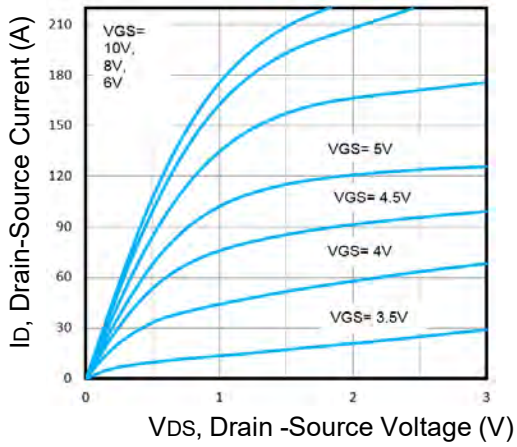


Fig1. Typical Output Characteristics

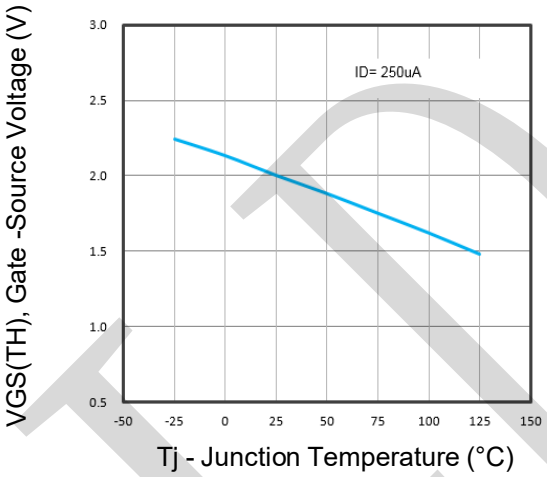


Fig2. Normalized Threshold Voltage Vs. Temperature

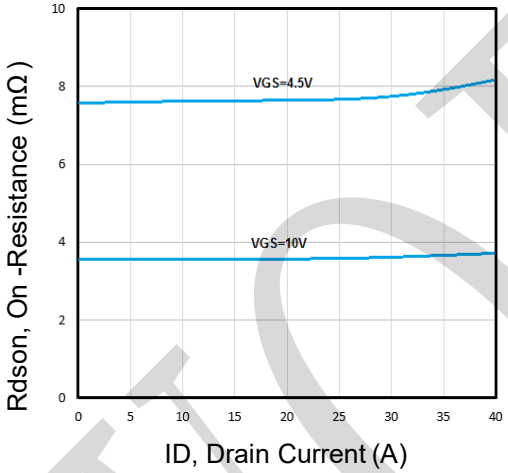


Fig3. On-Resistance vs. Drain Current and Gate

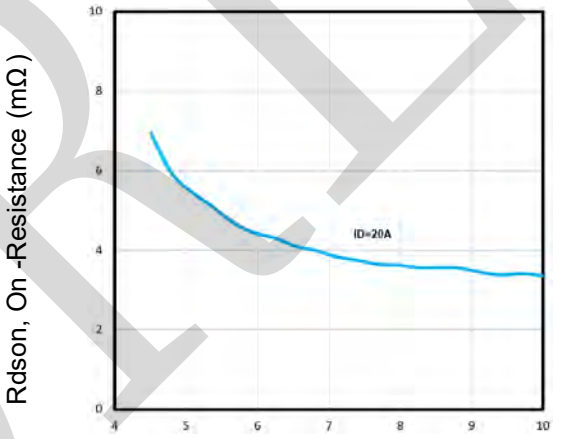


Fig4. On-Resistance vs. Gate Source Voltage

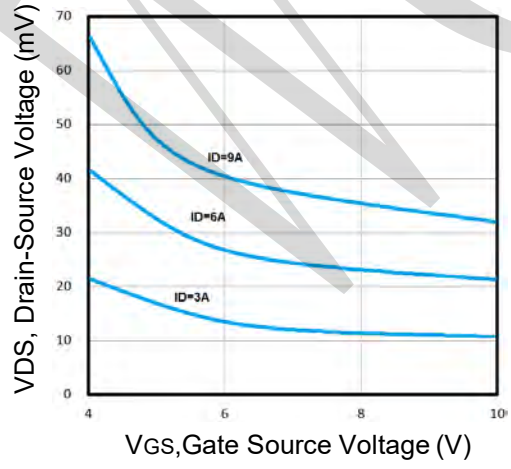


Fig5. Drain-Source Voltage vs Gate-Source Voltage

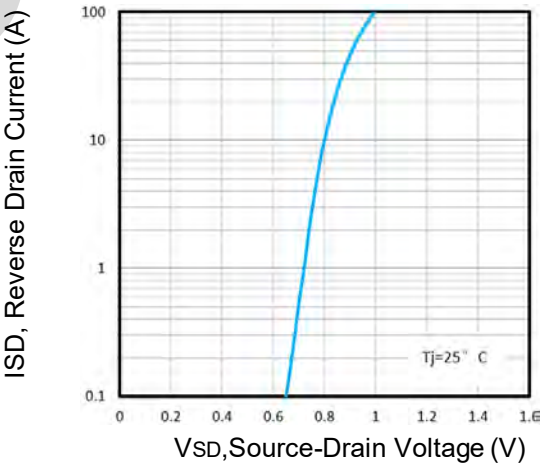


Fig6. Typical Source-Drain Diode Forward Voltage

Typical Characteristics

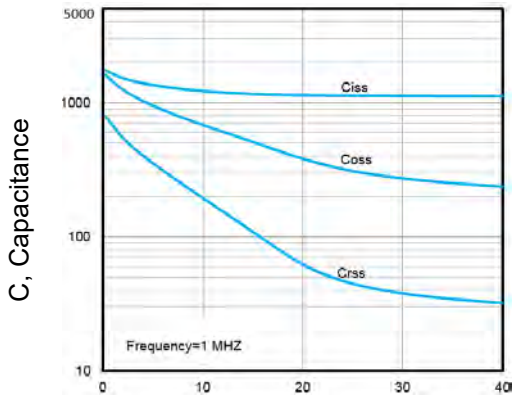


Fig7. Typical Capacitance Vs. Drain-Source Voltage

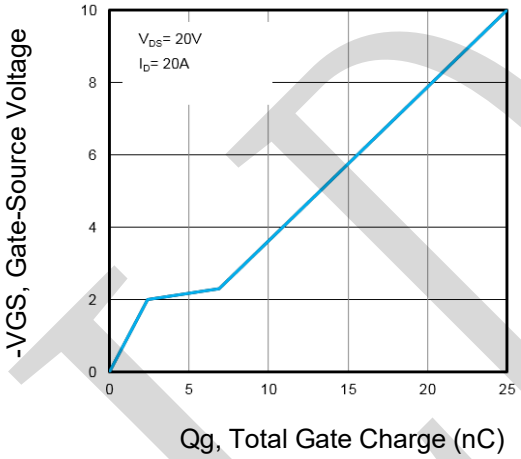


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

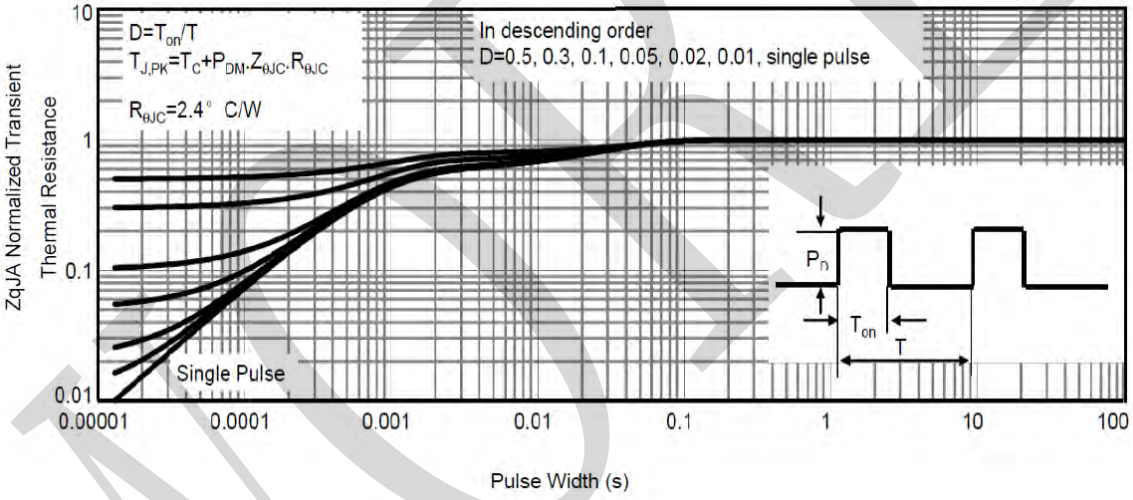


Fig9. Normalized Maximum Transient Thermal Impedance

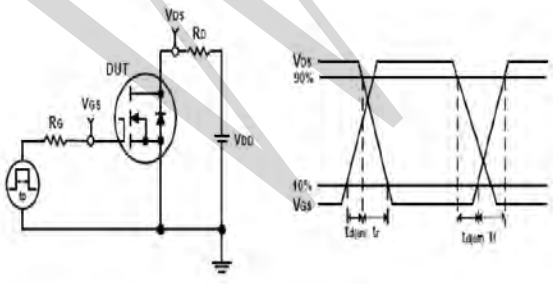


Fig10. Switching Time Test Circuit and waveforms

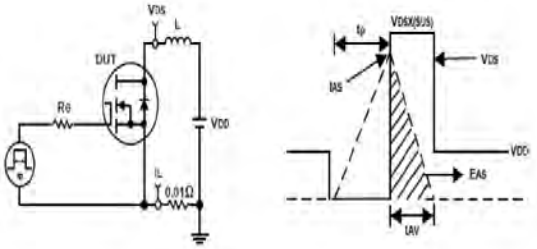
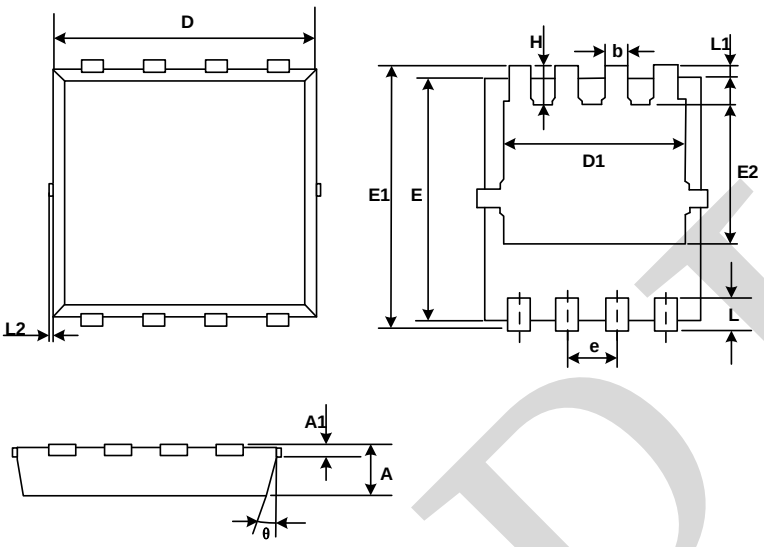


Fig11. Unclamped Inductive Test Circuit and waveforms

PACKAGE OUTLINE DIMENSIONS

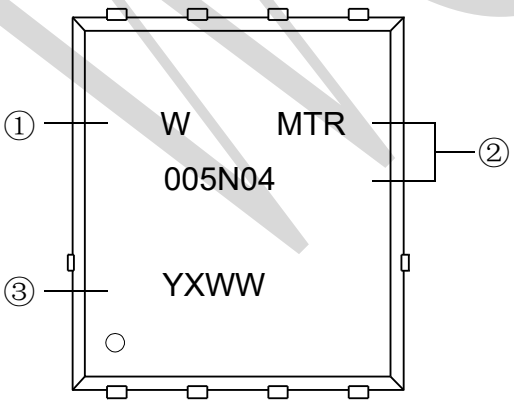
PDFN3*3



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	0.65	0.90
A1	0.10	0.25
D	2.90	3.25
D1	2.25	2.69
E	2.90	3.20
E1	3.00	3.60
E2	1.35	2.20
b	0.20	0.40
e	0.65BSC	
L	0.15	0.50
L1	0.13BSC	
L2	0.00	0.20
H	0.15	0.65
θ	0°	14°

Marking Information



①W : Company's trademark
②Product model : MTR005N04
③PDC information：

Y X WW

WW:Week code(01 to 53)
X:Internal identification code
Y:Year code(ex:0=2020)