TSD60N03D
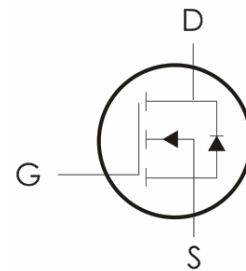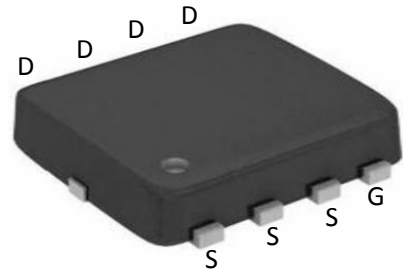
Description：

This N-Channel MOSFET uses advanced trench technology and design to provide excellent RDS(on) with low gate charge. It can be used in a wide variety of applications.

Features：

1) V_{DS}=30V,I_D=60A,$R_{DS(ON)}$<6mΩ @V_{GS}=10V

2) Improved dv/dt capability

3) Fast switching

4) 100% EAS Guaranteed

5) Green Device Available.

Absolute Maximum Ratings： (T$_C$=25℃ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	$\pm$20	V
I_D	Continuous Drain Current-Continuous (TC=25℃)	60	A
	Continuous Drain Current-TC=100℃	38	
I_{DM}	Drain Current – Pulsed[1]	240	A
E_{AS}	Single Pulse Avalanche Energy[2]	88	mJ
P_D	Power Dissipation (TC=25℃)	45	W
	Power Dissipation – Derate above 25℃	0.36	W/℃
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	℃

Thermal Characteristics：

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance,Junction to Case	62	℃/W
$R_{\theta JA}$	Thermal Resistance,Junction to Ambient	2.8	

Package Marking and Ordering Information：

Part NO.	Marking	Package
TSD60N03D	**TSD60N03D**	DNF3*3

Electrical Characteristics： (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	30	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{GS}=0V, V_{DS}=30V, T_J=25℃	---	---	1	μA
		V_{GS}=0V, V_{DS}=24V, T_J=125℃			10	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	1.2	1.6	2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance[3]	V_{GS}=10V,I_D=20A	---	---	6	mΩ
		V_{GS}=4.5V,I_D=10A	---	---	9	
G_{FS}	Forward Transconductance	V_{DS}=10V, I_D=10A	---	23	---	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1MHz	---	1210	1800	pF
C_{oss}	Output Capacitance		---	190	280	
C_{rss}	Reverse Transfer Capacitance		---	100	150	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time[3.4]	V_{DD}=15V , V_{GS}=10V , R_G= =3.3Ω,I_D=15A	---	7.5	14	ns
t_r	Rise Time[3.4]		---	14.5	28	ns
$t_{d(off)}$	Turn-Off Delay Time[3.4]		---	32.5	67	ns

t_f	Fall Time[3.4]		---	9.6	18	ns
Q_g	Total Gate Charge[3.4]	V_{DS}=15V , V_{GS}=4.5V , I_D=20A	---	11.1	18	nC
Q_{gs}	Gate-Source Charge[3.4]		---	1.85	3.8	nC
Q_{gd}	Gate-Drain "Miller" Charge[3.4]		---	6.8	12	nC
Drain-Source Diode Characteristics						
V_{SD}	Source-Drain Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1	V
t_{rr}	Reverse Recovery Time	V_{GS}=0V,I_S=1A , di/dt=100A/µs,T_J=25℃		---		nS
Q_{rr}	Reverse Recovery Charge			---		nC

Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.

2. V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=42A.,RG=25,Starting T_J=25℃.

3. The data tested by pulsed , pulse width≦300us , duty cycle≦2%.

4. Essentially independent of operating temperature.

Typical Characteristics： (T_C=25℃ unless otherwise noted)
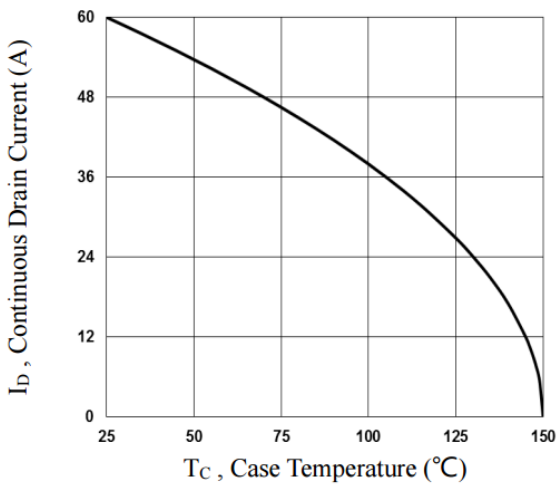
Fig.1 Continuous Drain Current vs. T_C
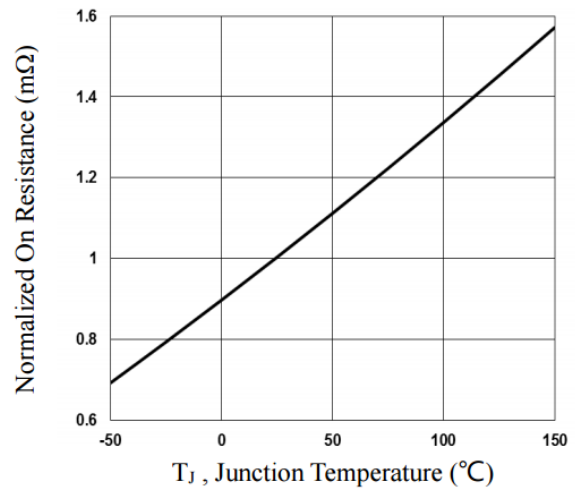
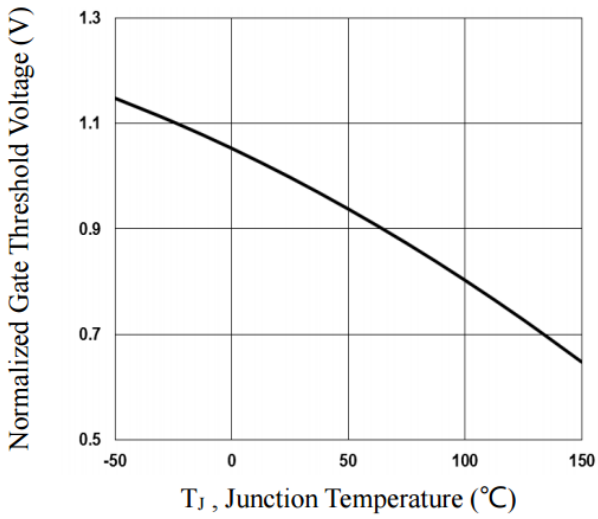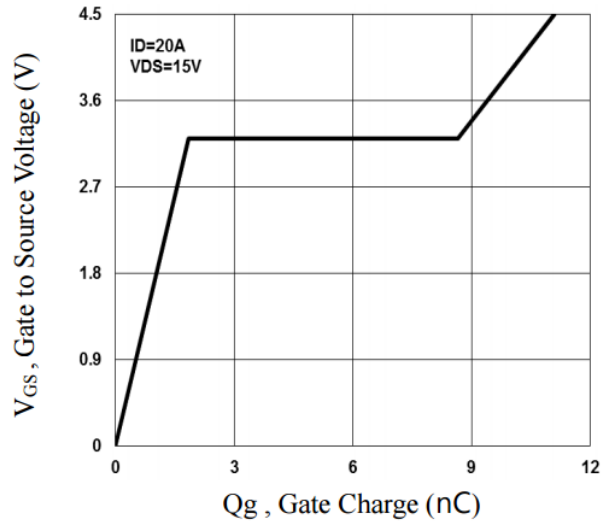**Fig.2 Normalized R_DSON vs. T_J**

Fig.3 Normalized V_{th} vs. T_J

Fig.4 Gate Charge Waveform
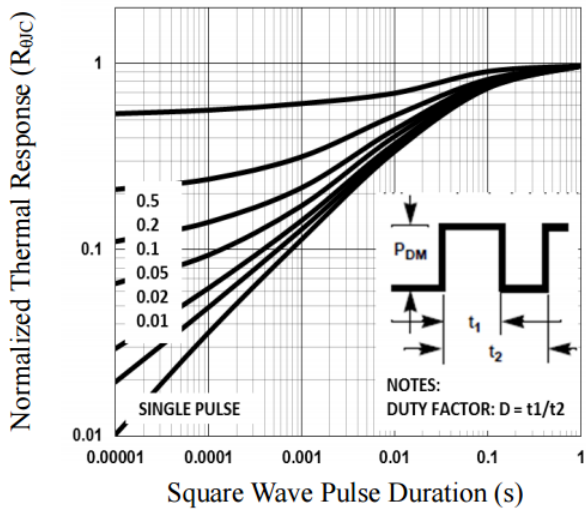

Fig.5 Normalized Transient Response
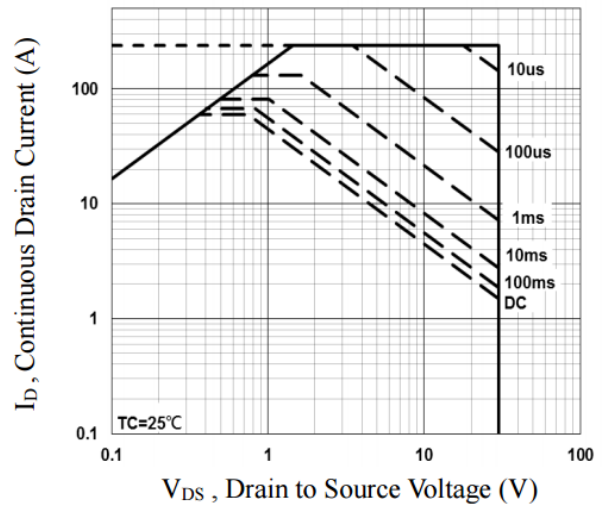

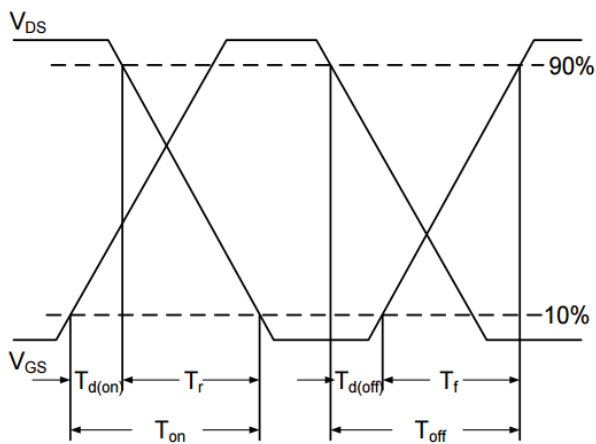**Fig.6 Maximum Safe Operation Area**
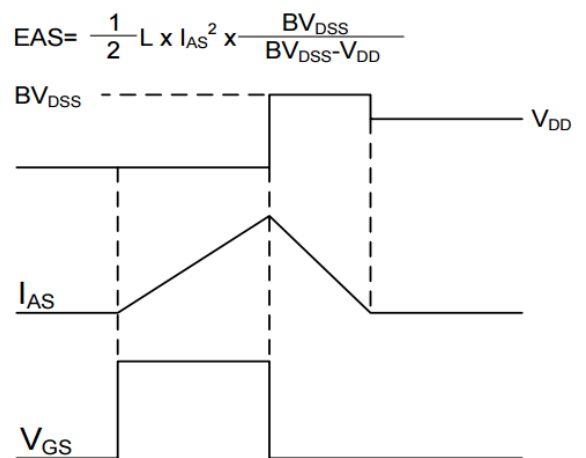

Fig.7 Switching Time Waveform

Fig.8 EAS Waveform

$$EAS = \frac{1}{2}L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$