MOSPEC

125N600D

600V Super-junction Power MOSFET

DESCRIPTION：

·Low On-Resistance

·Fast Switching Capability

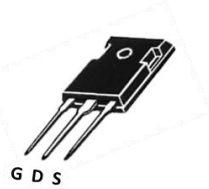
·100% ΔVDS & UIS & Rg Tested

·Green Molding Compound

·Moisture Sensitivity: Level 3 per J-STD-020

·UL Flammability Classification Rating 94V-0

V_{DS}	600V
I_D	125A
$R_{DS(ON)_MAX}$ @V_{GS}=10V	17mΩ



TO-247

TYPICAL APPLICATIONS：

·LED Lighting

·Charger and Adapter

·PC and Telecom Power

MAXIMUM RATINGS (at T_C = 25 °C, unless otherwise specified)

Characteristic	Condition	Symbol	Value	Unit
Drain - Source Voltage		V_{DS}	600	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current(1)	Tc=25℃ Tc=100℃	I_D	125 81.0	A
Pulsed Drain Current (2)		I_{DM}	375	A
Single Pulsed Avalanche Energy (3)		E_{AS}	1500	mJ
Single Pulse Avalanche Current	L= 10.0mH	I_{AS}	9.6	A
Power dissipation	Tc=25℃ Tc=100℃	P_D	625 250.0	W
Reverse Diode dv/dt		dv/dt	20	V/ns
Junction & Storage temperature Range		T_J, T_{STG}	-55~+150	℃

Notes： 1. This current is chip limited, which is calculated based on Rthjc..

2. This current is calculated on single pulse with 10μs Pulse & Duty Cycle = 1%

3. Defined by design, not subject to production test, EAS condition: TJ=25°C, VDD=400V, VGS=10V, L=50mH.

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient Junction to Case	$R_{\theta JA}$ $R_{\theta JC}$	43 0.20	℃/W

ELECTRICAL CHARATERISTICS (at T_J = 25 °C, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage VGS = 0V, ID = 250uA	$V_{(BR)DSS}$	600			V
Zero Gate Voltage Drain Current VDS = 600 V, VGS = 0 V ,Tj=25℃ VDS = 600 V, VGS = 0 V ,Tj=125℃	I_{DSS}		 5000	10	uA
Gate-Source Leakage Current VGS = ±30V, VDS = 0V	I_{GSS}			±100	nA
Gate-Source threshold voltage VDS = VGS, ID = 250uA	$V_{GS(th)}$	3.0	4.0	5.0	V
Drain-Source On-State Resistance VGS = 10V, ID = 58.2A	$R_{DS(on)}$		14.5	17	mΩ
Diode Forward Voltage VGS = 0V, I_{SD} =10A	V_{SD}		0.90	1.1	V
Gate Resistance f=1MHz	R_g		1.5		Ω
Input capacitance f=1MHz, VDS=400 V, VGS=0 V	C_{iss}		10900		pF
Output capacitance f=1MHz, VDS=400 V, VGS=0 V	C_{oss}		205		pF
Reverse transfer capacitance f=1MHz, VDS=400 V, VGS=0 V	C_{rss}		6.0		pF
Turn-on delay time VDS=400 V, ID=17A, VGS=10V, R_{GEN}=27Ω	td (ON)		35		ns
Rise time VDS=400 V, ID=17A, VGS=10V, R_{GEN}=27Ω	tr		72		ns
Turn-off delay time VDS=400 V, ID=17A, VGS=10V, R_{GEN}=27Ω	td (OFF)		133		ns
Fall time VDS=400 V, ID=17A, VGS=10V, R_{GEN}=27Ω	tf		80		ns
Total Gate Charge VDS= 480V, ID= 10A, VGS= 10V VDS= 480V, ID= 10A, VGS= 8.0V	Q_G		260 220		nC
Gate to Source Charge VDS= 480V, ID= 10A, VGS= 10V	Q_{GS}		125		nC
Gate to Drain Charge VDS= 480V, ID= 10A, VGS= 10V	Q_{GD}		75		nC
Gate Plateau Voltage VDS= 480V, ID= 10A, VGS= 10V	$V_{plateau}$		7.5		nC
Revers Recovery Time I_F =17A, di_F/dt = 100A/us ,Tj=25℃	Trr		125		ns
Revers Recovery Charge I_F =17A, di_F/dt = 100A/us ,Tj=25℃	Qrr		1.6		uC
Peak Reverse Recovery Current I_F =17A, di_F/dt = 100A/us ,Tc=25℃	IS			125	A

Typical Performance Characteristics

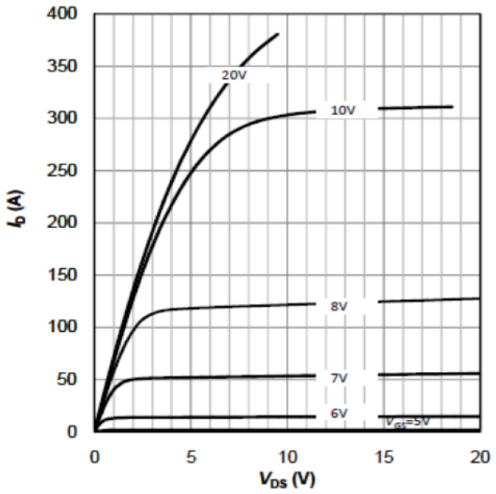


Figure 1. Output Characteristics(T_j=25°C)
I_D=f(V_{DS});T_j=25°C:parameter:V_{GS}

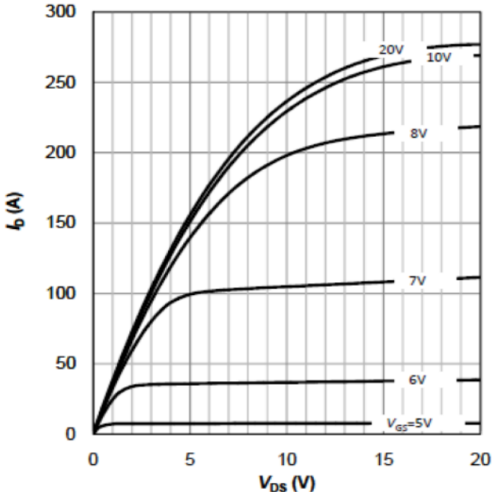


Figure 2. Output Characteristics (T_j=125°C)
I_D=f(V_{DS});T_j=125°C:parameter:V_{GS}

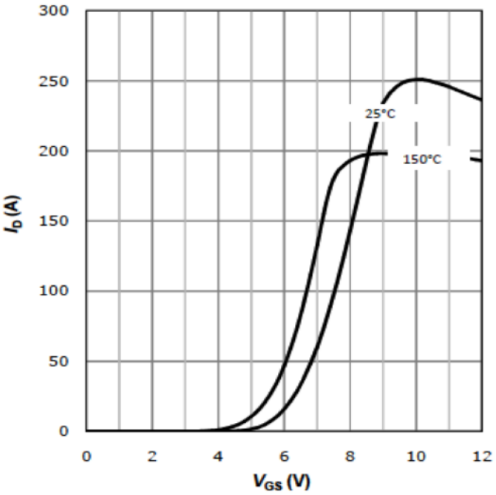


Figure 3. Transfer Characteristics
I_D=f(V_{DS});V_{DS}=20V:parameter:T_J

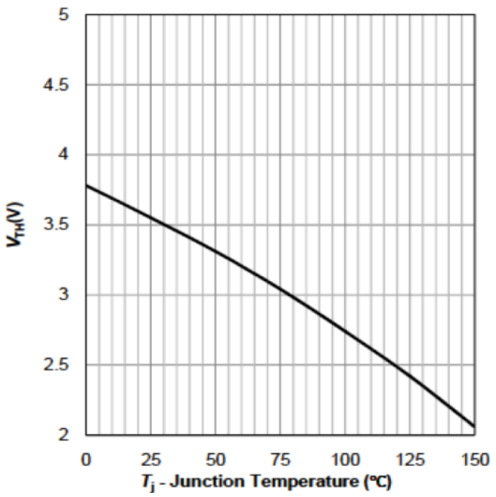


Figure 4. V_{TH} Vs. T_j Temperature Characteristics
V_{TH}=f(T_J);I_D=2mA

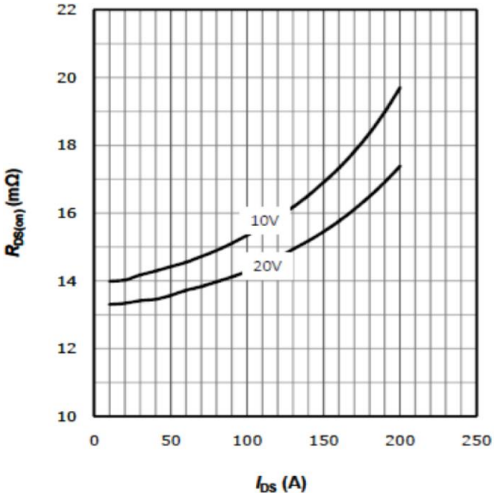


Figure 5. $R_{DS(on)}$ Vs. I_{DS} Characteristics
$R_{DS(on)}$=f(I_D);T_j=125°C ; parameter: V_{GS}

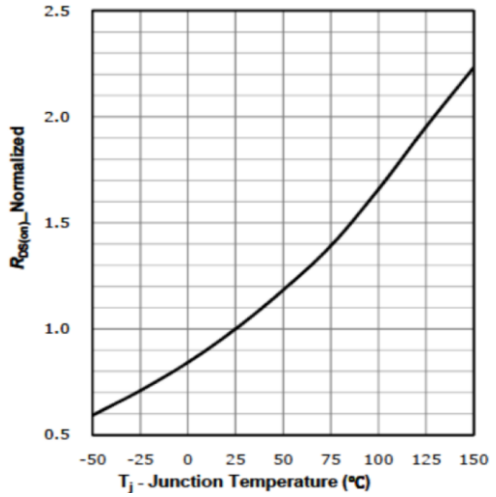


Figure 6. $R_{DS(on)}$ Vs. Temperature
$R_{DS(on)}$=f(T_J); I_D=58.2A; V_{GS}=10V

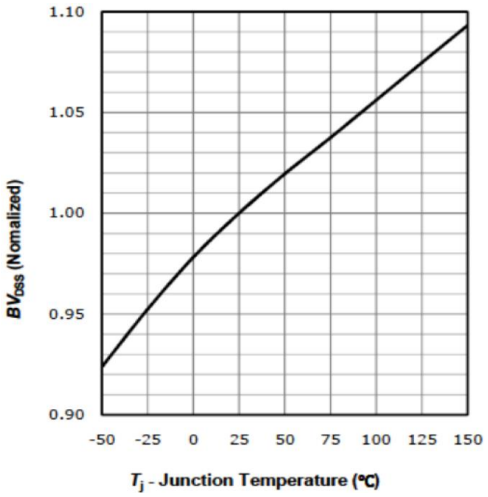


Figure 7. BV_{DSS} vs. Temperature
$BV_{DSS}=f(T_J)$; I_D=1mA

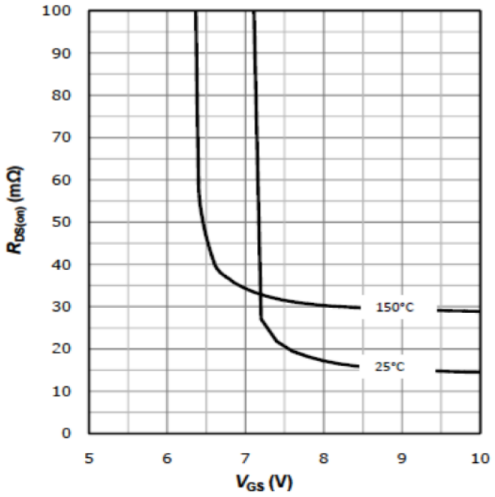


Figure8. $R_{DS(on)}$ vs. Gate Voltage
$R_{DS(on)}=f(V_{GS})$; I_D=58.2A; parameter:T_J

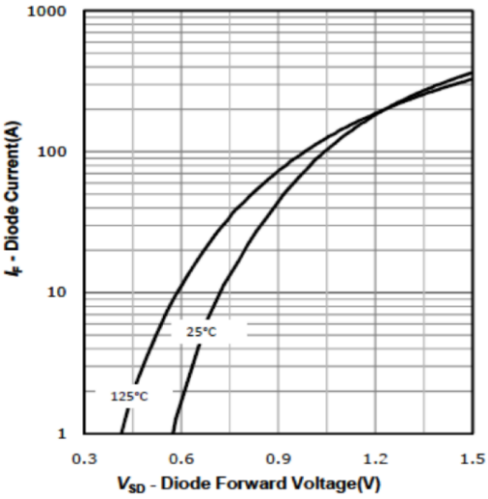


Figure 9. Body-diode Forward Characteristics
$I_F=f(V_{SD})$; parameter: T_j

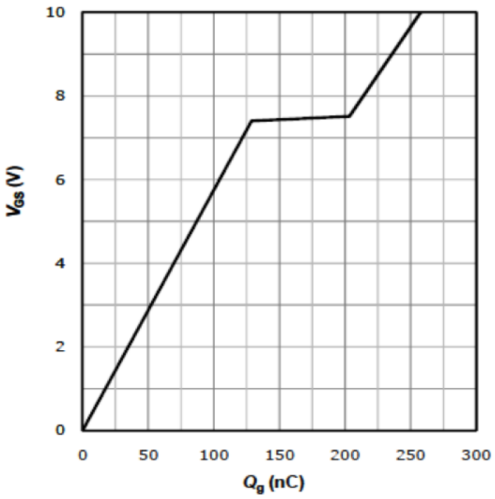


Figure 10. Gate Charge Characteristics
$V_{GS}=f(Q_g)$:V_{DD}=400V:I_D=58.2A

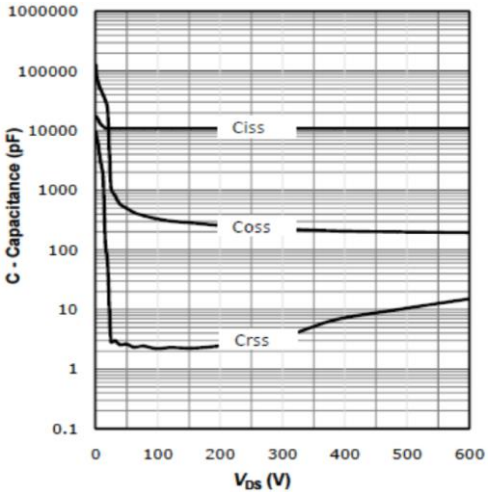


Figure 11. Capacitance Characteristics
$C=f(V_{DS})$;V_{GS}=0V;f-250kHZ

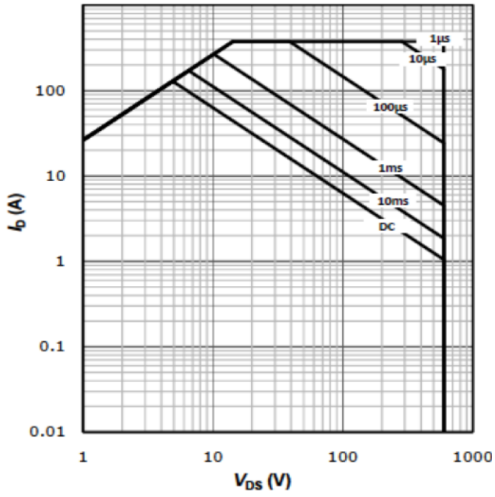


Figure 12. Safe Operating Area
$I_D=f(V_{DS})$:Tc=25°C;D=0;parameter:t_p

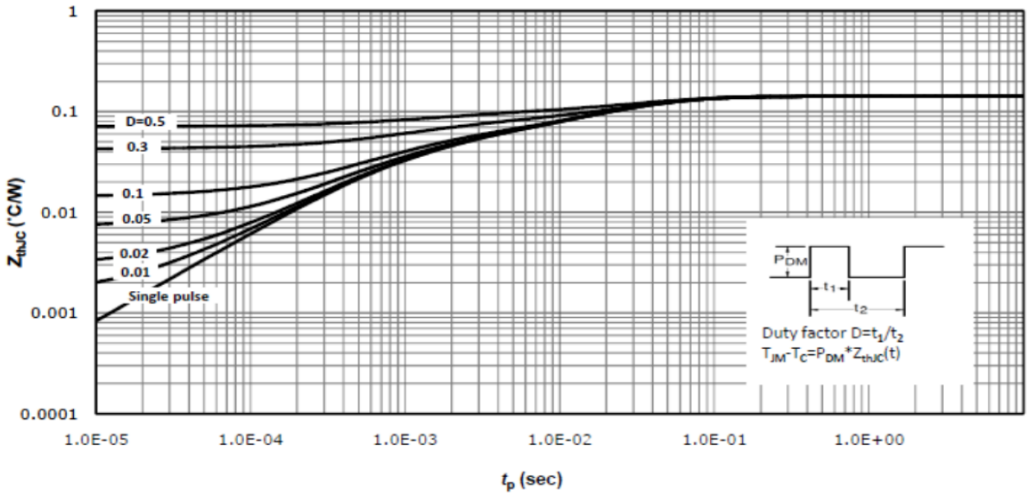
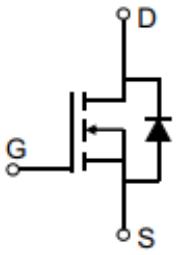
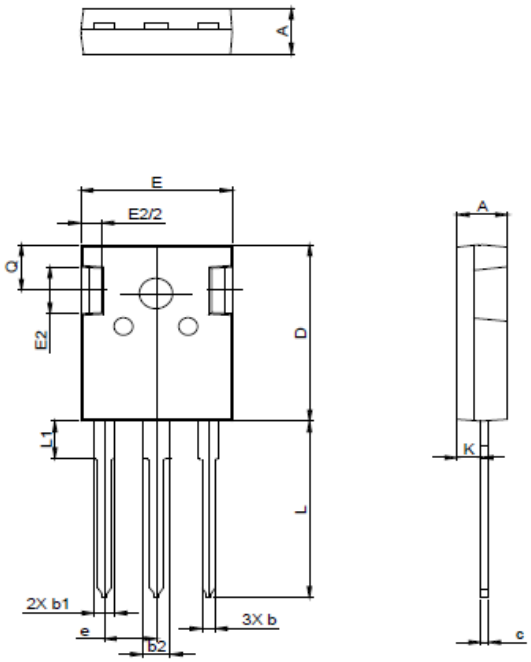


Figure 13. Max. Transient Thermal Impedance
$Z_{thJC}=f(t_p)$; parameter:$D=t_1/t_2$

·Circuit diagram



·Package outlines : Dimensions in (mm)



DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	4.80	5.00	5.20
b	1.00	1.20	1.40
b1	1.80	2.00	2.20
b2	2.80	3.00	3.20
c	0.50	0.60	0.70
D	20.80	21.00	21.20
E	15.50	15.80	16.10
E2	4.50	5.00	5.50
L	19.70	20.00	20.30
L1	4.00	4.20	4.40
K	2.30	2.40	2.50
e	5.44 BSC		

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