

Description:

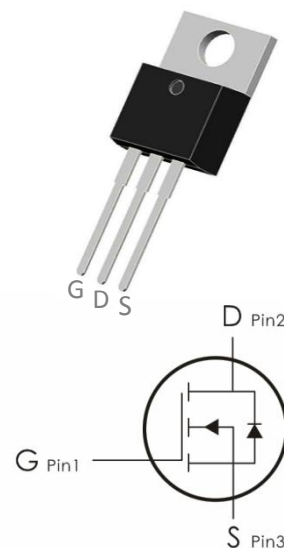
This N-Channel MOSFET uses advanced SGT technology and

design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.

Features:

- 1) $V_{DS}=100V, I_D=80A, R_{DS(ON)}<9m\Omega @V_{GS}=10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low $R_{DS(ON)}$.
- 5) Excellent package for good heat dissipation.



Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
PH009T2G	H009T2	TO- 220	50 pcs/Tube

Absolute Maximum Ratings: ($T_C=25^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	80	A
	Continuous Drain Current- $T_C=100^{\circ}C$	50	
I_{DM}	Pulsed Drain Current ²	290	
P_D	Power Dissipation	120	W
E_{AS}	Single pulse avalanche energy ³	100	mJ
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55-+150	$^{\circ}C$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.04	$^{\circ}C/W$

R_{θJA}	Thermal Resistance, Junction to Ambient	50	°C/W
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Electrical Characteristics: (T_C=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	100	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =100V	---	---	1	μ A
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 =250 μ A	1.2	1.8	2.4	V
R _{DS(ON)}	Drain-Source On Resistance	V _{GS} =10V, I _D =20A	---	7.8	9	m Ω
		V _{GS} =4.5V, I _D =10A	---	10.7	14	m Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} 50V, V _{GS} =0V, f=1MHz	---	1799	---	pF
C _{OSS}	Output Capacitance		---	529	--	
C _{rss}	Reverse Transfer Capacitance		---	9	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DS} =50V, I _D =20A, R _{ENG} =3 Ω ,V _{GS} =10V	---	5.8	---	ns
t _r	Rise Time		---	4.2	---	ns
t _{d(off)}	Turn-Off Delay Time		---	19	---	ns
t _f	Fall Time		---	5	---	ns
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =50V, I _D =20A	---	6.1	---	nc
Q _{gs}	Gate-Source Charge		---	4	---	nc
Q _{gd}	Gate-Drain “Miller” Charge		---	14.1	---	nc
Drain-Source Diode Characteristics						
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _{SD} =20A	---	0.85	1.1	V
I _S	Continuous Drain Current	V _D =V _G =0V	---	---	80	A
I _{SM}	Pulsed Drain Current		---	---	290	A
T _{rr}	Reverse Recovery Time	I _F =20A, T _J =25 °C	---	33	---	ns

Qrr	Reverse Recovery Charge	di/dt=100A/us	---	41	---	nc
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Notes:

1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. $I_{AS}=15.0A$, $V_{DD}=50V$, $R_G=25\Omega$, Starting $T_J=25^\circ C$

Typical Characteristics: ($T_C=25^\circ C$ unless otherwise noted)

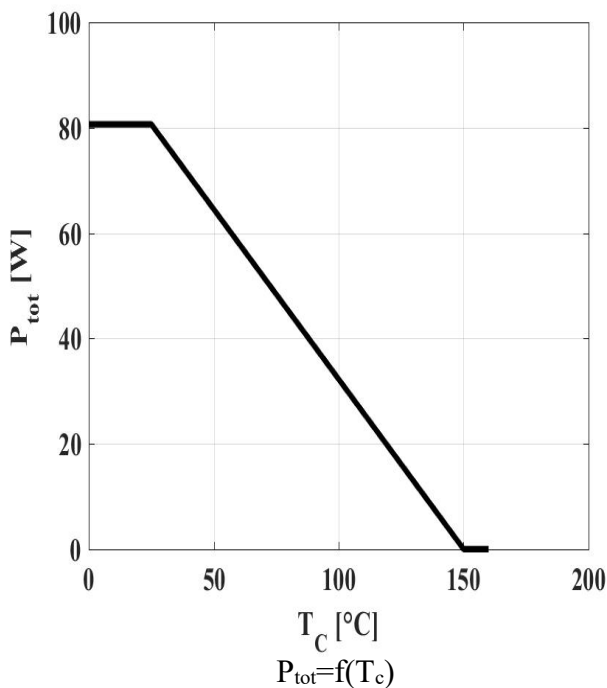


Figure 1: Power Dissipation

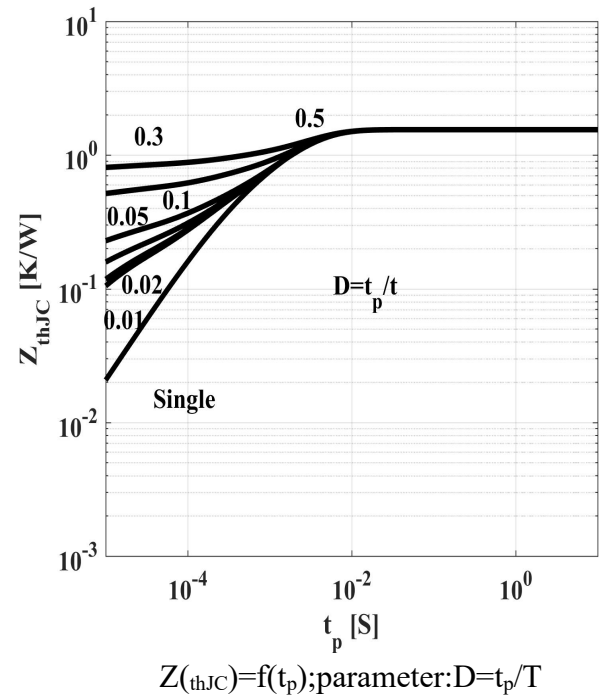


Figure 2 : Max. Transient Thermal Impedance

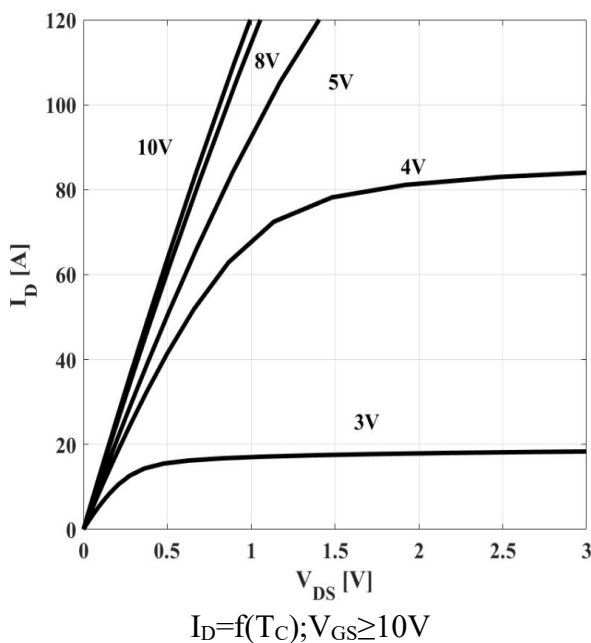


Figure3 : Drain Current

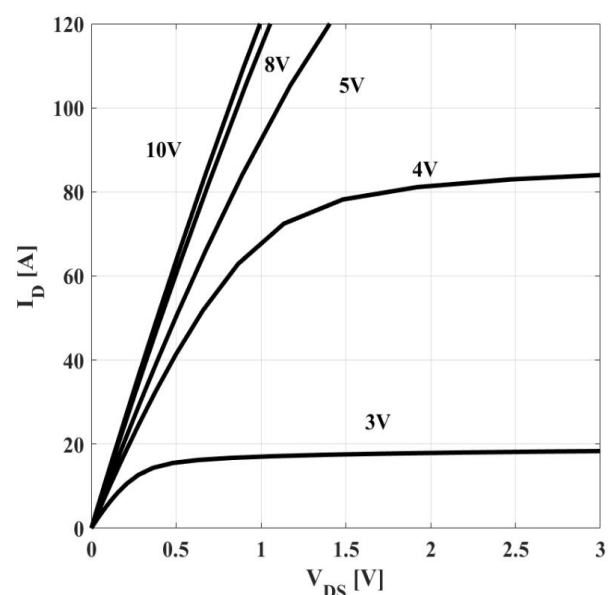
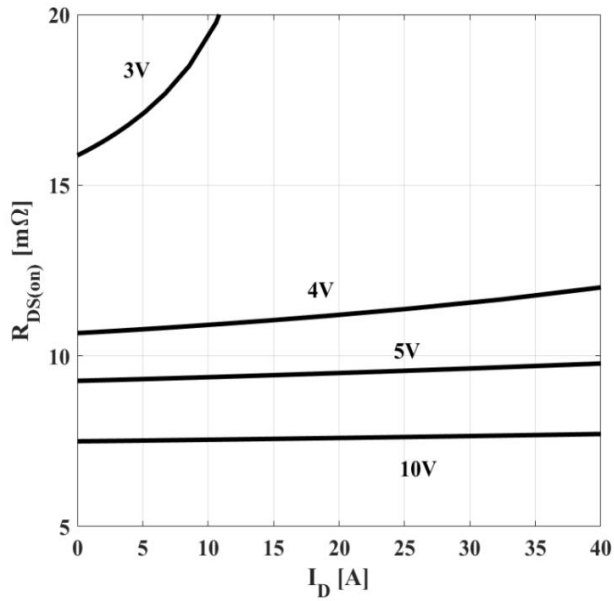
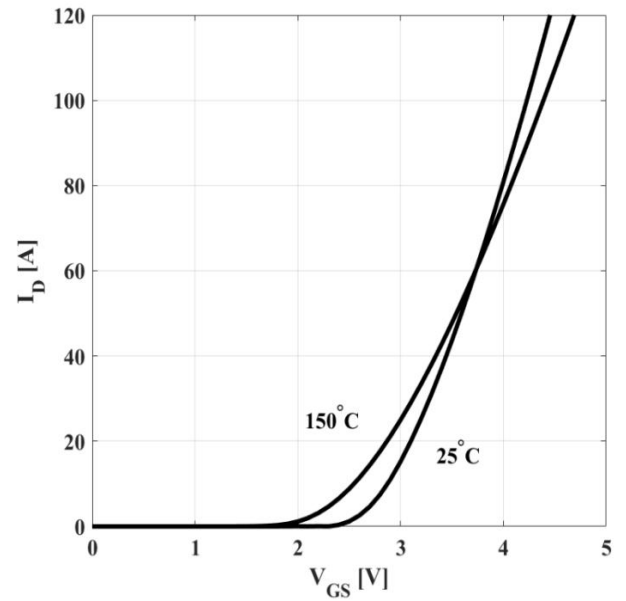


Figure4: Typ. Output Characteristics



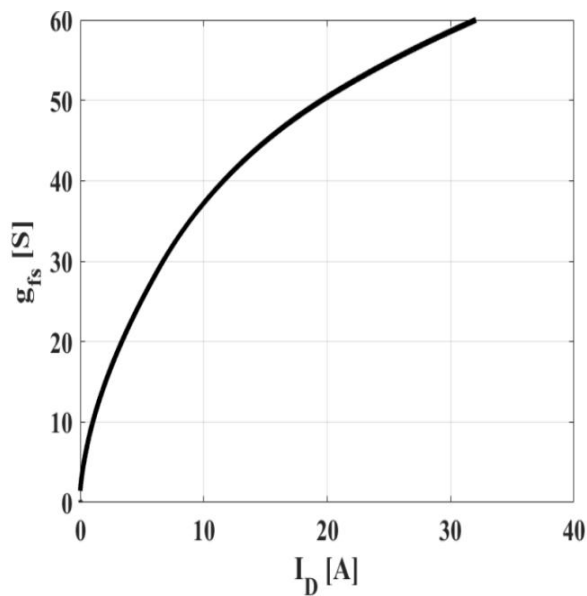
$$R_{DS(ON)} = f(I_D); T_J = 25^\circ\text{C}; \text{parameter : } V_{GS}$$

Figure5: Typ. Drain-Source On-State Resistance



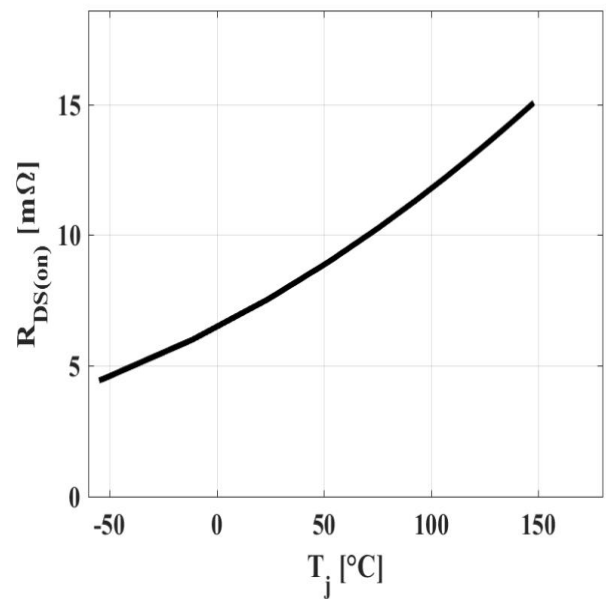
$$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}; \text{parameter: } T_J$$

Figure6: Typ. Transfer Characteristics



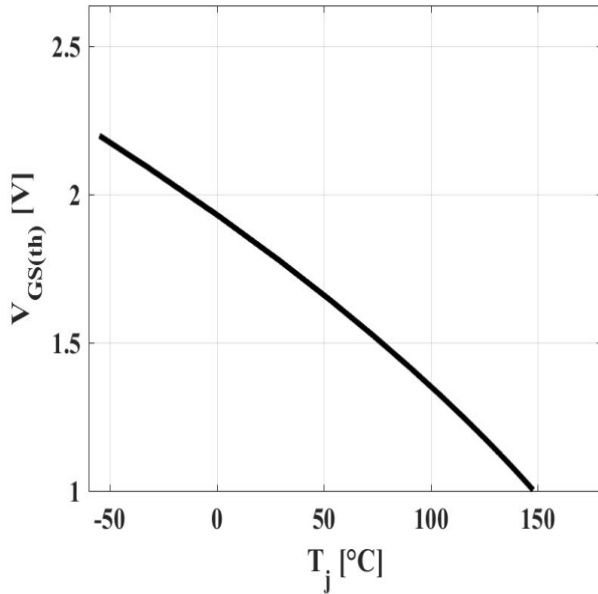
$$g_{fs} = f(I_D); T_J = 25^\circ\text{C}$$

Figure7: Typ. Forward Transconductance

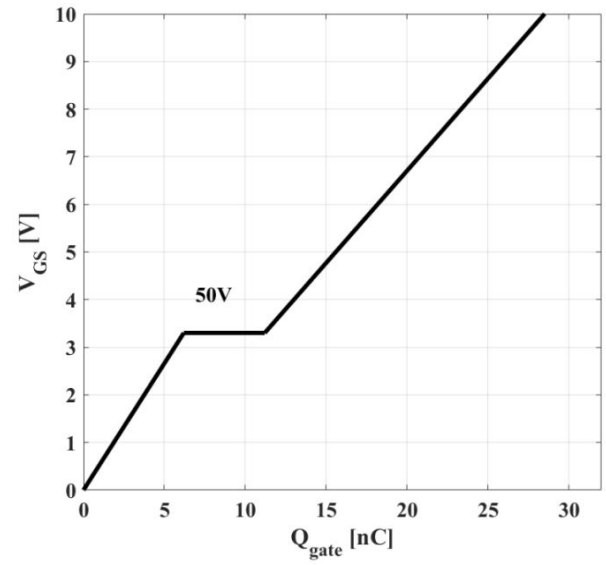


$$R_{DS(ON)} = f(T_J); I_D = 20\text{A}; V_{GS} = 10\text{V}$$

Figure8: Typ. Drain-Source On-State Resistance

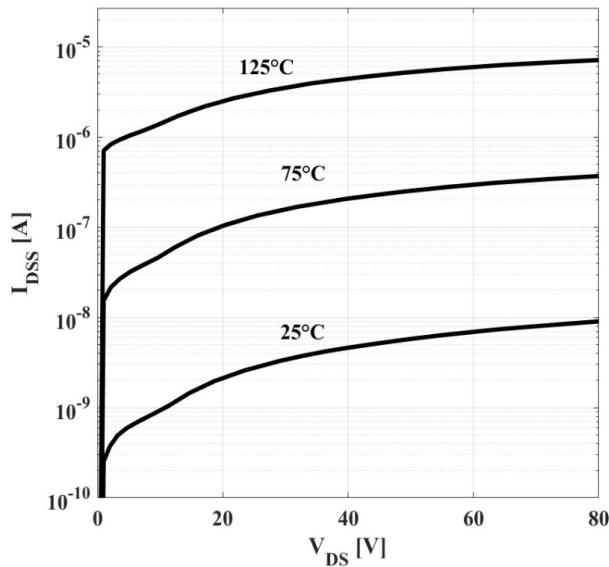


$V_{GS(th)} = f(T_j)$; $V_{GS} = V_{DS}$; $I_{DS} = 250\mu A$
Figure 9 : Typ. Gate Threshold Voltage



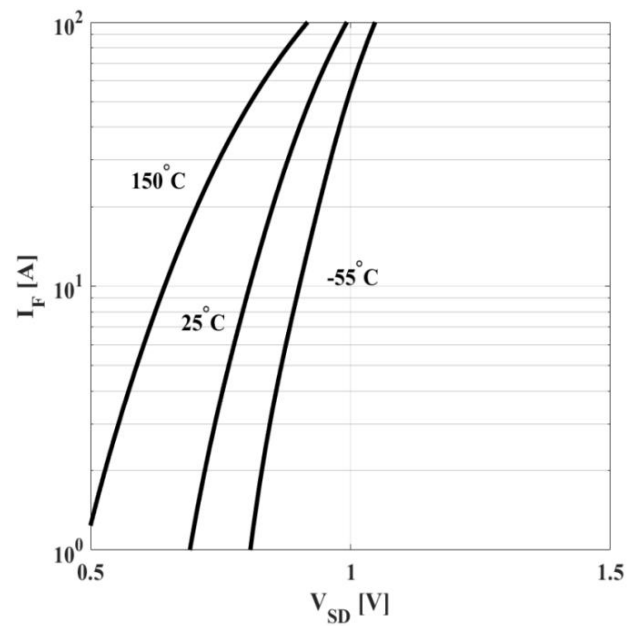
$V_{GS} = f(Q_{gate})$, $I_D = 20A$ pulsed

Figure 10: Typ. Gate Charge



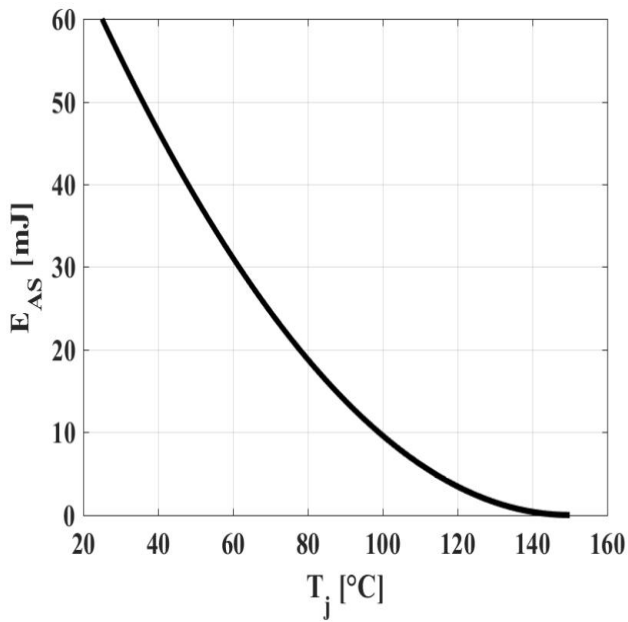
$I_{DSS} = f(V_{DS})$; $V_{GS} = 0V$; parameter: T_j

Figure 11: Drain-Source Leakage Current



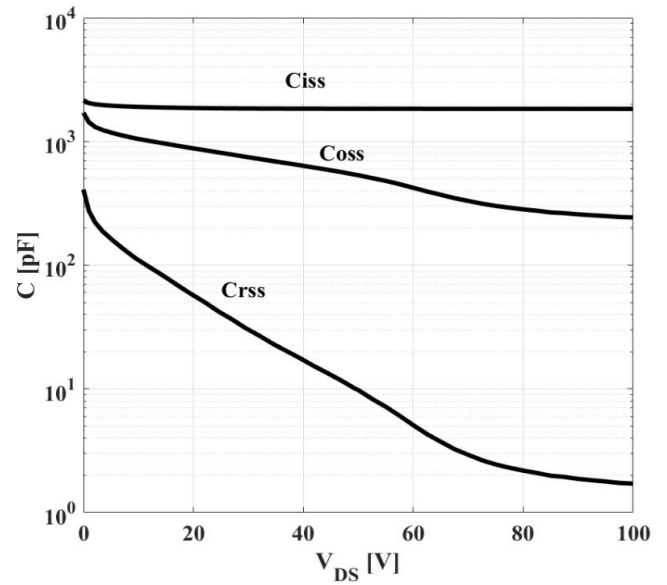
$I_F = f(V_{SD})$; parameter: T_j

Figure 12: Forward Characteristics of Reverse Diode



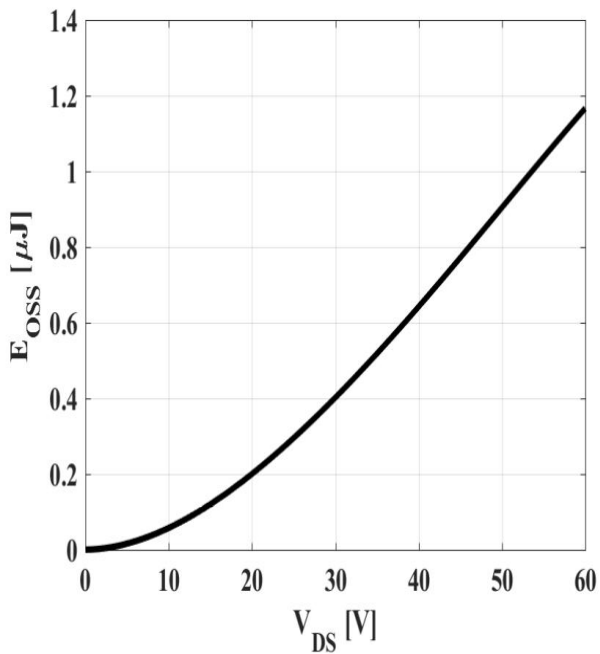
$$E_{AS}=f(T_j); I_D=15.0A; V_{DD}=50V$$

Figure 13: Avalanche Energy



$$C=f(V_{DS}); V_{GS}=0; f=1MHz$$

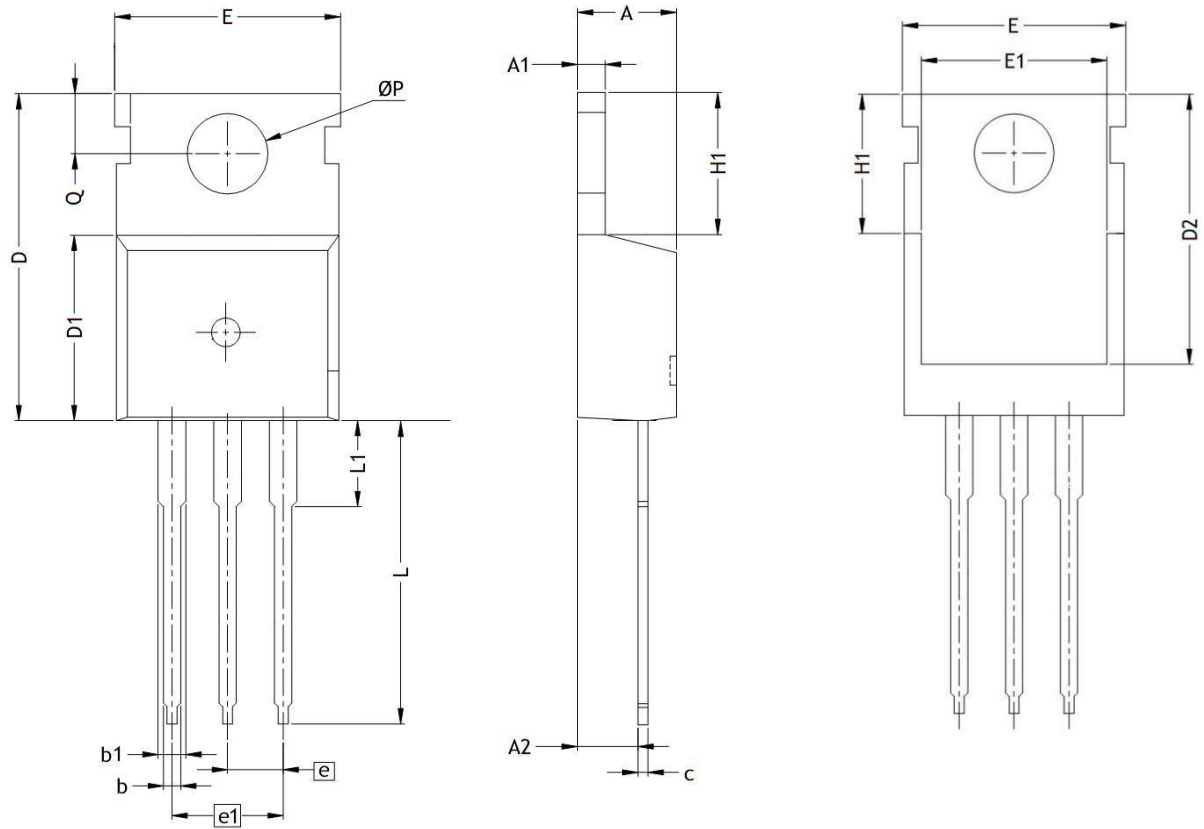
Figure 14: Typ. Capacitances



$$E_{OSS}=f(V_{DS})$$

Figure 15: Coss Stored Energy

TO-220 Package Information:



UNIT: mm

SYMBOLS	A	A1	A2	b	b1	c	D	D1	D2	E	E1	e
MIN	4.25	1.25	2.35	0.7	1.15	0.45	14.35	8.80	13.05	9.90	7.85	2.540
MAX	4.65	1.35	2.55	0.9	1.75	0.60	15.95	9.50	13.65	10.35	8.85	BSC
SYMBOLS	e1	H1	L	L1	Q	φP						
MIN	5.080	6.30	12.85	2.85	2.70	3.50						
MAX	BSC	6.65	13.50	3.25	2.90	3.70						

Marking Information:

①. Doingter LOGO

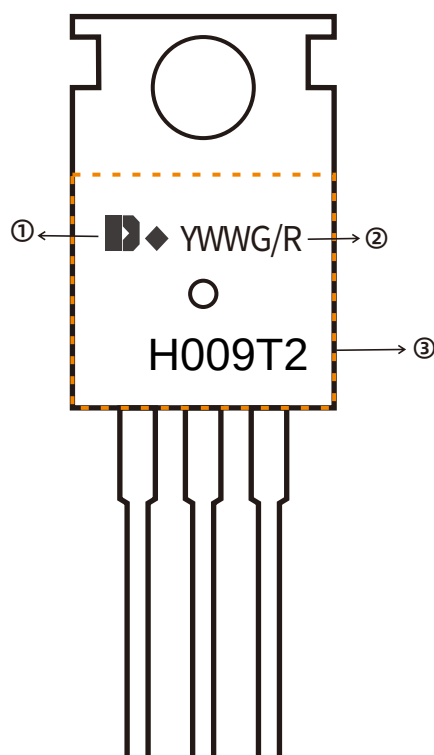
②. Date Code(YWWG / R)

Y : Year Code , last digit of the year

WW : Week Code(01-53)

G/R : G(Green) /R(Lead Free)

③. Part NO.

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