

## General Description

The AGM15T05LL combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ .

This device is ideal for load switch and battery protection applications.

## Features

- Advance high cell density Trench technology
- Low  $R_{DS(ON)}$  to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance
- 100% Avalanche tested
- 100% DVDS tested

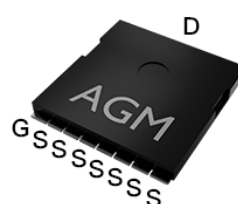
## Application

- MB/VGA Vcore
- SMPS 2<sup>nd</sup> Synchronous Rectifier
- POL application
- BLDC Motor driver

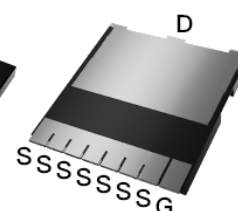
## Product Summary

BVDSS	RDSON	ID
150V	5.0mΩ	180A

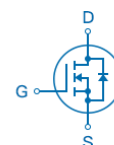
## TOLL Pin Configuration



Top View



Bottom View



Pin	Description
1	Gate(G)
2,3,4,5,6,7,8	Source(S)
9	Drain(D)

## Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM15T05LL	AGM15T05LL	TOLL	330mm	25mm	2000

**Table 1. Absolute Maximum Ratings (TC=25°C)**

Symbol	Parameter	Value	Unit
VDS	Drain-Source Voltage (VGS=0V)	150	V
VGS	Gate-Source Voltage (VDS=0V)	±20	V
ID	Drain Current-Continuous(Tc=25°C) <b>(Note 1)</b>	180	A
	Drain Current-Continuous(Tc=100°C)	108	A
IDM (pluse)	Drain Current-Pulsed <b>(Note 2)</b>	720	A
PD	Maximum Power Dissipation(Tc=25°C)	300	w
	Maximum Power Dissipation(Tc=100°C)	150	w
EAS	Avalanche energy <b>(Note 3)</b>	757	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 175	°C

**Table 2. Thermal Characteristic**

Symbol	Parameter	Typ	Max	Unit
RθJA	Thermal Resistance Junction-ambient (Steady State) <sup>1</sup>	---	60	°C/W
RθJC	Thermal Resistance Junction-Case <sup>1</sup>	---	0.5	°C/W

**Table 3. Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

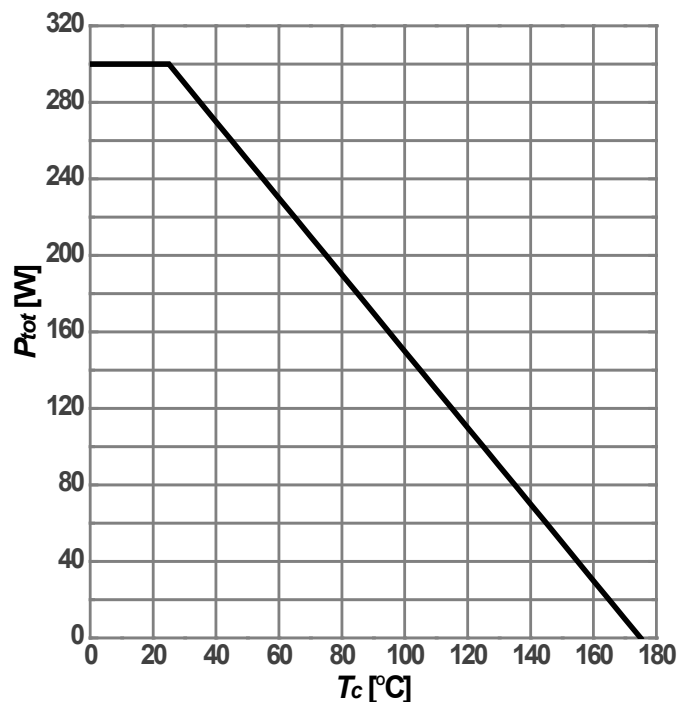
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=250μA	150	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=150V,VGS=0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=250μA	2.0	--	4.0	V
gFS	Forward Transconductance	VDS=5V,ID=10A	--	18	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=20A	--	5.0	6.0	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=75V,VGS=0V, F=1MHZ	--	5025	--	pF
Coss	Output Capacitance		--	410	--	pF
Crss	Reverse Transfer Capacitance		--	10	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	2.4	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=10V,VDS=75V, ID=80A,RGEN=6Ω	--	25	--	nS
tr	Turn-on Rise Time		--	115	--	nS
td(off)	Turn-Off Delay Time		--	60	--	nS
tf	Turn-Off Fall Time		--	105	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=75V, ID=80A	--	72	--	nC
Qgs	Gate-Source Charge		--	18	--	nC
Qgd	Gate-Drain Charge		--	12	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	180	A
VSD	Forward on Voltage	VGS=0V,IS=20A	--	--	1.2	V
trr	Reverse Recovery Time	IF=20A , dI/dt=100A/μs ,TJ=25℃	--	84	--	ns
Qrr	Reverse Recovery Charge		--	205	--	nc

Notes 1.The maximum current rating is package limited.

Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature

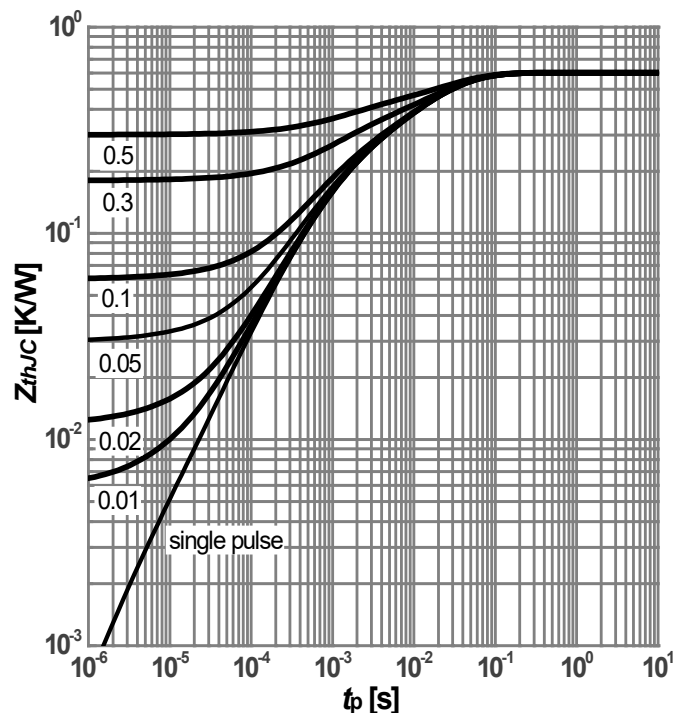
Notes 3.EAS condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=50V, V<sub>gs</sub>=10V, ID=87A, L=0.2mH, R<sub>G</sub>=25ohm

Diagram 1: Power dissipation



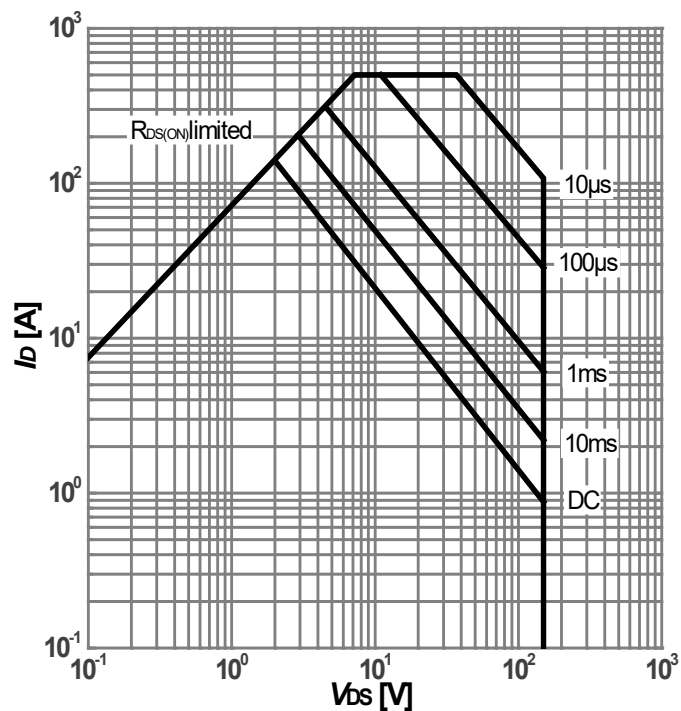
$$P_{tot}=f(T_c)$$

Diagram 2: Max. transient thermal impedance



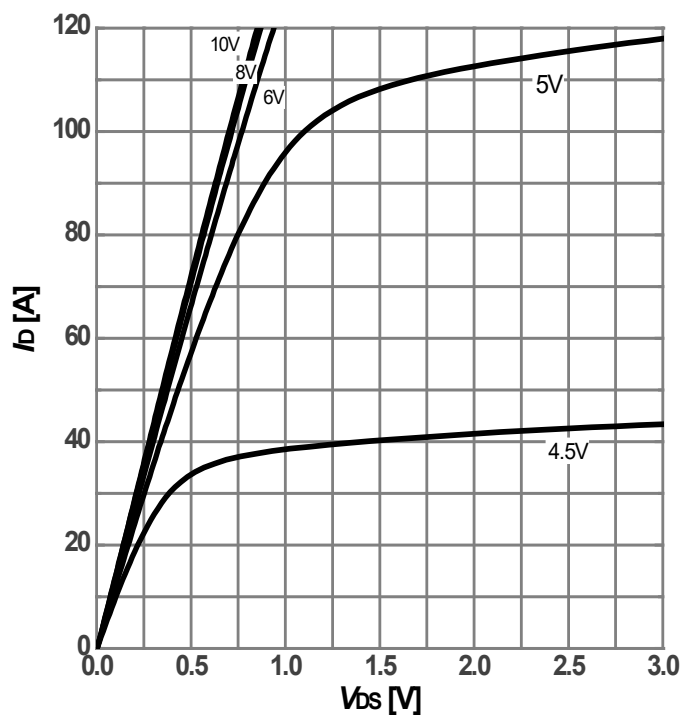
$$Z_{thJC}=f(t_p); \text{ parameter: } D= t_p/T$$

Diagram 3: Safe operating area



$$I_D=f(V_{DS}); T_J=25^{\circ}\text{C}; D=0; \text{ parameter: } t_p$$

Diagram 4: Typ. output characteristics



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

Diagram 5: Typ. transfer characteristics

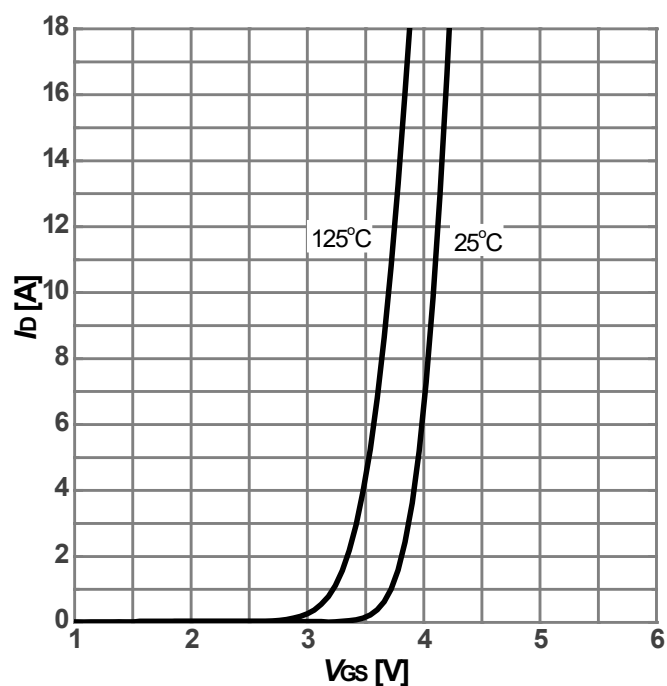

 $I_D = f(V_{GS})$ ;  $V_{DS} = 5\text{V}$ ; parameter:  $T_j$ 

Diagram 6: Gate threshold voltage vs. Junction temperature

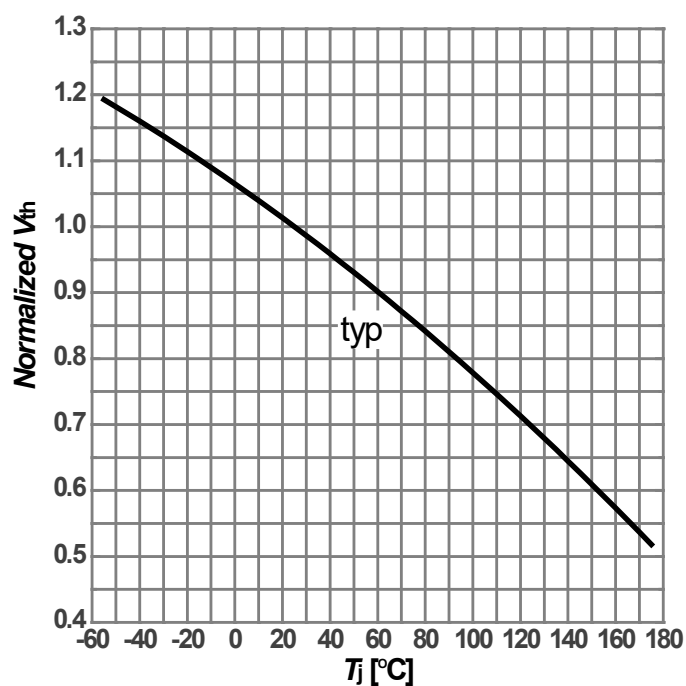

 $V_{th} = f(T_j)$ ;  $I_D = 250\mu\text{A}$ 

Diagram 7: On-state resistance vs. Drain current

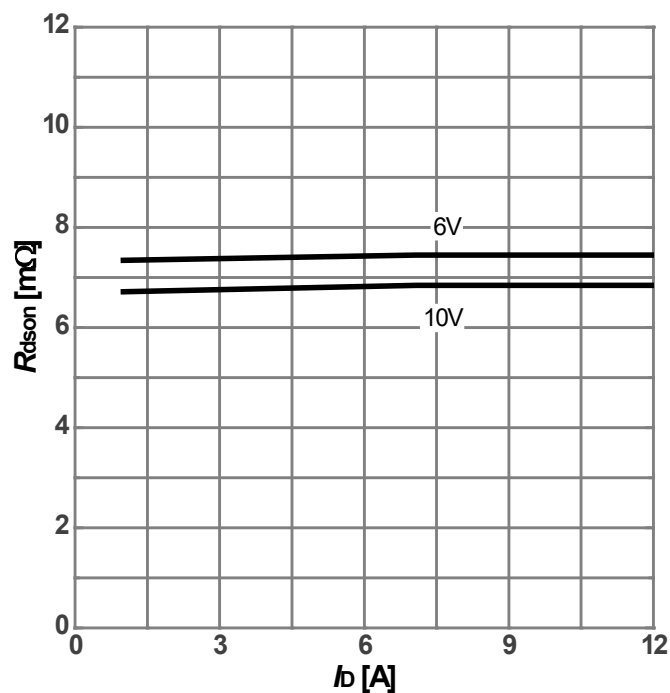
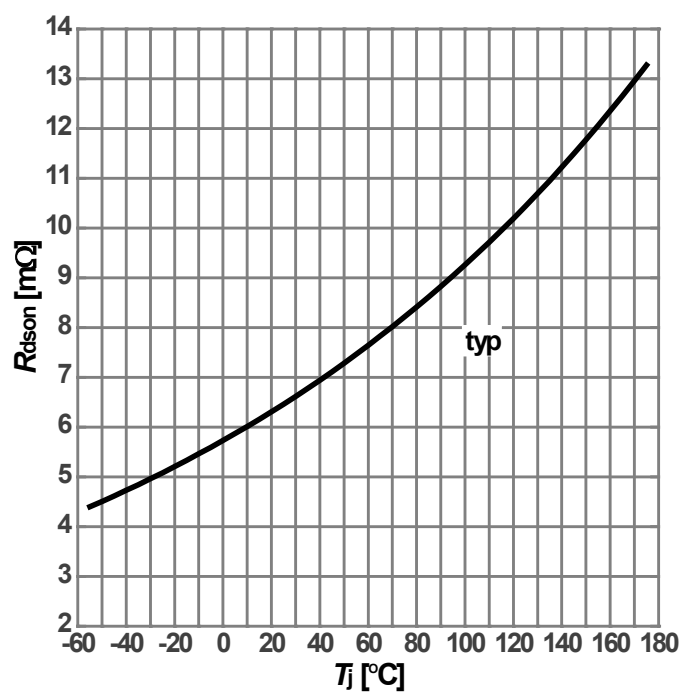

 $R_{DS(on)} = f(I_D)$ ;  $T_j = 25^\circ\text{C}$ ; parameter:  $V_{GS}$ 

Diagram 8: On-state resistance vs. Junction temperature


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

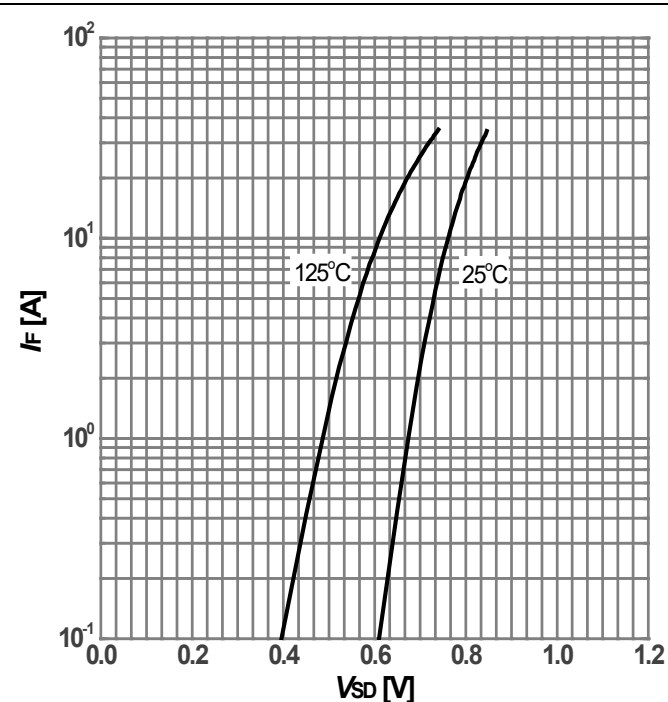
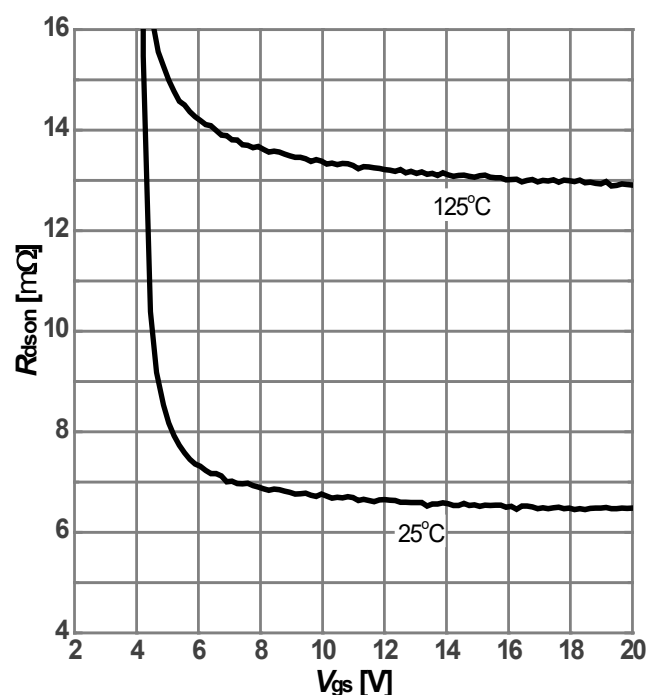
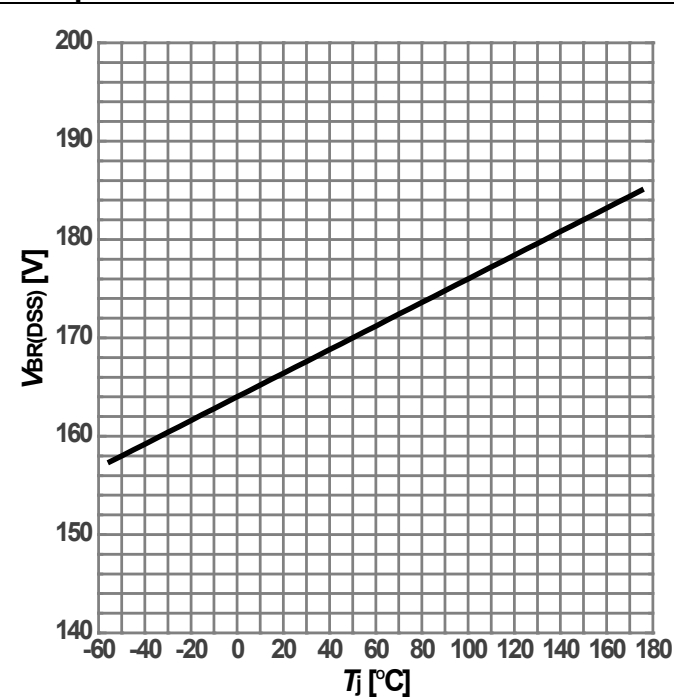
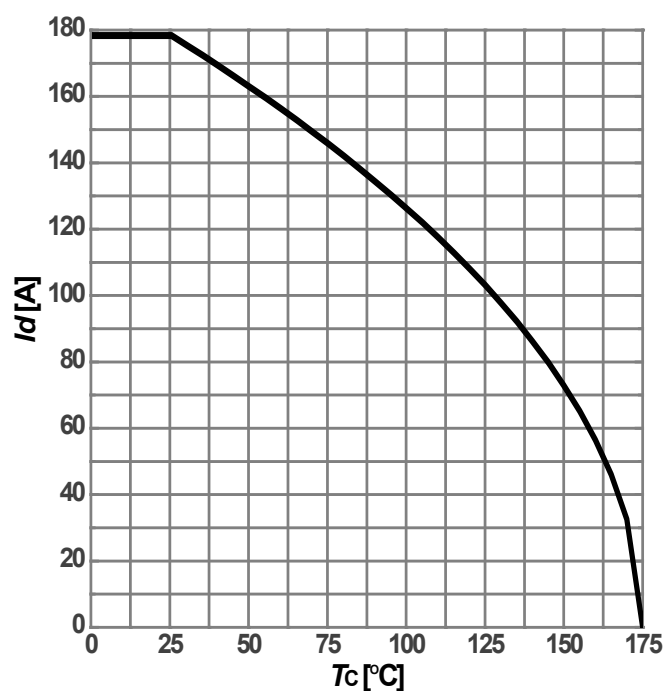
**Diagram 9: Forward characteristics of reverse diode**

 $I_F = f(V_{SD});$  parameter:  $T_j$ 
**Diagram 10: On-state resistance vs.  $V_{GS}$  characteristics**

 $R_{DS(on)} = f(V_{GS}); I_D = 20A;$  parameter:  $T_j$ 
**Diagram 11: Breakdown Voltage Variation vs. Temperature**

 $V_{BR(DSS)} = f(T_j); I_D = 250\mu A$ 
**Diagram 12: Maximum Drain Current**

 $I_D = f(T_c); V_{GS} = 10V$

Diagram 13: Typ. capacitances

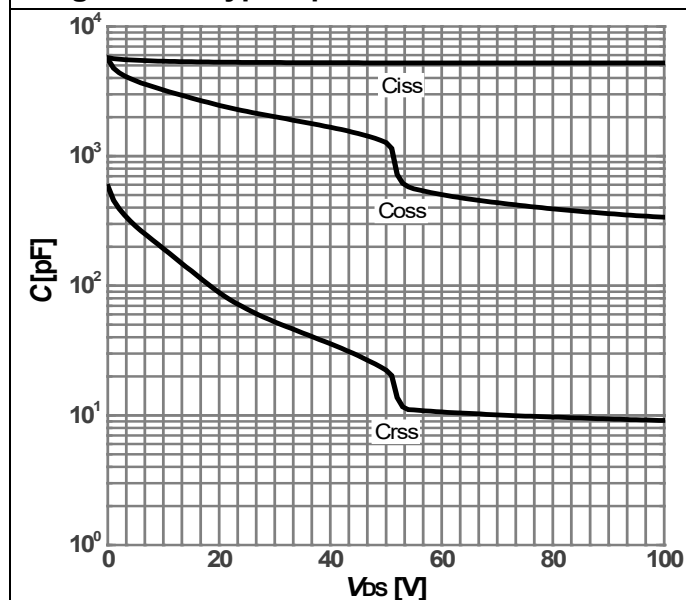
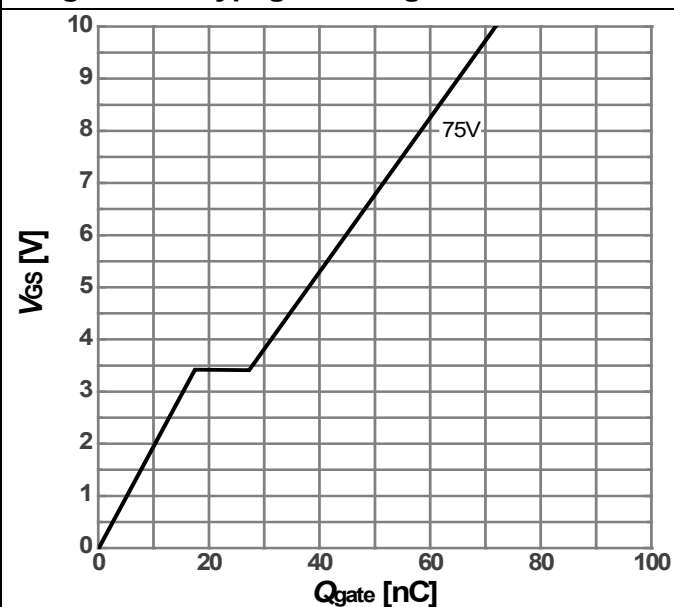

 $C=f(V_{DS}); V_{GS}=0V; f=1MHz$ 

Diagram 14: Typ. gate charge


 $V_{GS}=f(Q_{gate}); I_D=20A \text{ pulsed}; V_{DS}=75V$

**Table 7. Diode characteristics**

Test circuit for diode characteristics	Diode recovery waveform

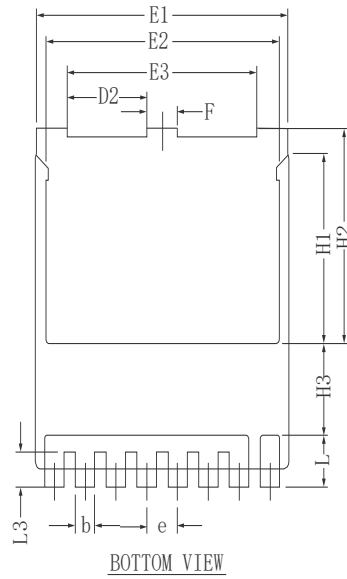
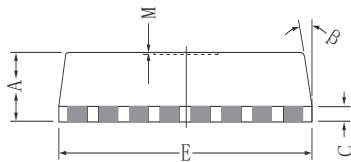
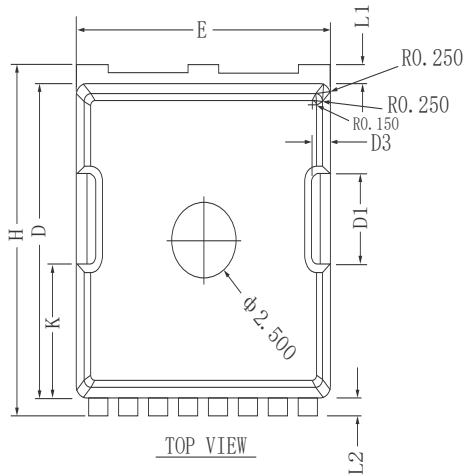
**Table 8. Switching times**

Switching times test circuit for inductive load	Switching times waveform

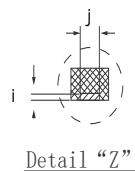
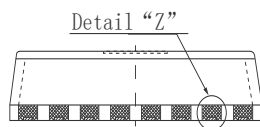
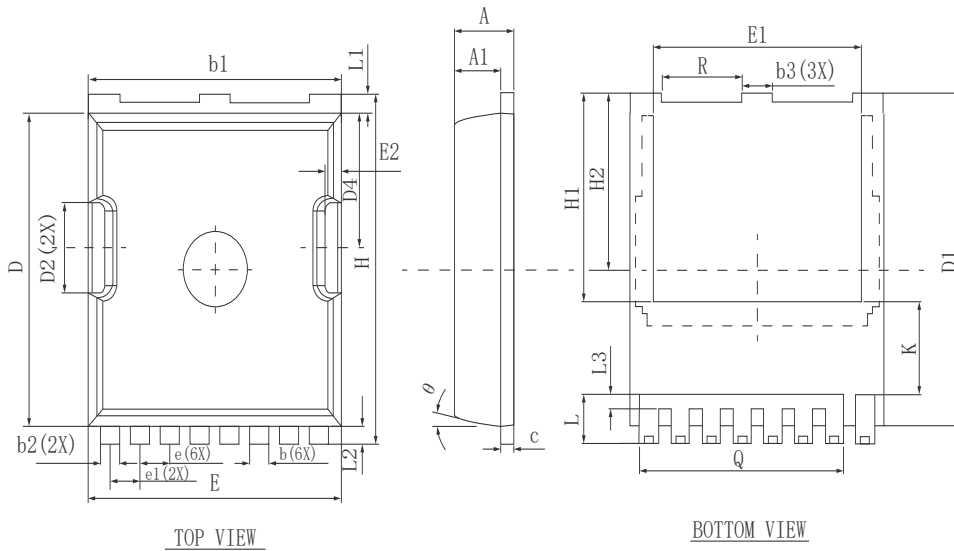
**Table 9. Unclamped inductive load**

Unclamped inductive load test circuit	Unclamped inductive waveform

# Dimensions (TOLL)



Symbols	Millimeters		
	MIN.	NOM.	MAX.
A	2.20	2.30	2.40
b	0.65	0.75	0.85
C	0.508 REF		
D	10.25	10.40	10.55
D1	2.85	3.00	3.15
D2	2.95	3.10	3.25
D3	0.75 REF		
E	9.75	9.90	10.05
E1	9.65	9.80	9.95
E2	8.95	9.10	9.25
E3	7.25	7.40	7.55
e	1.20 BSC		
F	1.05	1.20	1.35
H	11.55	11.70	11.85
H1	6.03	6.18	6.33
H2	6.85	7.00	7.15
H3	3.00 BSC		
L	1.55	1.70	1.85
L1	0.55	0.70	0.85
L2	0.45	0.60	0.75
L3	1.00	1.15	1.30
M	0.08 REF		
β	8°	10°	12°
K	4.25	4.40	4.55

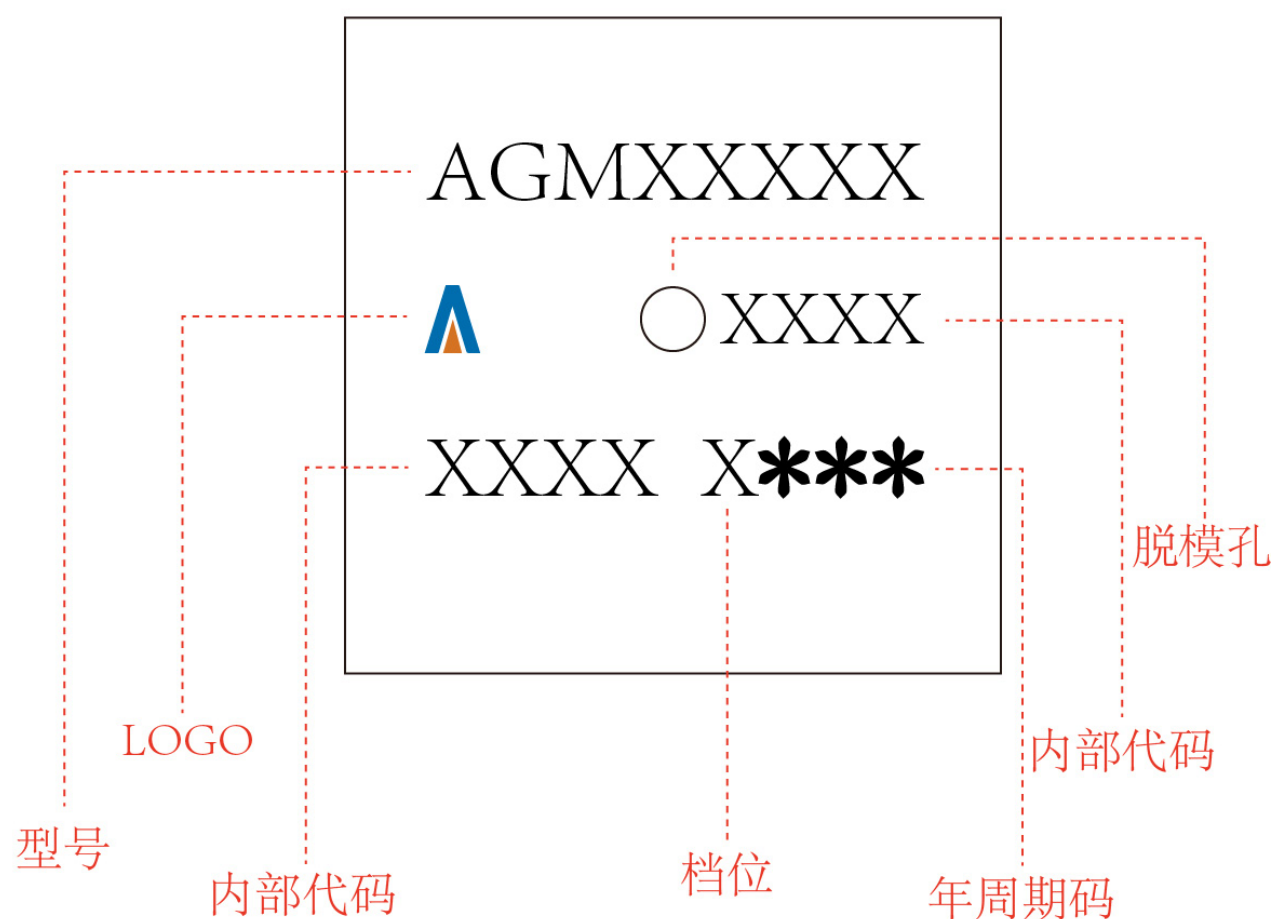


SYMBOL	MILLIMETER		
	MIN.	NOM.	MAX.
A	2.200	2.300	2.400
A1	1.700	1.800	1.900
b	0.600	0.700	0.800
b1	9.700	9.800	9.900
b2	0.650	0.750	0.850
b3	1.100	1.200	1.300
c	0.400	0.500	0.600
D	10.300	10.400	10.500
D1	11.000	11.100	11.200
D2	3.200	3.300	3.400
D4	4.470	4.570	4.670
E	9.800	9.900	10.000
E1	8.000	8.100	8.200
E2	0.500	0.600	0.700
e	1.200 BSC		
e1	1.225 BSC		
H	11.600	11.700	11.800
H1	6.950 BSC		
H2	5.900 BSC		
i	0.100 REF.		
j	0.350 REF.		
K	3.100 REF.		
L	1.550	1.650	1.750
L1	0.600	0.700	0.800
L2	0.500	0.600	0.700
L3	0.400	0.500	0.600
Q	7.950 REF.		
R	3.000	3.100	3.200
θ	10° REF.		



TOLL

Marking Instructions:




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