N-Channel Logic Level Enhancement Mode Field Effect Transistor

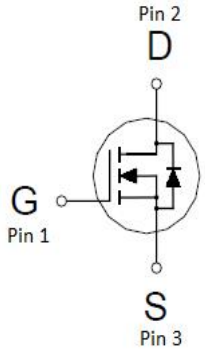
Product Summary:

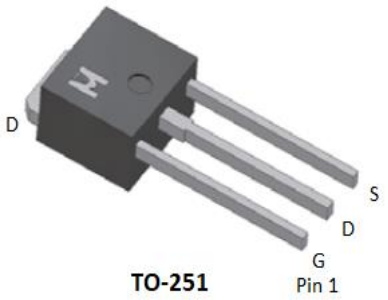
BV_{DSS}	100V
$R_{DSON\ (MAX.)}$ @V_{GS}=10V	12mΩ
$R_{DSON\ (MAX.)}$ @V_{GS}=4.5V	15mΩ
I_D @T_C=25°C	68A

Single N Channel MOSFET

UIS, Rg 100% Tested

Pb-Free Lead Plating & Halogen Free





TO-251

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNIT
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C = 25 °C	I_D	68	A
	T_C = 100 °C		43	
Pulsed Drain Current[1]		I_{DM}	150	
Avalanche Current		I_{AS}	18	
Avalanche Energy	L = 0.1mH	E_{AS}	16.2	mJ
Repetitive Avalanche Energy[2]	L = 0.05mH	E_{AR}	8.1	
Power Dissipation	T_C = 25 °C	P_D	89	W
	T_C = 100 °C		35	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNIT
Junction-to-Case	$R_{\theta JC}$		1.4	°C / W
Junction-to-Ambient	$R_{\theta JA}$		62.5	

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle ≤ 1%

[3]62.5°C / W when mounted on a 1 in2 pad of 2 oz copper.

ELECTRICAL CHARACTERISTICS (T_J = 25 °C, Unless Otherwise Noted)

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	100			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.0	2.0	3.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±12V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 80V, V_{GS} = 0V			1	μA
		V_{DS} = 70V, V_{GS} = 0V, T_J = 125 °C			25	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = 5V, V_{GS} = 10V	68			A
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 12A		9.5	12	mΩ
		V_{GS} = 4.5V, I_D = 10A		11.5	15	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 12A		45		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 50V, f = 1MHz		2130		pF
Output Capacitance	C_{oss}			336		
Reverse Transfer Capacitance	C_{rss}			29		
Gate Resistance	R_g	V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz		1.5		Ω
Total Gate Charge[1,2]	Q_g(V_{GS}=10V)	V_{DS} = 50V, V_{GS} = 10V, I_D = 12A		38		nC
	Q_g(V_{GS}=4.5V)			23		
Gate-Source Charge[1,2]	Q_{gs}			10		
Gate-Drain Charge[1,2]	Q_{gd}			8.2		
Turn-On Delay Time[1,2]	$t_{d(on)}$	V_{DS} = 50V, I_D = 12A, V_{GS} = 10V, R_{GS} = 6Ω		6		nS
Rise Time[1,2]	t_r			10		
Turn-Off Delay Time[1,2]	$t_{d(off)}$			8		
Fall Time[1,2]	t_f			25		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current	I_S				68	A
Pulsed Current[3]	I_{SM}				150	
Forward Voltage[1]	V_{SD}	I_F = 12A, V_{GS} = 0V			1.2	V
Reverse Recovery Time	t_{rr}	I_F = 12A, dI_F/dt = 100A / μS		30		nS
Reverse Recovery Charge	Q_{rr}			130		nC

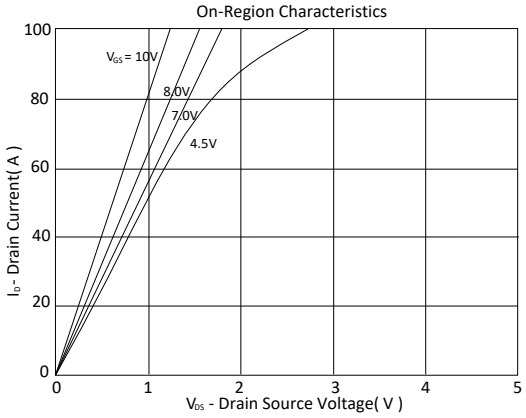
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

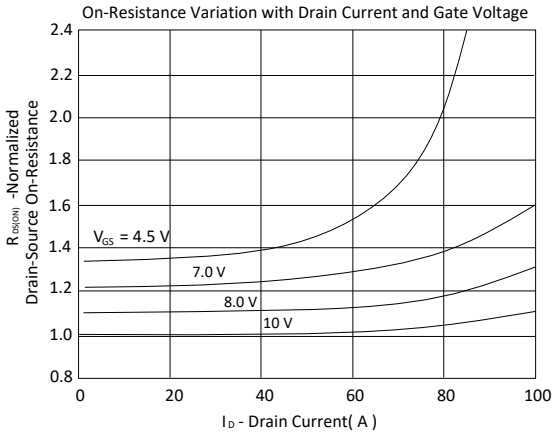
[2]Independent of operating temperature.

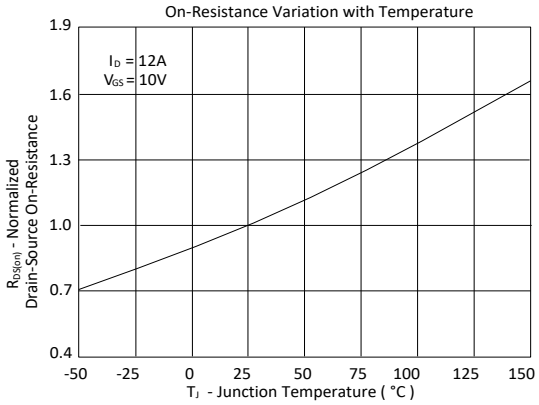
[3]Pulse width limited by maximum junction temperature.

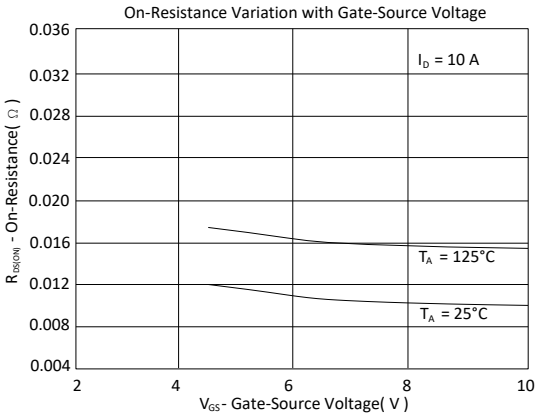
EMC will review datasheet by quarter, and update new version.

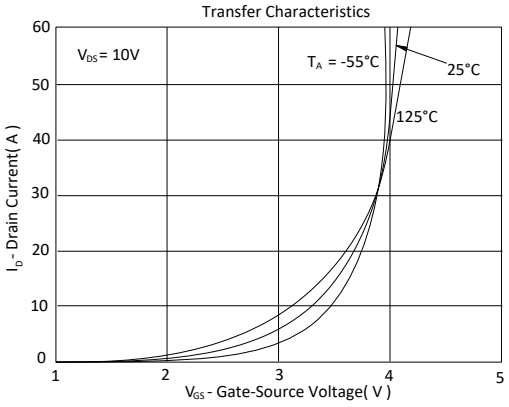
TYPICAL CHARACTERISTICS

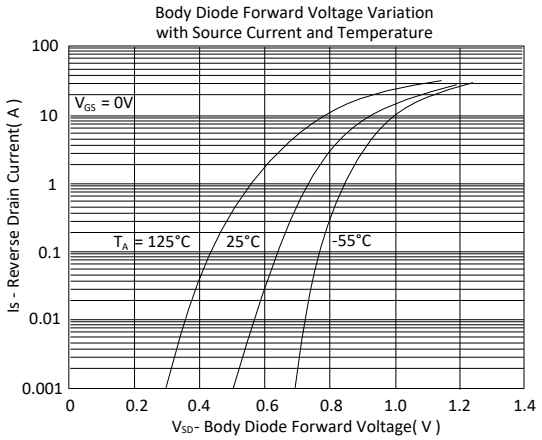


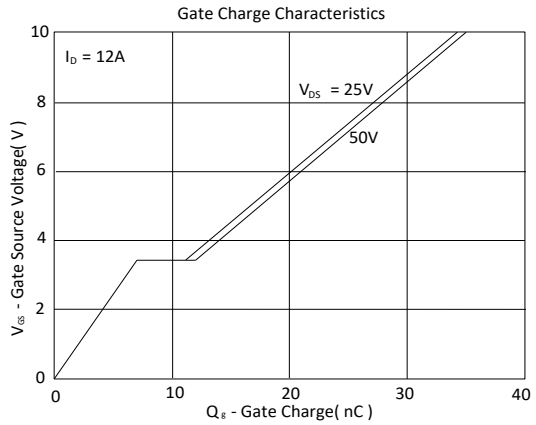


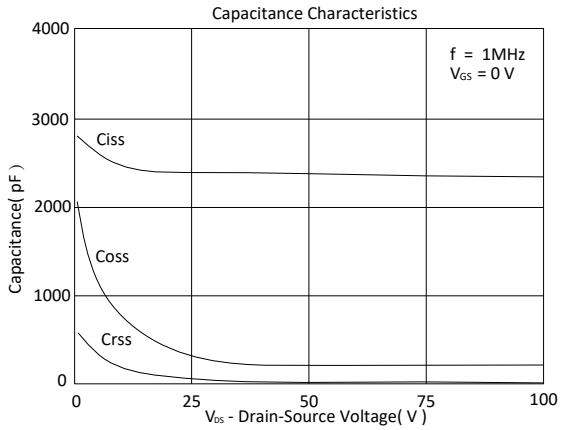


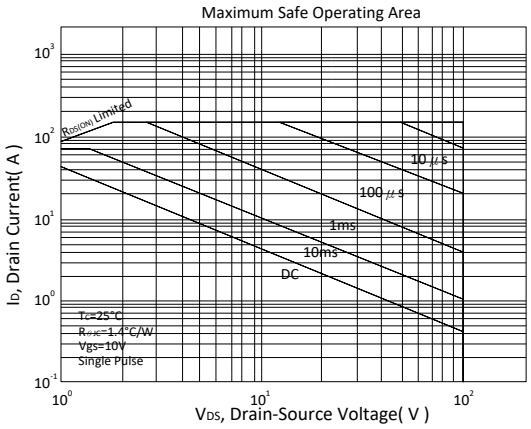


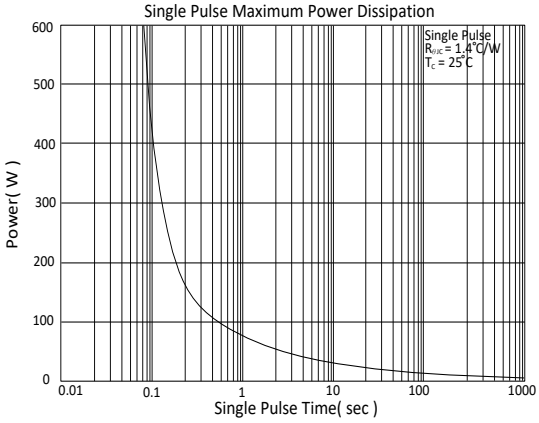


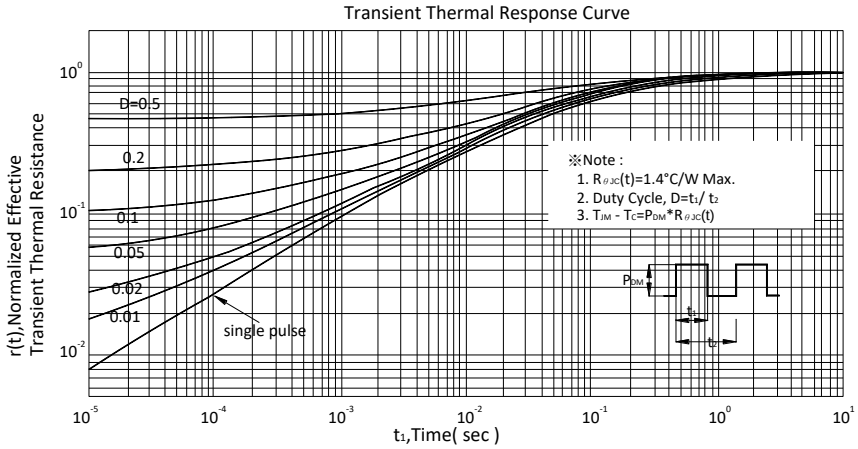



Gate Charge Characteristics
I_D = 12A
V_{DS} = 25V
50V
V_{GS} - Gate Source Voltage(V)
Q_g - Gate Charge(nC)


Capacitance Characteristics
f = 1MHz
V_{GS} = 0 V
Ciss
Coss
Crss
Capacitance(pF)
V_{DS} - Drain-Source Voltage(V)

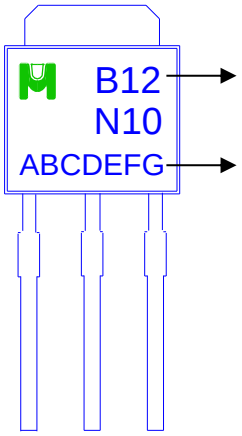

Maximum Safe Operating Area
$R_{DS(ON)}$ Limited
10 μs
100 μs
1ms
10ms
DC
T_C=25°C
$R_{θJC}$=1.4°C/W
Vgs=10V
Single Pulse
ID, Drain Current(A)
VDS, Drain-Source Voltage(V)


Single Pulse Maximum Power Dissipation
Single Pulse
$R_{θJC}$ = 1.4°C/W
T_C = 25°C
Power(W)
Single Pulse Time(sec)


Transient Thermal Response Curve
D=0.5
0.2
0.1
0.05
0.02
0.01
single pulse
※Note :
1. $R_{θJC}$(t)=1.4°C/W Max.
2. Duty Cycle, D=t_1/ t_2
3. T_{JM} - T_C=P_{DM}*$R_{θJC}$(t)
P_{DM}
t_1
t_2
r(t),Normalized Effective Transient Thermal Resistance
t_1,Time(sec)

Ordering & Marking Information:

Device Name: EMB12N10CL for IPAK (TO-251)



B12N10: Device Name

ABCDEFG: Date Code

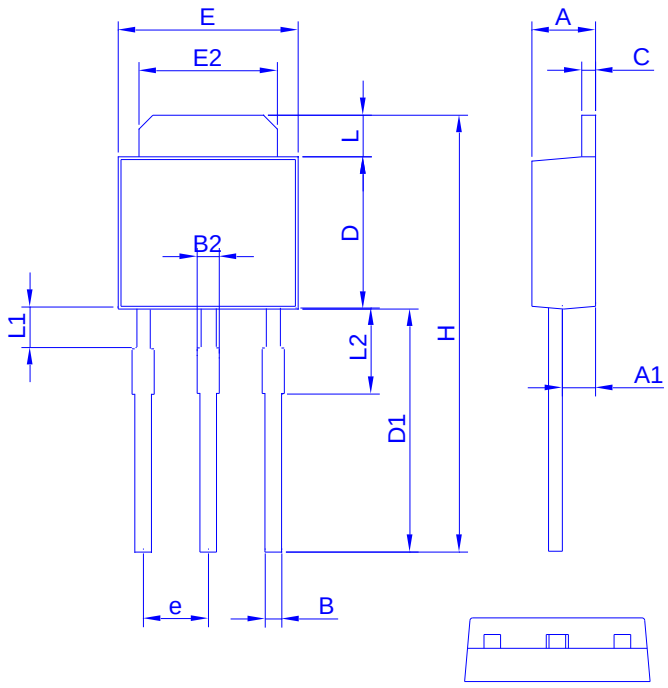
A: Assembly House

B: Year(A:2008 B:2009 C:2010….)

C: Month(A:01 B:02 C:03 D:04 E:05 F:06 G:07 H:08 I:09 J:10 K:11 L:12)

DEFG: Serial No.

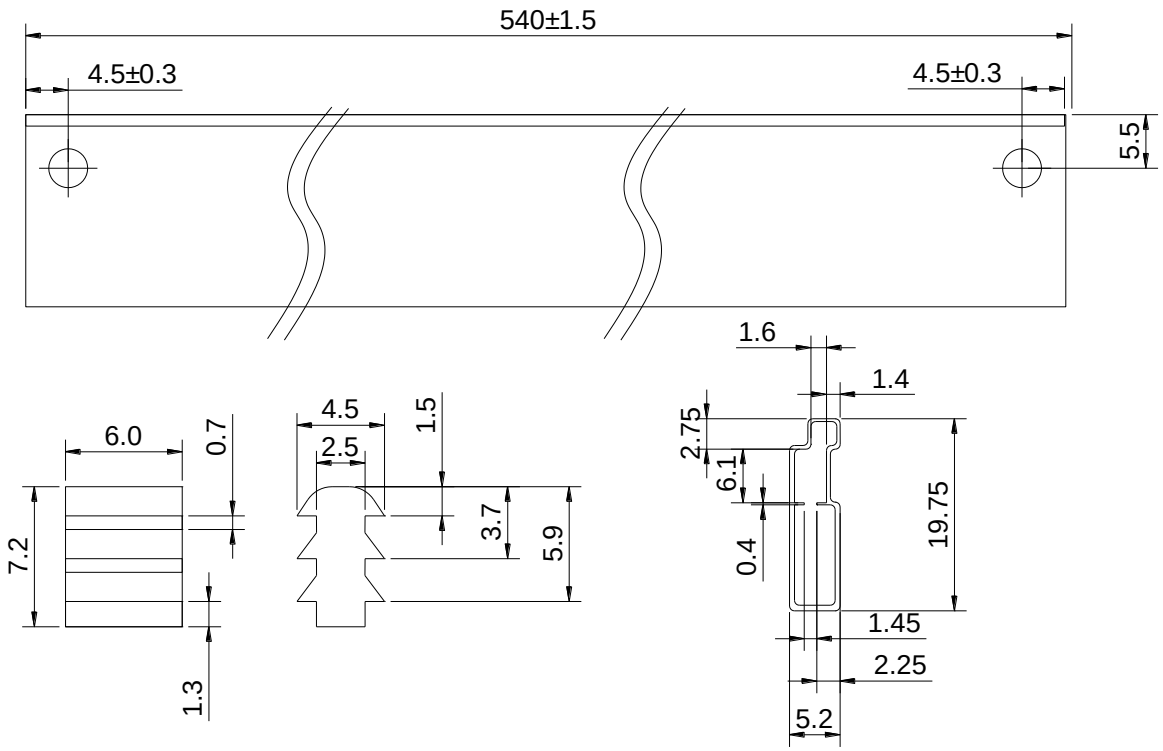
Outline Drawing



Dimension in mm

Dimension	A	A1	B	B2	C	D	D1	E	E2	H	L	L1	L2	e
Min.	2.18	0.89	0.64	0.91	0.46	5.33	7.00	6.35	4.95	13.22	0.89	0.94	1.91	-
Typ.	2.29	1.02	0.76	1.03	0.67	5.78	8.33	6.54	5.21	15.18	1.08	1.23	2.10	2.29
Max.	2.39	1.14	0.89	1.14	0.89	6.22	9.65	6.73	5.46	17.14	1.27	1.52	2.29	-

◆ TO-251 Tube Information:75pcs/Tube(Dimension in millimeter)



產品別	TO-251
底塞顏色	白
端塞顏色	藍
裝管方向	Pin 孔朝底塞
裝箱數	
滿管數量	75
管/內盒比	50:1
內盒滿箱數	3.75K
內盒/外箱比	4:1
外箱滿箱數	15K