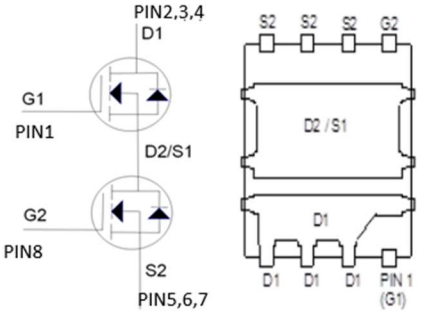
杰力科技股份有限公司
Excelliance MOS Corporation

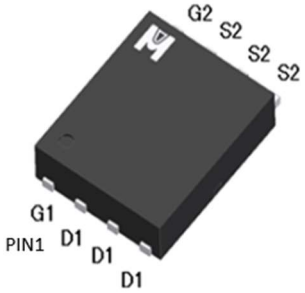
EMB09A03HP

N-Channel Logic Level Enhancement Mode Field Effect Transistor

Product Summary:

	N-CH-Q1	N-CH-Q2
BV_{DSS}	30V	30V
$R_{DSON\ (MAX.)}$	9.5mΩ	9.5mΩ
I_D	30A	30A





N-Channel MOSFET

UIS, Rg 100% Tested

Pb-Free Lead Plating & Halogen Free

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

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS		UNIT
			Q1	Q2	
Gate-Source Voltage		V_{GS}	±20	±20	V
Continuous Drain Current	T_C = 25 °C	I_D	30	30	A
	T_C = 100 °C		24	24	
Pulsed Drain Current[1]		I_{DM}	120	120	
Avalanche Current		I_{AS}	30	30	
Avalanche Energy	L = 0.1mH	E_{AS}	45	45	mJ
Repetitive Avalanche Energy[2]	L = 0.05mH	E_{AR}	22.5	22.5	
Power Dissipation	T_C = 25 °C	P_D	48	69	W
	T_C = 100 °C		19	27	
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	$R_{\theta JC}$	Steady State		2.6	1.8	°C / W
Junction-to-Ambient	$R_{\theta JA}$	Steady State		62	55	
	$R_{\theta JA}$	t ≦ 10 s		27	25	

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle ≤ 1%

$R_{\theta JA}$ when mounted on a 1 in^2 pad of 2 oz copper.

ELECTRICAL CHARACTERISTICS (T_C = 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	Q1	30			V
			Q2	30			
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	Q1	1	1.5	3	
			Q2	1	1.5	3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	Q1			±100	nA
			Q2			±100	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 24V, V_{GS} = 0V	Q1			1	μA
			Q2			1	
		V_{DS} = 20V, V_{GS} = 0V, T_J = 125 °C	Q1			25	
			Q2			25	
On-State Drain Current[1]	$I_{D(ON)}$	V_{DS} = 10V, V_{GS} = 10V	Q1	30			A
			Q2	30			
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 13A	Q1		8.2	9.5	mΩ
		V_{GS} = 10V, I_D = 13A	Q2		8.2	9.5	
		V_{GS} = 4.5V, I_D = 9A	Q1		11	15	
		V_{GS} = 4.5V, I_D = 9A	Q2		11	15	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 13A	Q1		18		S
		V_{DS} = 5V, I_D = 13A	Q2		18		
DYNAMIC							
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz	Q1		905		pF
			Q2		905		
Output Capacitance	C_{oss}		Q1		135		
			Q2		135		
Reverse Transfer Capacitance	C_{rss}		Q1		82		
			Q2		82		
Gate Resistance	R_g	V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz	Q1		3.0		Ω
			Q2		3.0		
Total Gate Charge[1,2]	Q_g(V_{GS}=10V)	V_{DD} = 15V, V_{GS} = 10V, I_D = 10A	Q1		16.7		nC
			Q2		16.7		
	Q_g(V_{GS}=4.5V)		Q1		8.4		
			Q2		8.4		

Gate-Source Charge[1,2]	Q_{gs}	V_{DD} = 15V, V_{GS} = 10V, I_D = 10A	Q1		2.3		
			Q2		2.3		
Gate-Drain Charge[1,2]	Q_{gd}		Q1		3.5		
			Q2		3.5		
Turn-On Delay Time[1,2]	$t_{d(on)}$	V_{DD} = 15V, I_D = 1A, V_{GS} = 10V, R_{GS} = 2.7Ω	Q1		8		nS
			Q2		8		
Rise Time[1,2]	t_r		Q1		18		
			Q2		18		
Turn-Off Delay Time[1,2]	$t_{d(off)}$		Q1		20		
			Q2		20		
Fall Time[1,2]	t_f		Q1		12		
			Q2		12		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)							
Continuous Current	I_S		Q1			30	A
			Q2			30	
Pulsed Current[3]	I_{SM}		Q1			120	
			Q2			120	
Forward Voltage[1]	V_{SD}	I_F = 10A, V_{GS} = 0V	Q1			1.3	V
		I_F = 10A, V_{GS} = 0V	Q2			1.3	
Reverse Recovery Time	t_{rr}	Q1 I_F = 10A, dI_F/dt = 100A / μS	Q1		22		nS
			Q2		22		
Reverse Recovery Charge	Q_{rr}	Q2 I_F = 10A, dI_F/dt = 100A / μS	Q1		6		nC
			Q2		6		

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

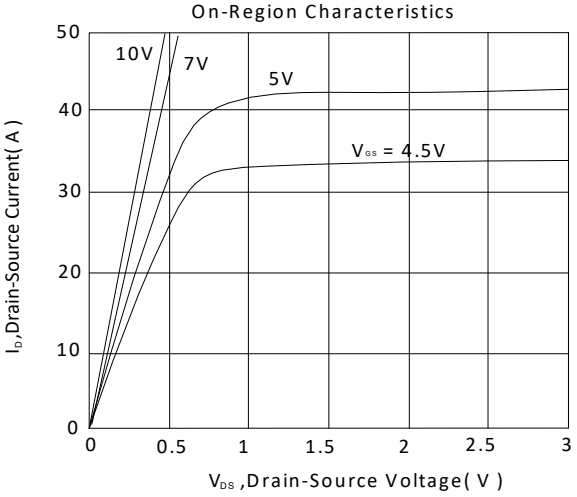
[2]Independent of operating temperature.

[3]Pulse width limited by maximum junction temperature.

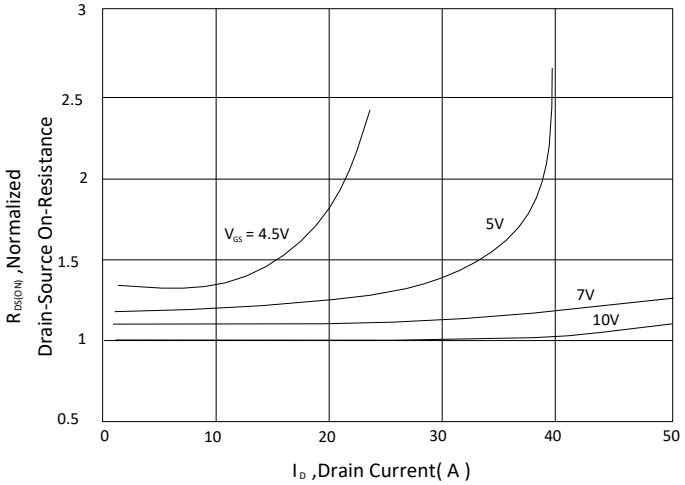
EMC will review datasheet by quarter, and update new version.

Q1 TYPICAL CHARACTERISTICS

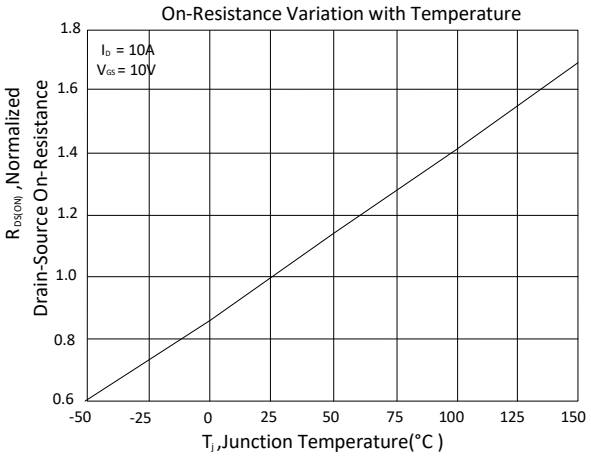
On-Region Characteristics



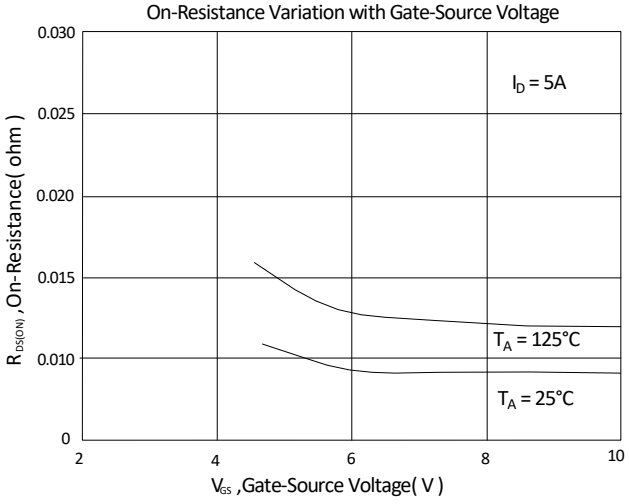
On-Resistance Variation with Drain Current and Gate Voltage



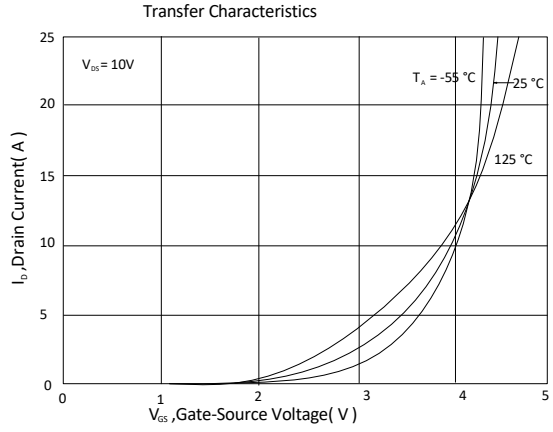
On-Resistance Variation with Temperature



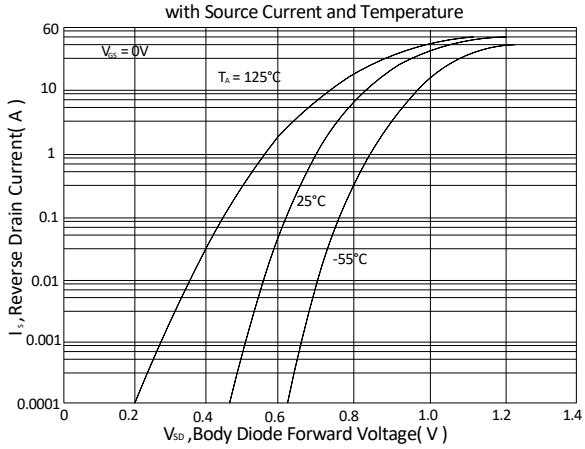
On-Resistance Variation with Gate-Source Voltage

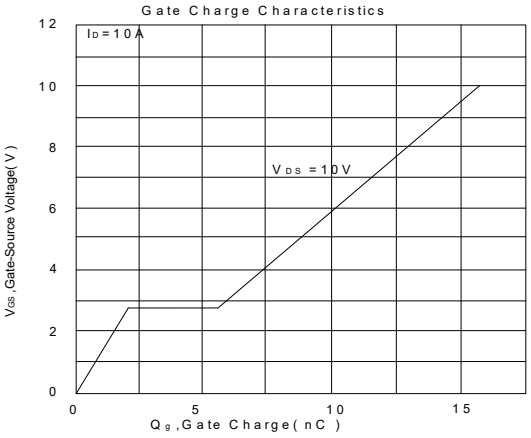


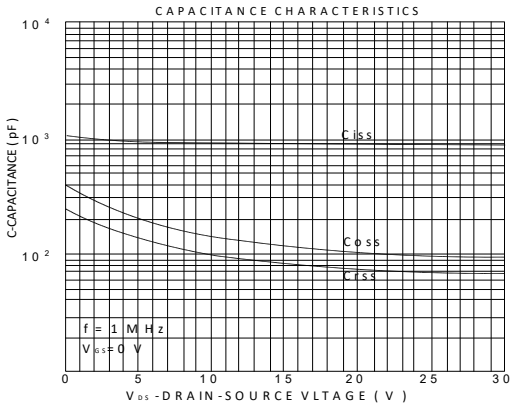
Transfer Characteristics

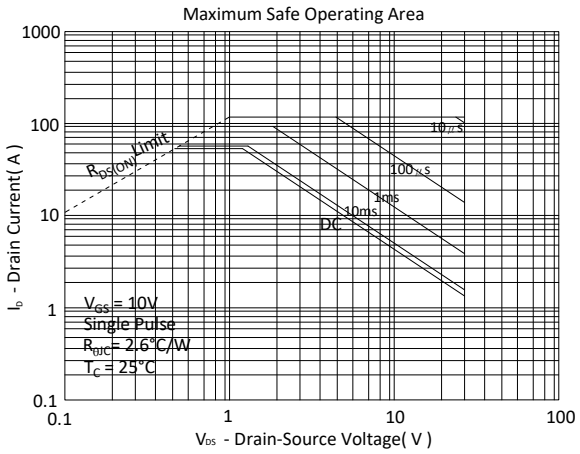


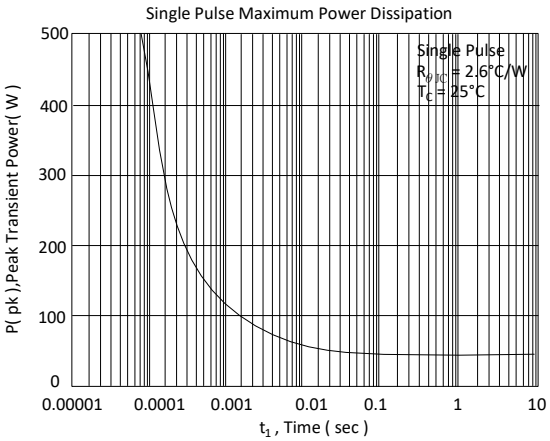
Body Diode Forward Voltage Variation with Source Current and Temperature

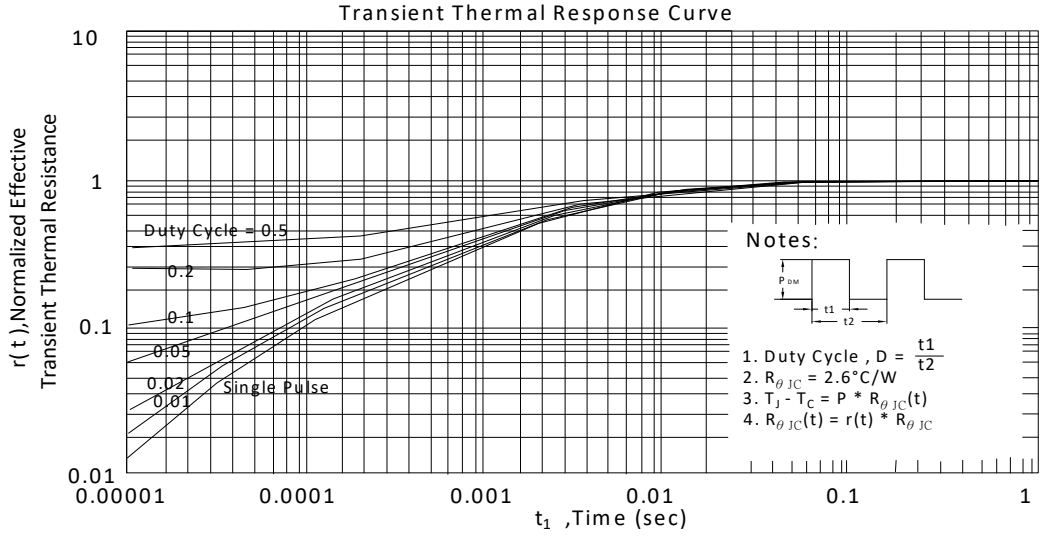



Gate Charge Characteristics
ID = 10A
VDS = 10V
VGS ,Gate-Source Voltage(V)
Qg ,Gate Charge(nC)


CAPACITANCE CHARACTERISTICS
Ciss
Coss
Crss
f = 1 MHz
VGS = 0 V
C-CAPACITANCE (pF)
VDS -DRAIN-SOURCE VLTAGE (V)

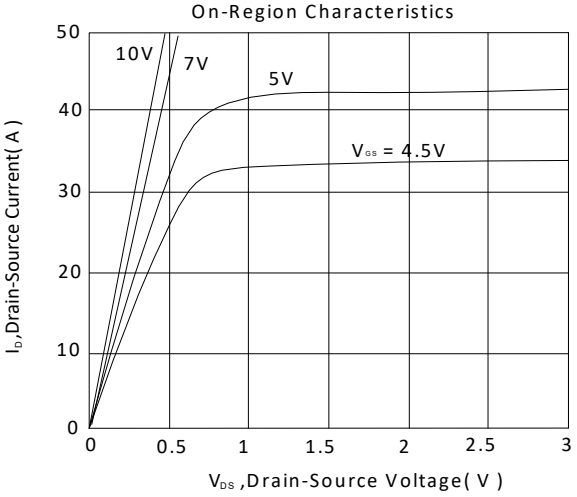

Maximum Safe Operating Area
RDS(ON) Limit
10μs
100μs
1ms
10ms
DC
VGS = 10V
Single Pulse
RθJC = 2.6°C/W
TC = 25°C
ID - Drain Current(A)
VDS - Drain-Source Voltage(V)


Single Pulse Maximum Power Dissipation
Single Pulse
RθJC = 2.6°C/W
TC = 25°C
P(pk),Peak Transient Power(W)
t1 , Time (sec)

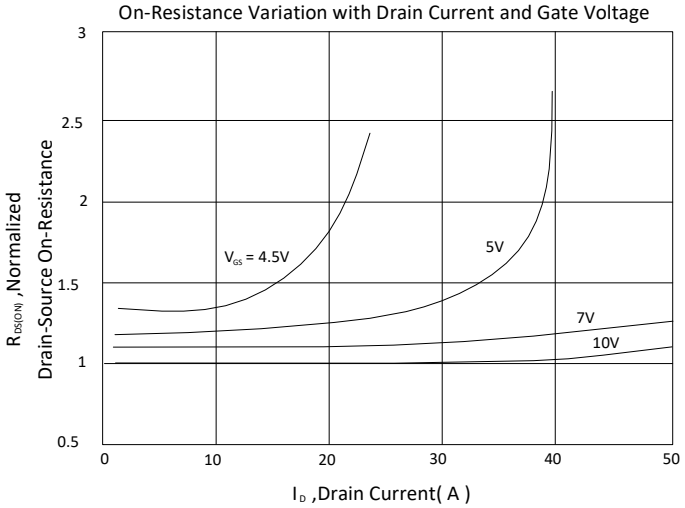

Transient Thermal Response Curve
Duty Cycle = 0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
Notes:
1. Duty Cycle , D = t1/t2
2. RθJC = 2.6°C/W
3. TJ - TC = P * RθJC(t)
4. RθJC(t) = r(t) * RθJC
r(t),Normalized Effective Transient Thermal Resistance
t1 ,Time (sec)

Q2 TYPICAL CHARACTERISTICS

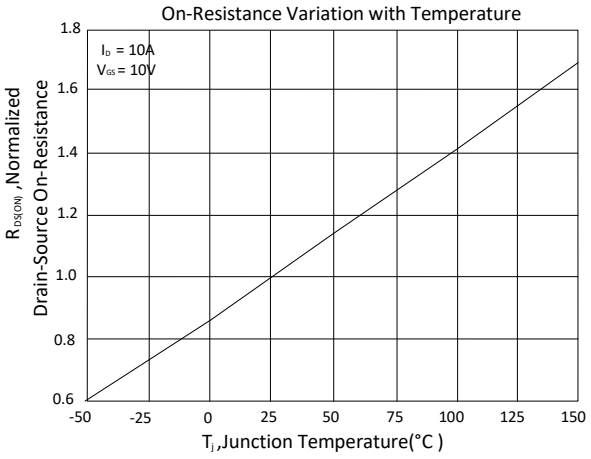
On-Region Characteristics



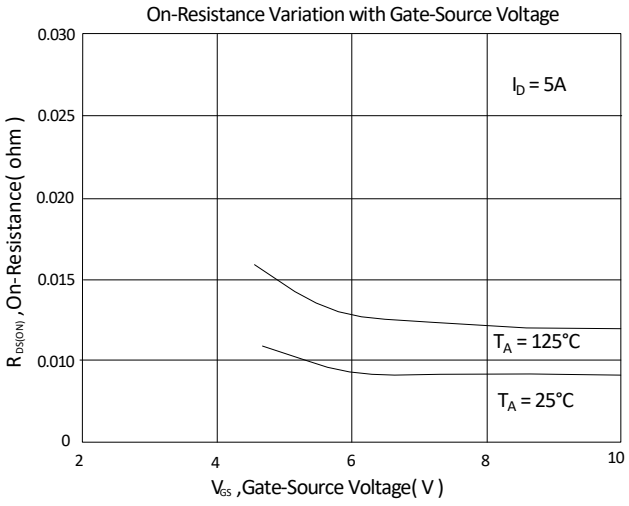
On-Resistance Variation with Drain Current and Gate Voltage



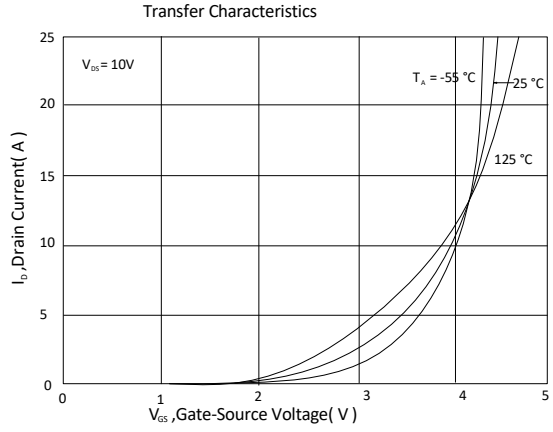
On-Resistance Variation with Temperature



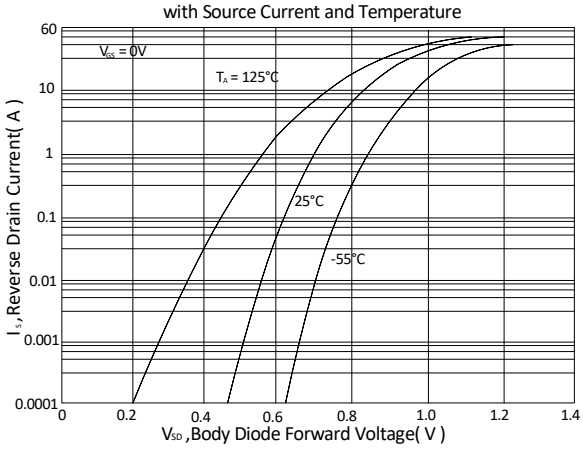
On-Resistance Variation with Gate-Source Voltage

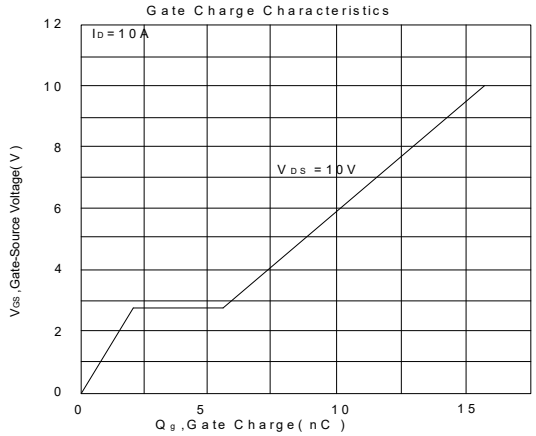


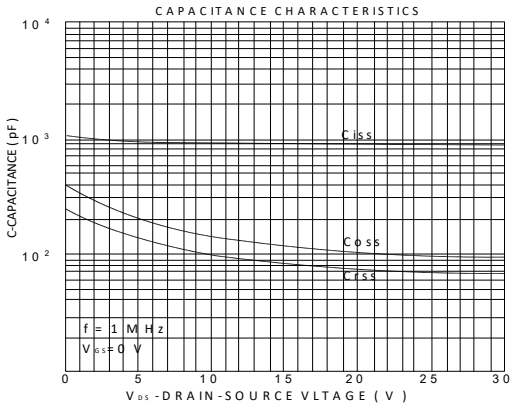
Transfer Characteristics

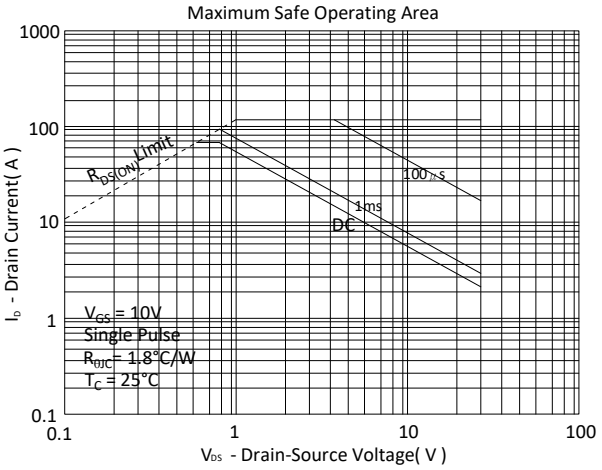


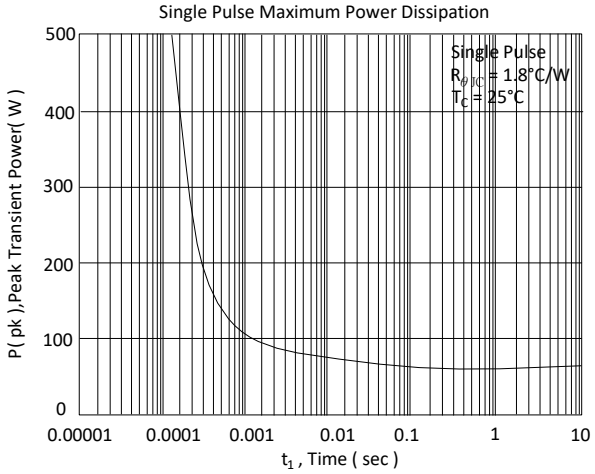
Body Diode Forward Voltage Variation with Source Current and Temperature

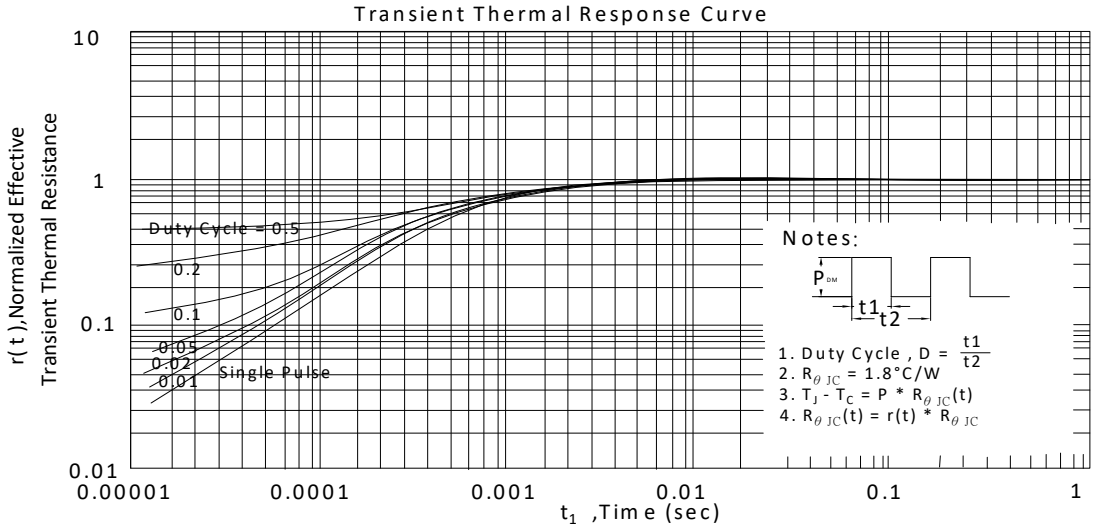



Gate Charge Characteristics
ID = 10A
VDS = 10V
VGS ,Gate-Source Voltage(V)
Qg ,Gate Charge(nC)


CAPACITANCE CHARACTERISTICS
Ciss
Coss
Crss
f = 1 MHz
VGS = 0 V
C-CAPACITANCE (pF)
VDS -DRAIN-SOURCE VLTAGE (V)


Maximum Safe Operating Area
RDS(ON)Limit
100μs
1ms
DC
VGS = 10V
Single Pulse
RθJC = 1.8°C/W
TC = 25°C
ID - Drain Current(A)
VDS - Drain-Source Voltage(V)


Single Pulse Maximum Power Dissipation
Single Pulse
RθJC = 1.8°C/W
TC = 25°C
P(pk),Peak Transient Power(W)
t1 , Time (sec)


Transient Thermal Response Curve
Duty Cycle = 0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
Notes:
1. Duty Cycle , D = t1/t2
2. RθJC = 1.8°C/W
3. TJ - TC = P * RθJC(t)
4. RθJC(t) = r(t) * RθJC
r(t),Normalized Effective Transient Thermal Resistance
t1 ,Time (sec)

Ordering & Marking Information:

Device Name: EMB09A03HP for Asymmetric Dual EDFN5X6

B09A03 : Device Name

ABCDEFG: Date Code

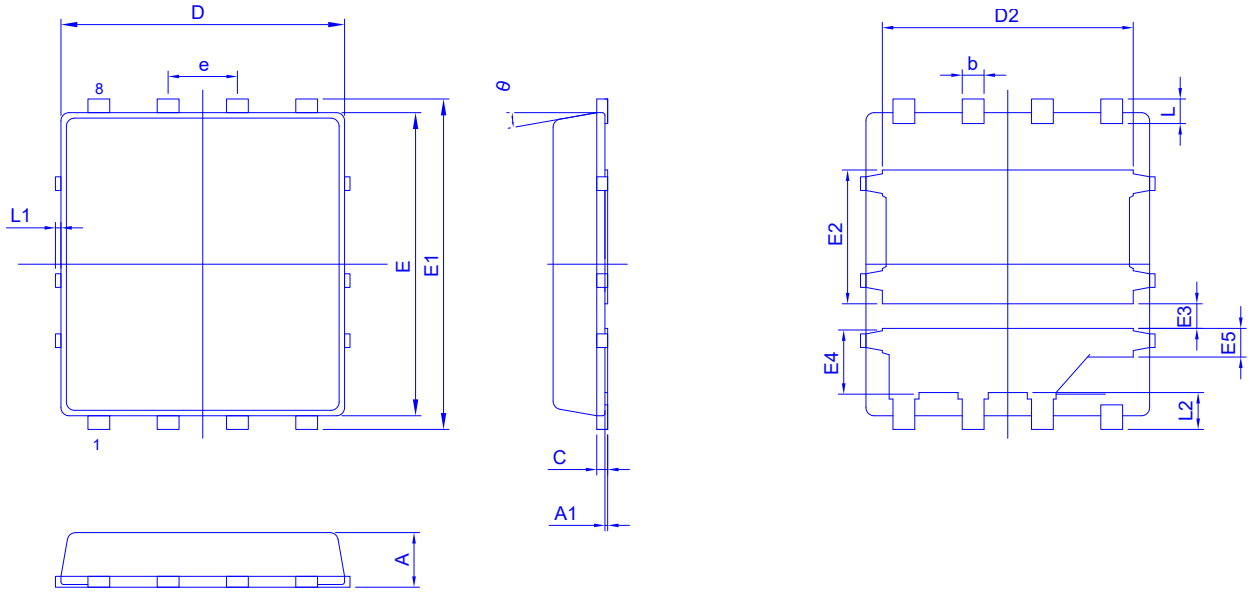
A: Assembly House

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.

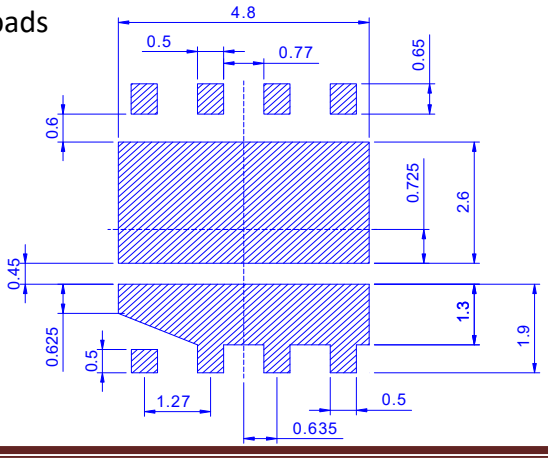
Outline Drawing



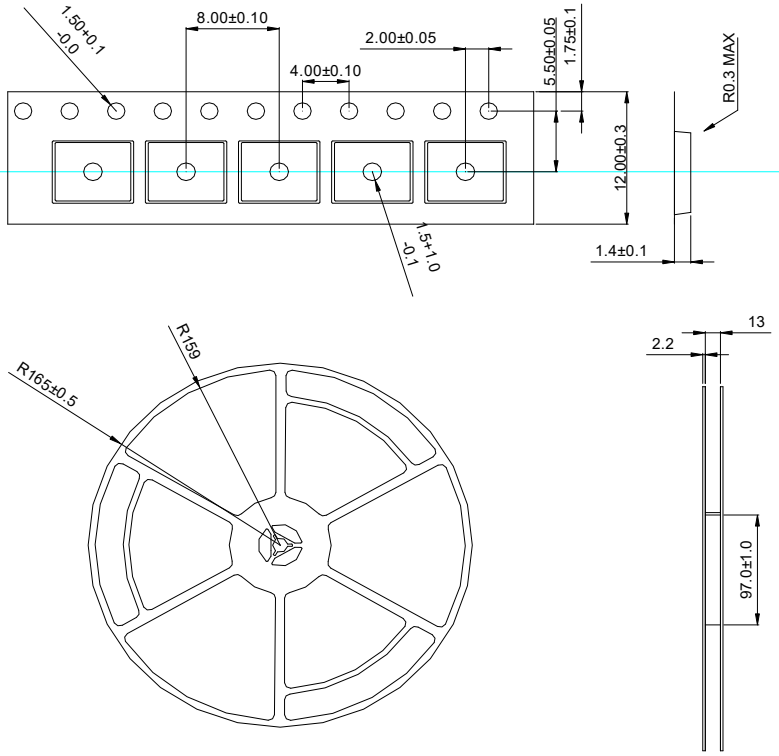
Dimension in mm

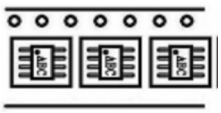
Dimension	A	A1	b	c	D	D2	E	E1	E2	E3	E4	E5	e	L	L1	L2	θ
Min.	0.85	0	0.33	0.15	4.8	3.61	5.55	5.9	2.02	0.4	1.1	0.475	0	0.35	0	0.48	0°
Typ.	0.9	0	0.4	0.2	4.9	3.81	5.65	6	2.17	0.45	1.175	0.525	1.27	0.45	0	0.58	
Max.	1.1	0.05	0.51	0.3	5.4	4.7	5.8	6.1	2.5	0.6	1.42	0.575	0	0.71	0.1	0.81	12°

Recommended minimum pads



◆ Tape&Reel Information:2500pcs/Reel(Dimension in millimeter)



產品別	EDFN5X6
Reel 尺寸	13”
編帶方式	FEED DIRECTION 
前空格	25
後空格	50
裝箱數	
滿捲數量	2.5K
捲/內盒比	1：1
內盒滿箱數	2.5K
內/外箱比	10：1
外箱滿箱數	25K