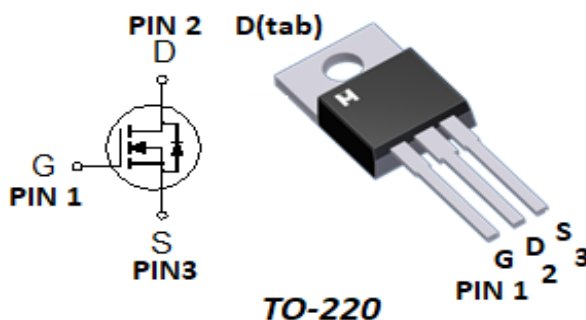


Single N-Channel Logic Level Enhancement Mode Field Effect Transistor

▪Product Summary:

	N-CH
BVDSS	60V
$R_{DS(on)} (MAX.) @ V_{GS}=10V$	4.3mΩ
$R_{DS(on)} (MAX.) @ V_{GS}=4.5V$	6.0mΩ
$I_D @ T_C=25^{\circ}C$	164A
$I_D @ T_A=25^{\circ}C$	17A

▪ Pin Description:



Single N Channel MOSFET

UIS, Rg 100% Tested

Pb-Free Lead Plating & Halogen Free

▪ABSOLUTE MAXIMUM RATINGS ($T_C = 25^{\circ}C$ Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNIT
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C = 25^{\circ}C$	I_D	167	A
	$T_C = 100^{\circ}C$		105	
Continuous Drain Current	$T_A = 25^{\circ}C$	I_D	17	
	$T_A = 70^{\circ}C$		13	
Pulsed Drain Current ¹		I_{DM}	590	mJ
Avalanche Current		I_{AS}	62.9	
Avalanche Energy	$L = 0.1mH$	EAS	153.8	
Repetitive Avalanche Energy ²	$L = 0.05mH$	EAR	76.9	W
Power Dissipation	$T_C = 25^{\circ}C$	P_D	192.3	
	$T_C = 100^{\circ}C$		76.9	W
Power Dissipation	$T_A = 25^{\circ}C$	P_D	2	
	$T_A = 70^{\circ}C$		1.3	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150	$^{\circ}C$

▪THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNIT
Junction-to-Case	$R_{\theta JC}$		0.65	$^{\circ}C/W$
Junction-to-Ambient ³	$R_{\theta JA}$		62.5	

¹Pulse width limited by maximum junction temperature.

²Duty cycle < 1%

³62.5 $^{\circ}C/W$ when mounted on a 1 in² pad of 2 oz copper.

⁴Guarantee by Engineering test

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

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage ⁴	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250uA	60			V
Gate Threshold Voltage ⁴	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250uA	1	1.8	2.5	
Gate-Body Leakage ⁴	I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current ⁴	I _{DSS}	V _{DS} = 48V, V _{GS} = 0V			1	uA
		V _{DS} =40V, V _{GS} =0V, T _J = 125 °C			25	
On-State Drain Current ¹	I _{D(ON)}	V _{DS} = 10V, V _{GS} = 10V	167			A
Drain-Source On-State Resistance ^{1,4}	R _{DS(ON)}	V _{GS} = 10V, I _D =20A		3.5	4.3	mΩ
		V _{GS} = 4.5V, I _D = 20A		4.8	6.0	
DYNAMIC						
Input Capacitance ⁵	C _{iss}	V _{GS} = 0V, V _{DS} = 30V, f = 1MHz		3657		pF
Output Capacitance ⁵	C _{oss}			1163		
Reverse Transfer Capacitance ⁵	C _{rss}			53		
Gate Resistance ^{4,5}	R _g	f = 1MHz		1.5		Ω
Total Gate Charge ^{1,2,5}	Q _g (V _{GS} =10V)	V _{DS} = 30V, V _{GS} = 10V, I _D = 20A		59.5		nC
	Q _g (V _{GS} =4.5V)			28.4		
Gate-Source Charge ^{1,2,5}	Q _{gs}			11.4		
Gate-Drain Charge ^{1,2,5}	Q _{gd}			9.8		
Turn-On Delay Time ^{1,2,5}	t _{d(on)}	V _{DS} = 30V, V _{GS} = 10V, I _D = 5A , R _g = 3Ω		12.7		nS
Rise Time ^{1,2,5}	t _r			14.7		
Turn-Off Delay Time ^{1,2,5}	t _{d(off)}			48.0		
Fall Time ^{1,2,5}	t _f			37.4		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS						
Continuous Current	I _S				167	A
Pulsed Current ³	I _{SM}				590	
Forward Voltage ^{1,4}	V _{SD}	I _F = I _S =50A, V _{GS} = 0V			1.2	V
Reverse Recovery Time ⁵	t _{rr}	I _F = 50A, dI _F /dt = 100A / uS		31.3		nS
Reverse Recovery Charge ⁵	Q _{rr}			14.6		nC

¹ Pulse test : Pulse Width ≤ 300 usec, Duty Cycle ≤ 2%.

² Independent of operating temperature.

³ Pulse width limited by maximum junction temperature.

⁴ Guarantee by FT test Item

⁵ Guarantee by Engineering test

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



▪ TYPICAL CHARACTERISTICS

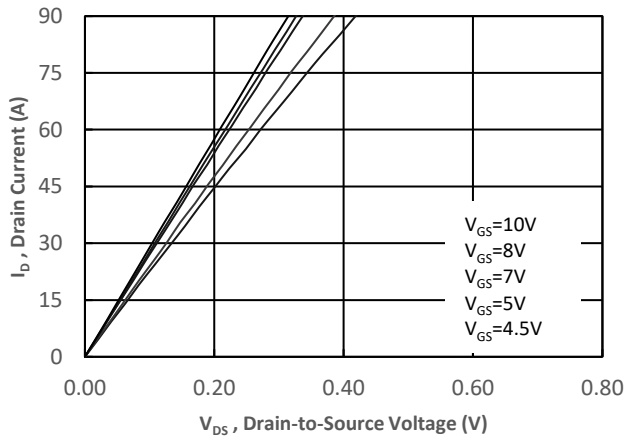


Fig.1 Typical Output Characteristics

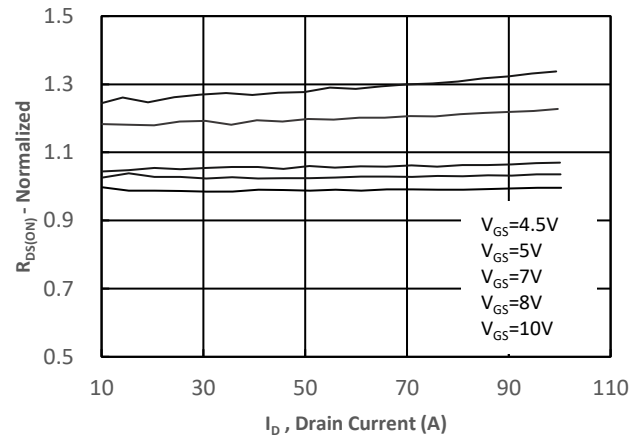


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

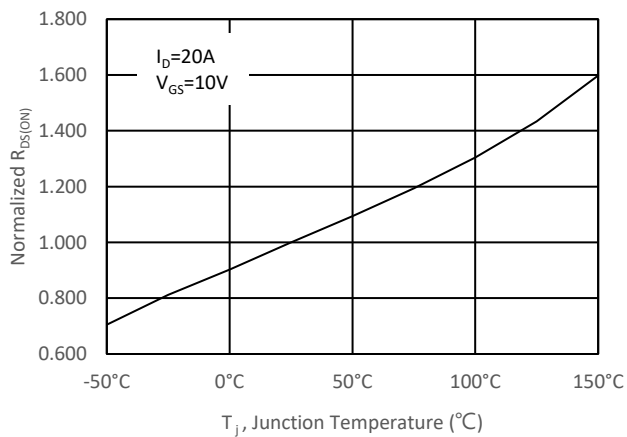


Fig.3 Normalized On-Resistance v.s. Junction Temperature

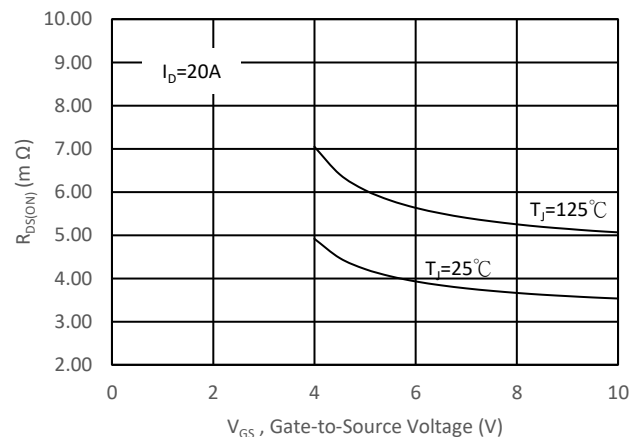


Fig.4 On-Resistance v.s. Gate Voltage

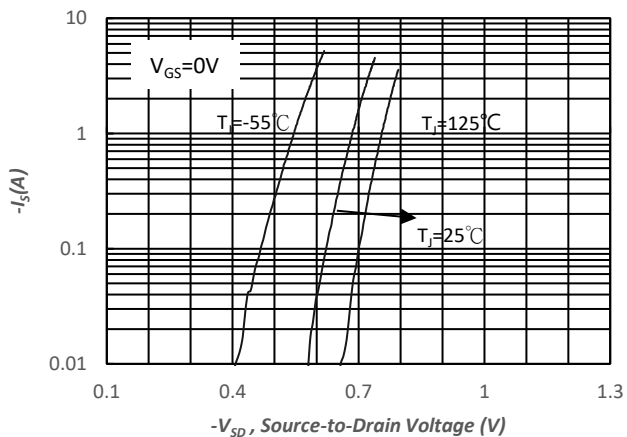


Fig.5 Forward Characteristic of Reverse Diode

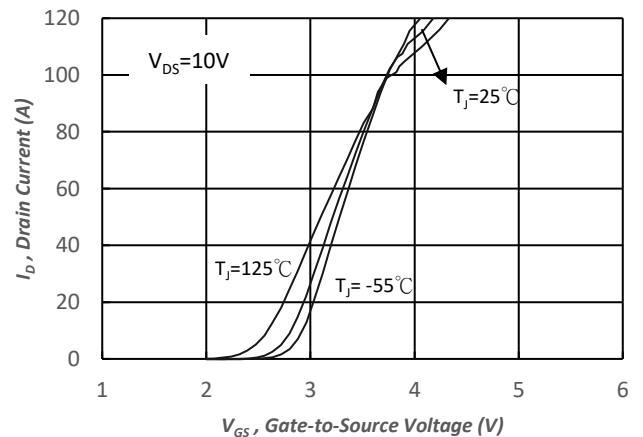


Fig.6 Transfer Characteristics

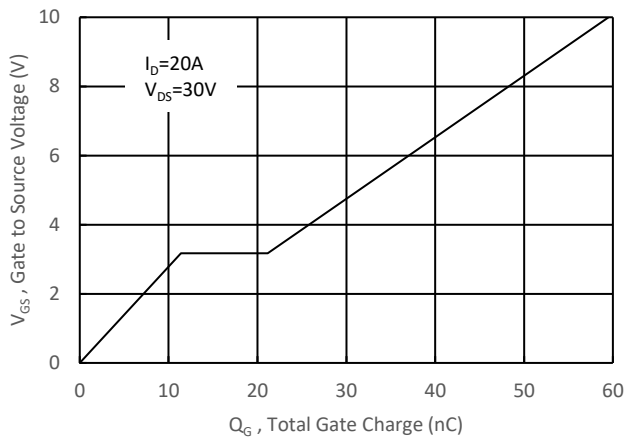


Fig.7 Gate Charge Characteristics

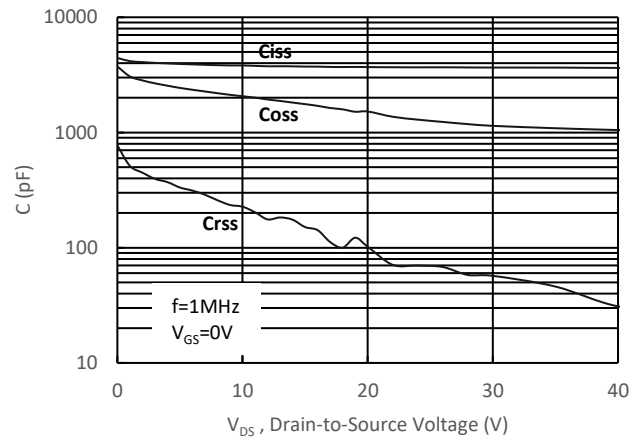


Fig.8 Typical Capacitance Characteristics

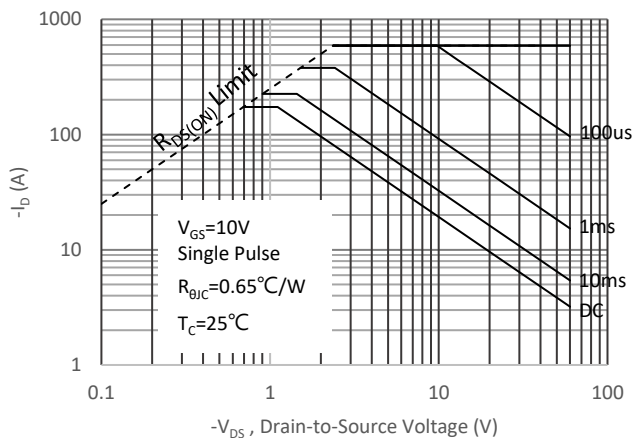


Fig.9. Maximum Safe Operating Area

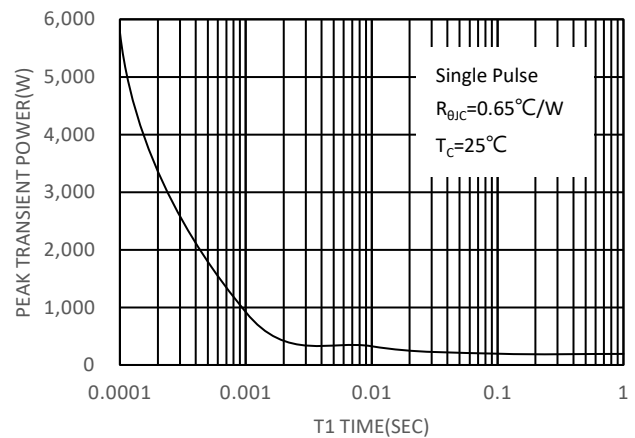


Fig.10. Single Pulse Maximum Power Dissipation

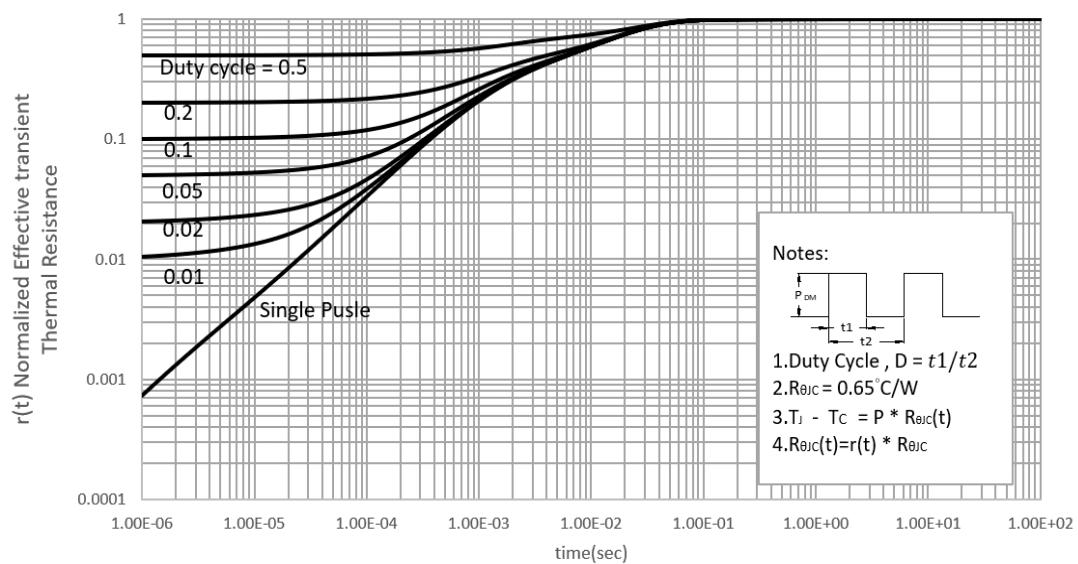
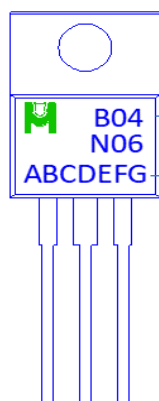


Fig.11. Effective Transient Thermal Impedance

Ordering & Marking Information:

Device Name: EMB04N06E for TO-220



B04N06: Device Name

ABCDEFG: Date Code

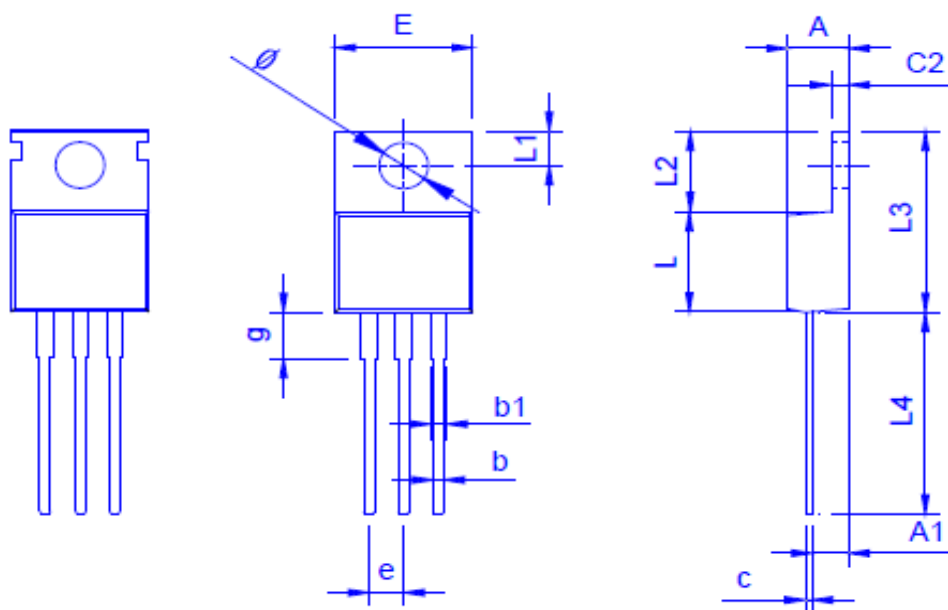
A: Assembly House

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

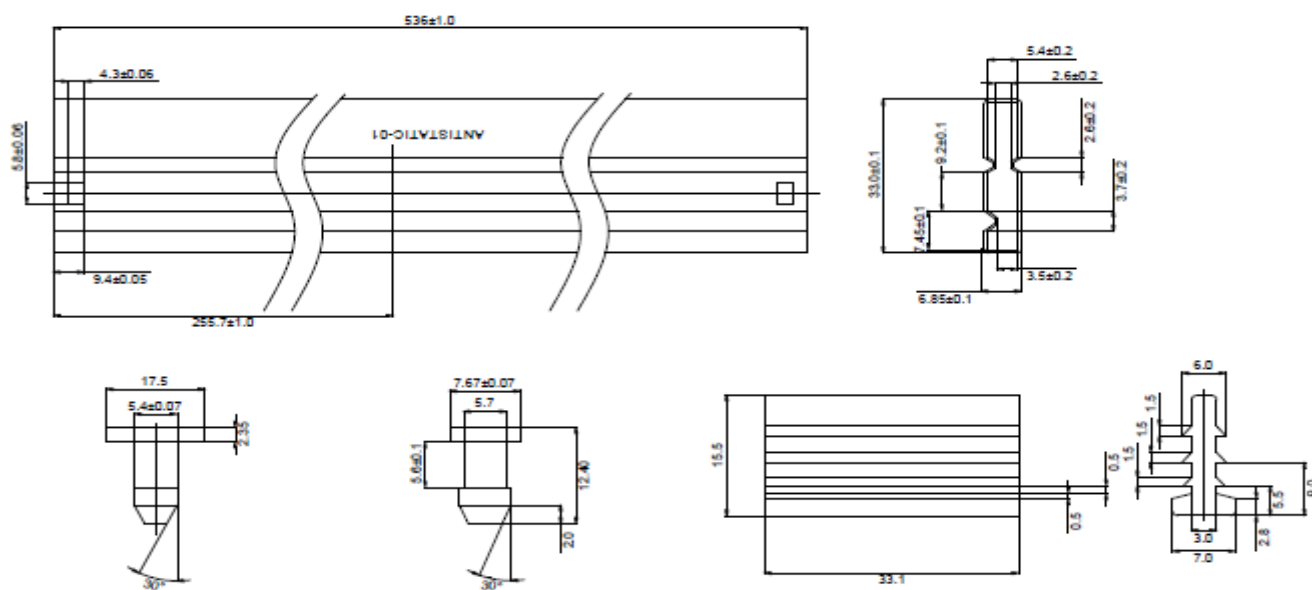


Dimension	A	A1	b	b1	c	c2	E	L	L1	L2	L3	L4	φ
Min.	4.07	2.04	0.6	1.15	0.31	1.11	9.9	8.3	2.5	6	14.3	12.7	3.4
Typ.	4.44	2.4	0.8	1.27	-	1.27	10.16	-	2.74	6.3	15	13.4	3.84
Max.	4.82	3	1	1.75	0.65	1.41	11.5	9.75	3.25	6.8	16.9	14.5	4

Dimension	e	g
Min.	2.04	2.85
Typ.	2.54	3.71
Max.	3.04	4.1



◆ Tape&Reel Information : 50pcs / Tube (1000pcs/Box)



產品別	TO-220F / TO-220
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	50ea
管/內盒比	20:1
內盒滿箱數	1K
內盒/外箱比	4:1
外箱滿箱數	4K