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

EMB02K03HP

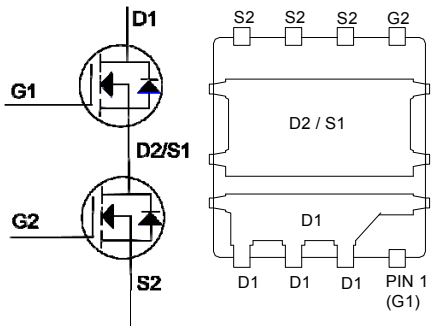
N-Channel Logic Level Enhancement Mode Field Effect Transistor

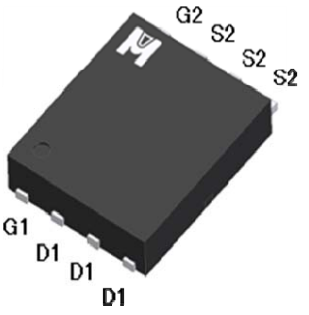
Product Summary:

	N-CH-Q1	N-CH-Q2
BV_{DSS}	30V	30V
$R_{DSON\ (MAX.)}$	5.5mΩ	2.6mΩ
I_D	50A	83A

UIS, Rg 100% Tested

Pb-Free Lead Plating & Halogen Free





GREEN PRODUCT

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

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS Q1	LIMITS Q2	UNIT
Gate-Source Voltage		V_{GS}	±20	±20	V
Continuous Drain Current[3]	T_C = 25 °C	I_D	50	83	A
	T_C = 100 °C		31	52	
Pulsed Drain Current[1]		I_{DM}	90	150	
Avalanche Current		I_{AS}	30	63	
Avalanche Energy	L = 0.1mH, R_G=25Ω	E_{AS}	45	198	mJ
Repetitive Avalanche Energy[2]	L = 0.05mH	E_{AR}	22	99	
Power Dissipation	T_C = 25 °C	P_D	48	100	W
	T_C = 100 °C		19	40	
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	1.25	°C / W
Junction-to-Ambient	$R_{\theta JA}$	Steady State		62	55	
	$R_{\theta JA}$	t ≦ 10 s		27	24	

[1]Pulse width limited by maximum junction temperature.

[2]Duty cycle ≤ 1%

[3]Package limitation current, Q1=25A, Q2=36A

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

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

PARAMETER	SYMBOL	TEST CONDITIONS		LIMITS MIN	LIMITS TYP	LIMITS MAX	UNIT
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	50			A
			Q2	83			
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 16A	Q1		4.4	5.5	mΩ
		V_{GS} = 10V, I_D = 25A	Q2		2.2	2.6	
		V_{GS} = 4.5V, I_D = 10A	Q1		6.2	8	
		V_{GS} = 4.5V, I_D = 15A	Q2		3.0	3.7	
Forward Transconductance[1]	g_{fs}	V_{DS} = 5V, I_D = 16A	Q1		50		S
		V_{DS} = 5V, I_D = 25A	Q2		70		
DYNAMIC							
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz	Q1		1508		pF
			Q2		3813		
Output Capacitance	C_{oss}		Q1		219		
			Q2		540		
Reverse Transfer Capacitance	C_{rss}		Q1		167		
			Q2		440		
Gate Resistance	R_g	V_{GS} = 15mV, V_{DS} = 0V, f = 1MHz	Q1		1.0		Ω
			Q2		1.5		
Total Gate Charge[1,2]	Q_g(V_{GS}=10V)	V_{DD} = 15V, V_{GS} = 10V, I_D = 16A	Q1		25		nC
			Q2		59		
	Q_g(V_{GS}=4.5V)		Q1		13		
			Q2		28		

Gate-Source Charge[1,2]	Q_{gs}	V_{DD} = 15V, V_{GS} = 10V, I_D = 25A	Q1		5		
			Q2		13		
Gate-Drain Charge[1,2]	Q_{gd}		Q1		5.3		
			Q2		11		
Turn-On Delay Time[1,2]	$t_{d(on)}$	V_{DD} = 15V, I_D = 1A, V_{GS} = 10V, R_{GS} = 2.7Ω	Q1		20		nS
			Q2		25		
Rise Time[1,2]	t_r		Q1		15		
			Q2		16		
Turn-Off Delay Time[1,2]	$t_{d(off)}$		Q1		55		
			Q2		60		
Fall Time[1,2]	t_f		Q1		20		
			Q2		25		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_J = 25 °C)							
Continuous Current	I_S		Q1			15	A
			Q2			25	
Pulsed Current[3]	I_{SM}		Q1			60	
			Q2			100	
Forward Voltage[1]	V_{SD}	I_F = 10A, V_{GS} = 0V	Q1			1.2	V
			Q2			1.2	
Reverse Recovery Time	t_{rr}	Q1 I_F = 16A, dI_F/dt = 100A / μS	Q1		30		nS
			Q2		35		
Reverse Recovery Charge	Q_{rr}	Q2 I_F = 25A, dI_F/dt = 100A / μS	Q1		18		nC
			Q2		25		

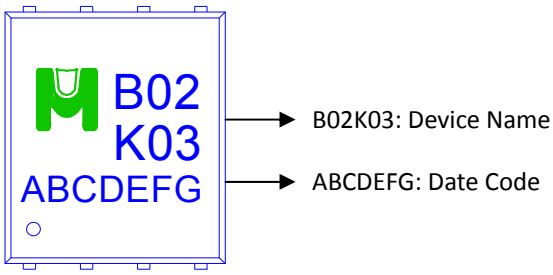
[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

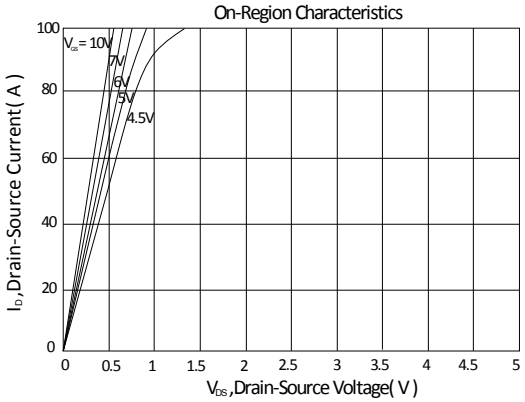
[3]Pulse width limited by maximum junction temperature.

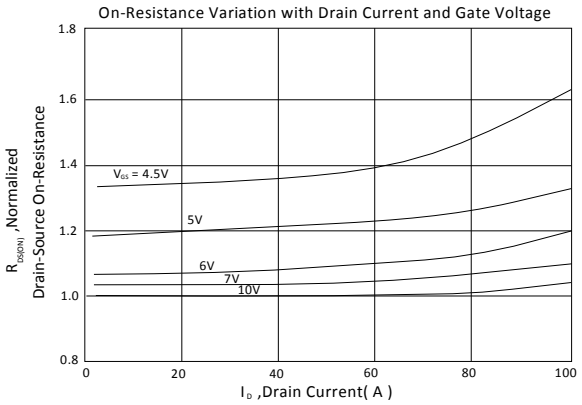
Ordering & Marking Information:

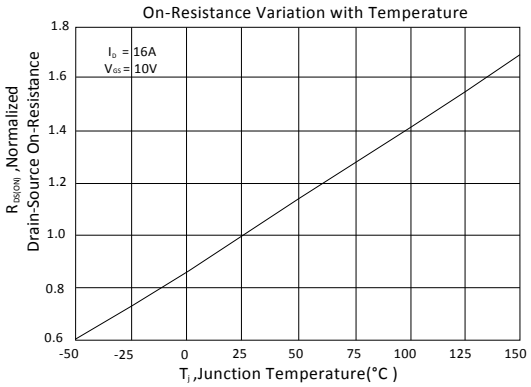
Device Name: EMB02K03HP for Asymmetric Dual EDFN 5 x 6

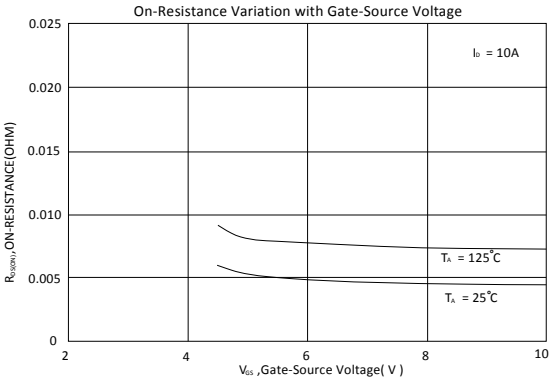


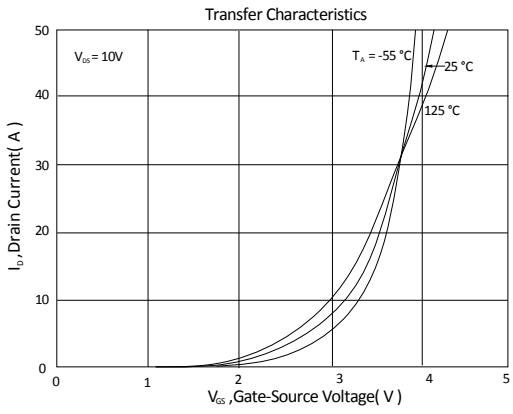
Q1 TYPICAL CHARACTERISTICS

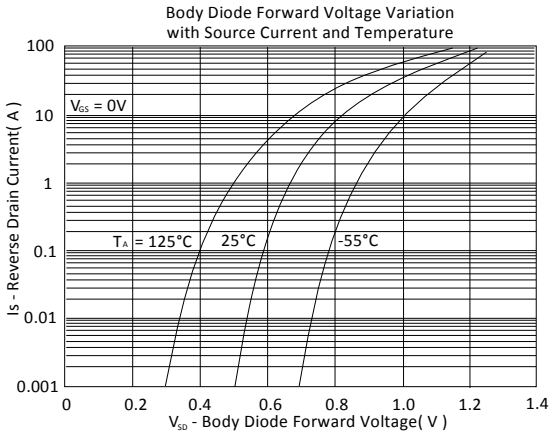


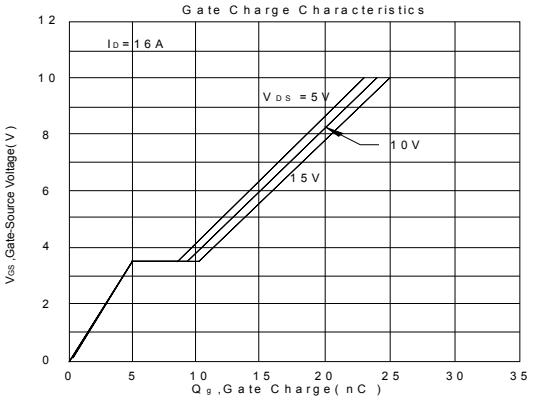


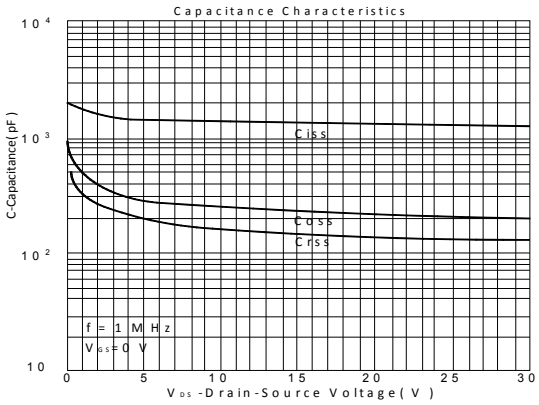


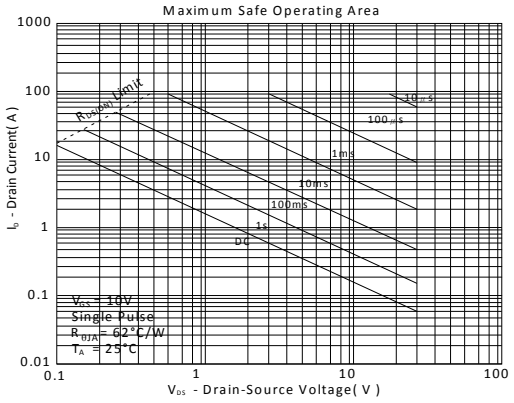


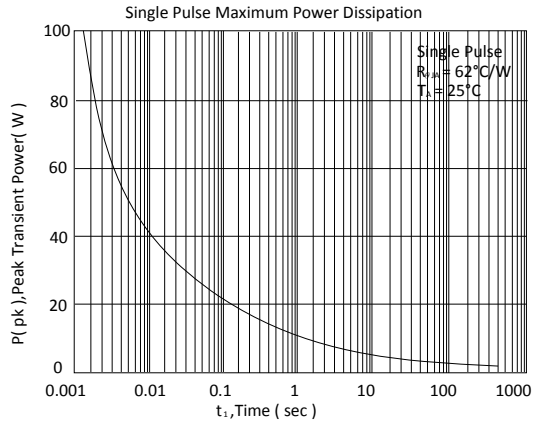


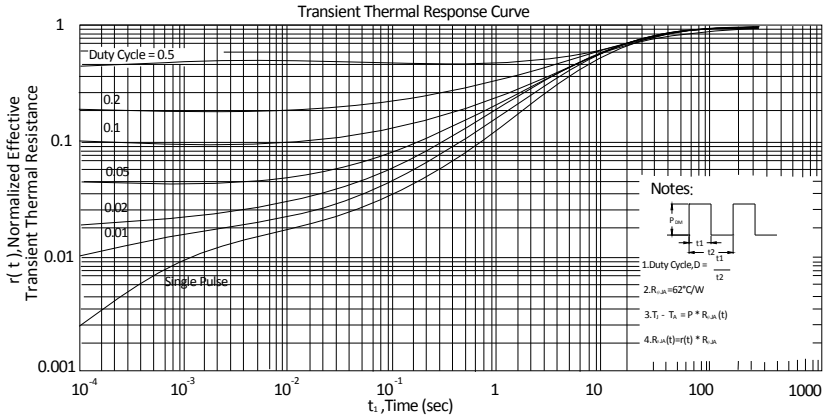



Gate Charge Characteristics
I D = 1 6 A
V D S = 5 V
1 0 V
1 5 V
V GS ,Gate-Source Voltage(V)
Q g ,Gate Charge(nC)


Capacitance Characteristics
C iss
C oss
C rss
f = 1 M Hz
V G S = 0 V
C-Capacitance(pF)
V D S -Drain-Source Voltage(V)

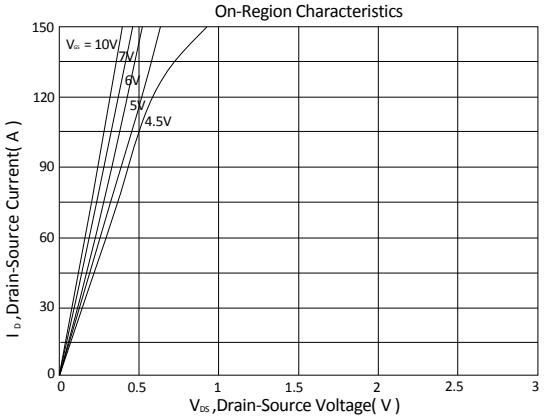

Maximum Safe Operating Area
R DS(ON) Limit
10μs
100μs
1ms
10ms
100ms
1s
DC
V GS = 10V
Single Pulse
R θJA = 62°C/W
T A = 25°C
I D - Drain Current(A)
V D S - Drain-Source Voltage(V)


Single Pulse Maximum Power Dissipation
Single Pulse
R θJA = 62°C/W
T A = 25°C
P(pk),Peak Transient Power(W)
t 1 ,Time (sec)

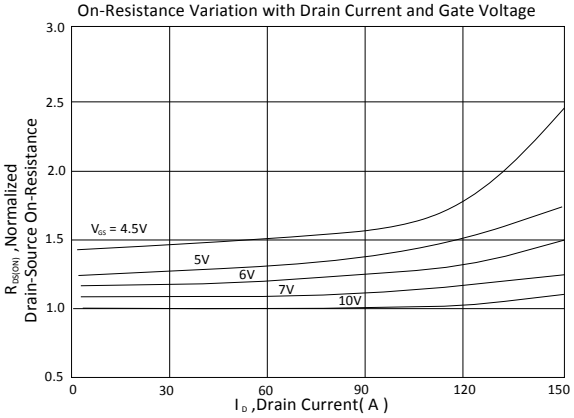

Transient Thermal Response Curve
Duty Cycle = 0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
Notes:
1.Duty Cycle,D =
2.R θJA=62°C/W
3.T J - T A = P * R θJA (t)
4.R θJA(t)=r(t) * R θJA
r(t),Normalized Effective Transient Thermal Resistance
t 1 ,Time (sec)

Q2 TYPICAL CHARACTERISTICS

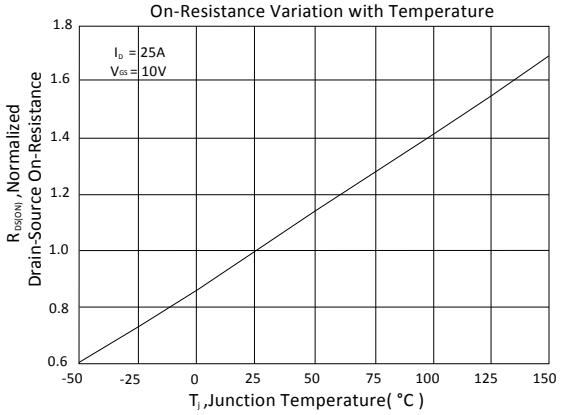
On-Region Characteristics



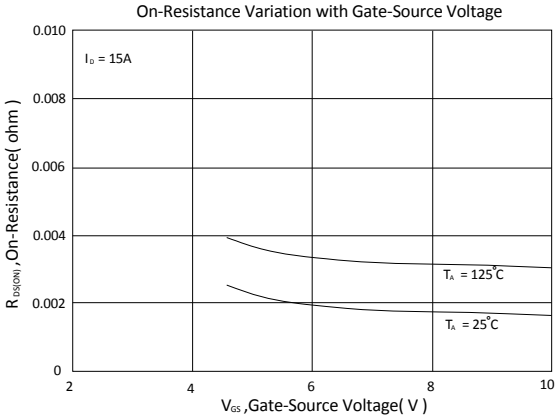
On-Resistance Variation with Drain Current and Gate Voltage



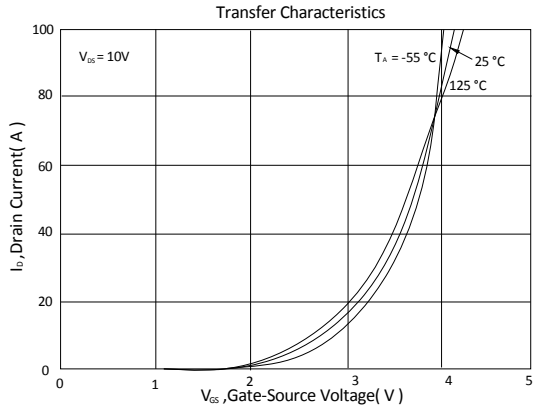
On-Resistance Variation with Temperature



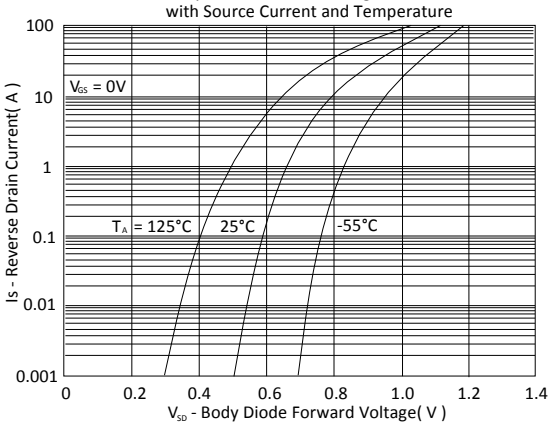
On-Resistance Variation with Gate-Source Voltage

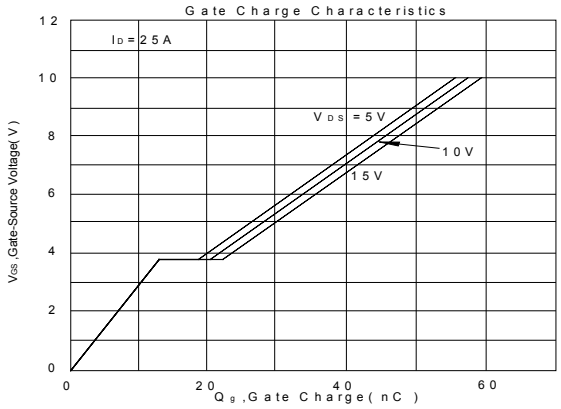


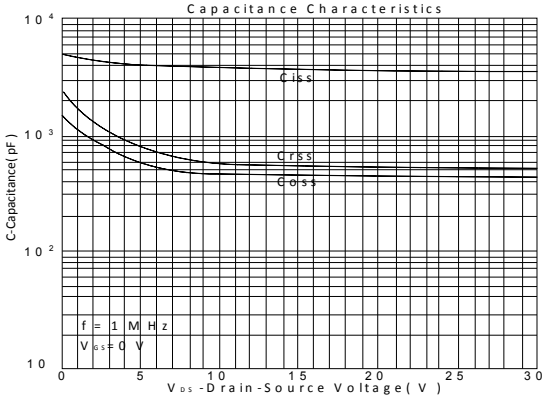
Transfer Characteristics

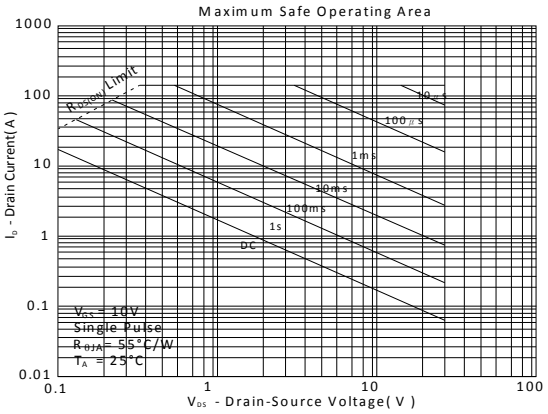


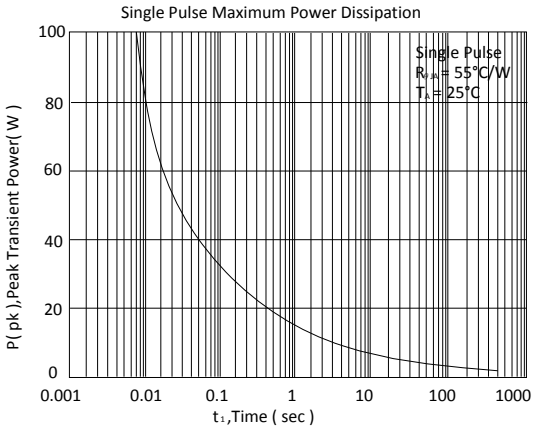
Body Diode Forward Voltage Variation with Source Current and Temperature

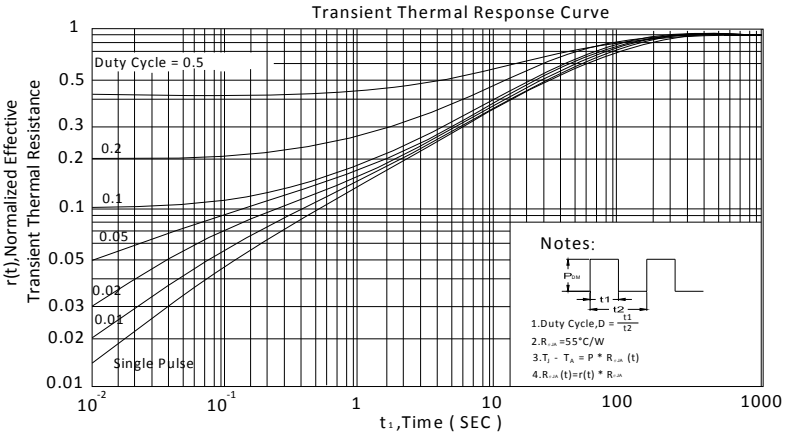



Gate Charge Characteristics
ID = 2.5A
VDS = 5V
10V
15V
VGS ,Gate-Source Voltage(V)
Qg ,Gate Charge(nC)

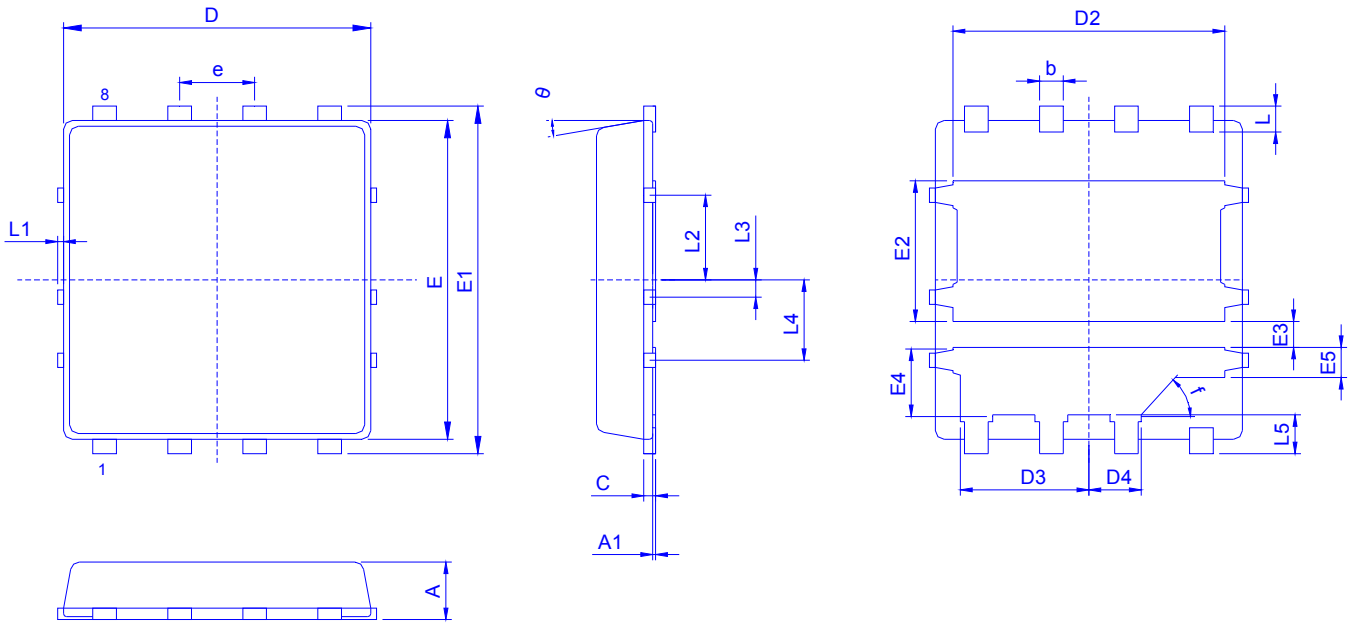

Capacitance Characteristics
Ciss
Crss
Coss
f = 1 MHz
VGS = 0 V
C-Capacitance(pF)
VDS -Drain-Source Voltage(V)


Maximum Safe Operating Area
RDS(ON) Limit
100μs
1ms
10ms
100ms
1s
DC
VGS = 10V
Single Pulse
RθJA= 55°C/W
TA = 25°C
ID - Drain Current(A)
VDS - Drain-Source Voltage(V)


Single Pulse Maximum Power Dissipation
Single Pulse
RθJA = 55°C/W
TA = 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.RθJA =55°C/W
3.TJ - TA = P * RθJA (t)
4.RθJA (t)=r(t) * RθJA
r(t),Normalized Effective Transient Thermal Resistance
t1,Time (SEC)

Outline Drawing



Dimension in mm

Dimension	A	A1	b	c	D	D2	D3	D4	E	E1	E2	E3	E4	E5
Min.	0.85	0.00	0.35	0.15		4.5	2.125	0.835			2.4	0.40	1.125	0.475
Typ.	0.90		0.40	0.20	5.2	4.6	2.175	0.885	5.55	6.05	2.45	0.45	1.175	0.525
Max.	1.00	0.05	0.45	0.25		4.7	2.225	0.935			2.5	0.50	1.225	0.575

Dimension	e	L	L1	L2	L3	L4	L5	F	θ
Min.		0.35	0	1.375	0.2	1.3	0.575		0°
Typ.	1.27	0.45		1.475	0.3	1.4	0.675	45°	
Max.		0.55	0.1	1.575	0.4	1.5	0.775		10°

Recommended minimum pads