SE18NS65
N-Channel Enhancement-Mode MOSFET

Revision: A

General Description

Thigh Density Cell Design For Ultra Low On-Resistance Fully Characterized Avalanche Voltage and Current Improved Shoot-Through FOM

- Simple Drive Requirement
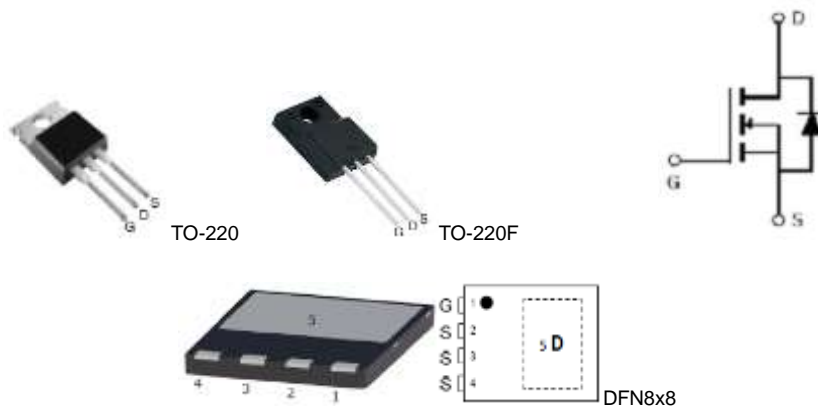- Small Package Outline
- Surface Mount Device

Features

For a single MOSFET

- V_{DS} = 650V
- $R_{DS(ON)}$ = 200mΩ @ V_{GS}=10V

Pin configurations

See Diagram below

TO-220   TO-220F

DFN8x8

Absolute Maximum Ratings

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Voltage		V_{GS}	±30	V
Drain Current	Continuous	I_D	18	A
	Pulsed		50	
Avalanche Energy, Single Pulse		E_{AS}	320	mJ
Avalanche Current, Repetitive		I_{AR}	2.2	A
Total Power Dissipation	@TA=25℃	P_D	156	W
Operating Junction Temperature Range		T_J	-55 to 150	℃

Thermal Resistance

Symbol	Parameter	Min	Typ	Units
$R_{θJC}$	Junction to Case		0.6	℃/W
$R_{θJA}$	Junction to Ambient (t≦10s)		62	℃/W

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Electrical Characteristics (TJ=25℃ unless otherwise noted)						
Symbol	**Parameter**	**Test Conditions**	**Min**	**Typ**	**Max**	**Units**
OFF CHARACTERISTICS (Note 2)						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250μA, V_{GS}=0 V	650			V
I_{DSS}	Drain to Source Leakage Current	V_{DS}=650V, V_{GS}=0V			1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=30V			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250μA	2.5		4.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance [2]	V_{GS}=10V, I_D=8.5A		200	260	mΩ
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		800		pF
C_{oss}	Output Capacitance			180		pF
C_{rss}	Reverse Transfer Capacitance			8		pF
SWITCHING PARAMETERS						
Q_g	Total Gate Charge [2]	V_{GS}=10V, V_{DS}=480V, I_D=6.5A		43		nC
Q_{gs}	Gate Source Charge			5		nC
Q_{gd}	Gate Drain Charge			22		nC
$t_{d(on)}$	Turn-On Delay Time	V_{GS}=10V, V_{DS}=400V, R_{GEN}=20Ω I_D=6.5A		13		ns
$t_{d(off)}$	Turn-Off Delay Time			100		ns
$t_{d(r)}$	Turn-On Rise Time			11		ns
$t_{d(f)}$	Turn-Off Fall Time			12		ns
Source-Drain Characteristics						
Symbol	**Parameter**	**Test Condition**	**Min**	**Typ**	**Max**	**Units**
V_{SD}	Diode forward voltage	V_{GS}=0V, I_S=7.5A		0.85		V
I_{rrm}	Peak Reverse Recovery Current	V_R=400V, I_F=7.5A di/dt=100A/μs		21		A
T_{rr}	Reverse recovery time[7]			405		ns
Q_{rr}	Reverse recovery charge[7]			4.0		μC

Test Circuits and Waveform

Switching times test circuit for inductive load

Switching time waveform

Unclamped inductive load test circuit

Unclamped inductive waveform

Test Circuits and Waveform

Test circuit for diode characteristics

$R_{G1} = R_{G2}$

Diode recovery waveform

$$t_{rr} = t_S + t_F$$
$$Q_{rr} = Q_S + Q_F$$

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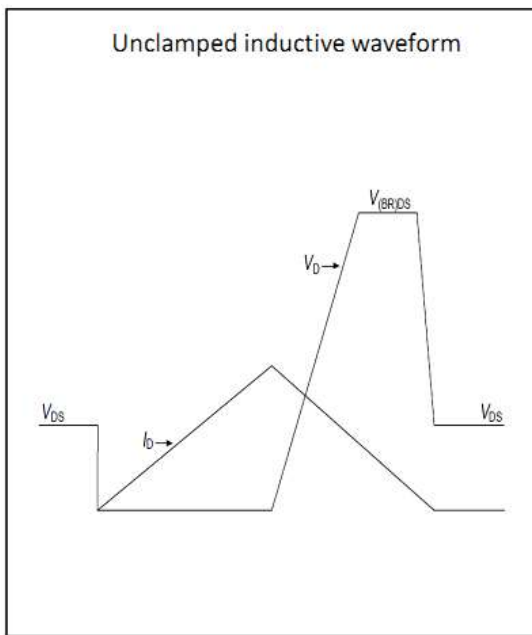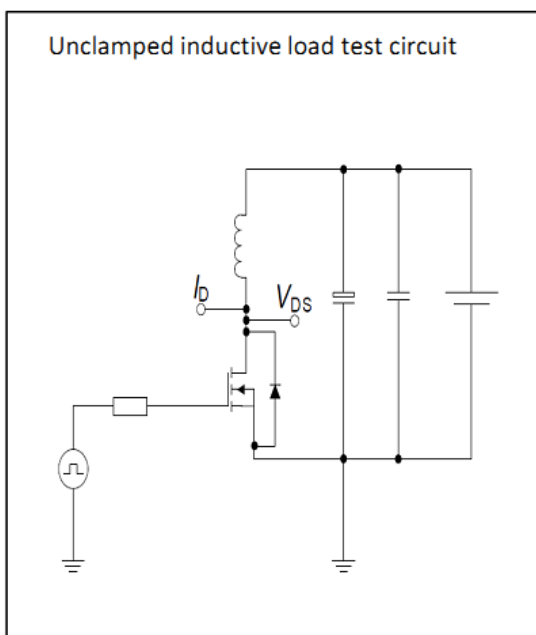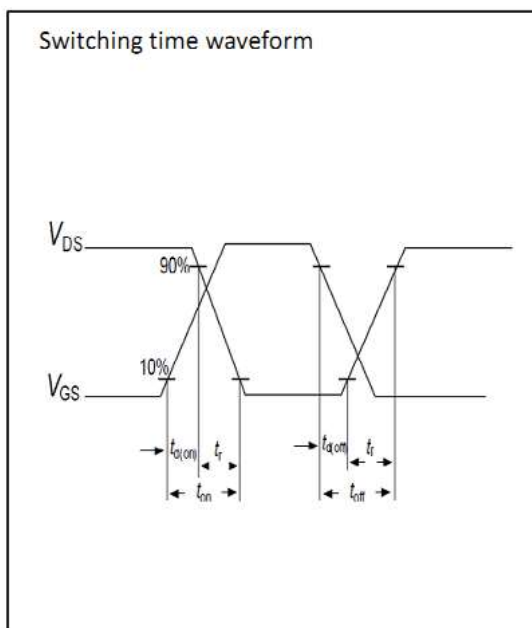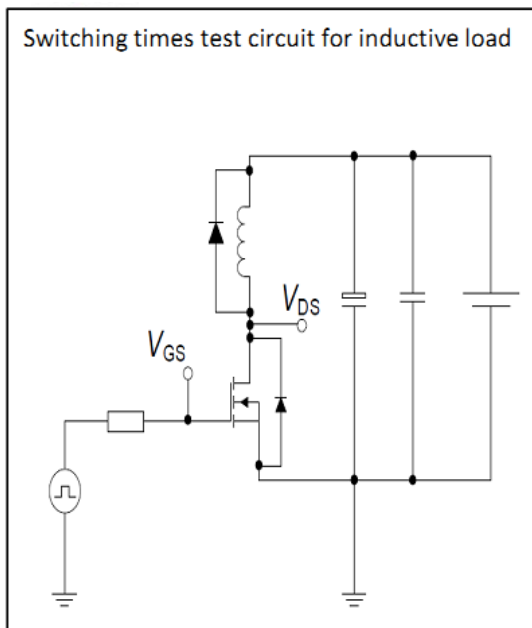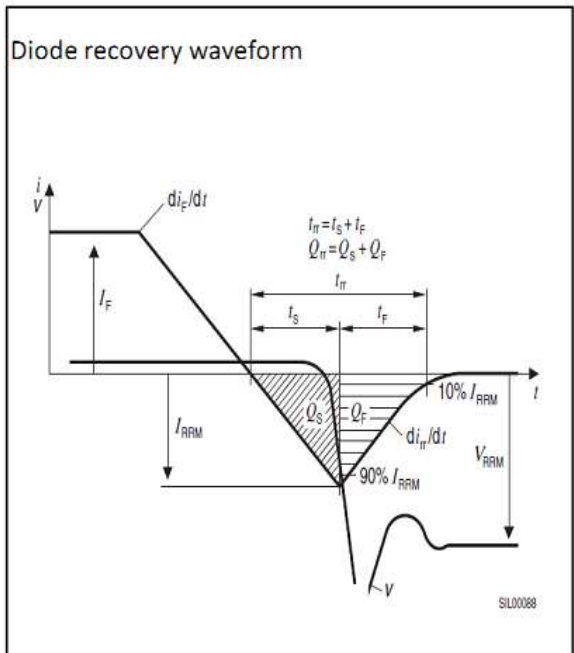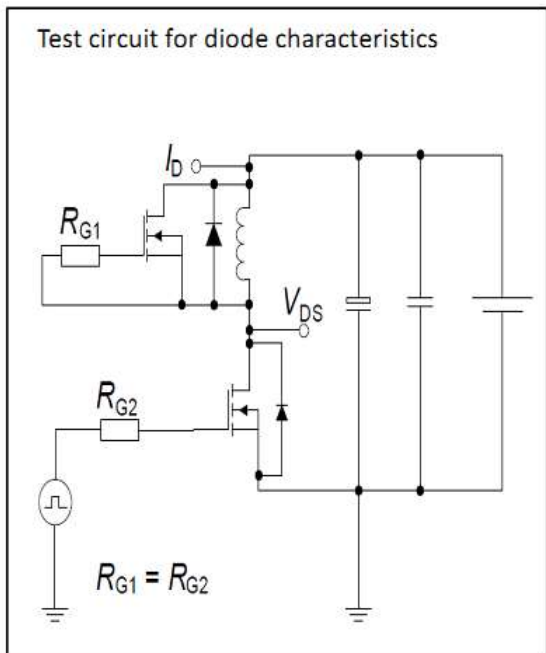
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Typical Characteristics

Power Dissipation

$P_{tot} = f(T_C)$
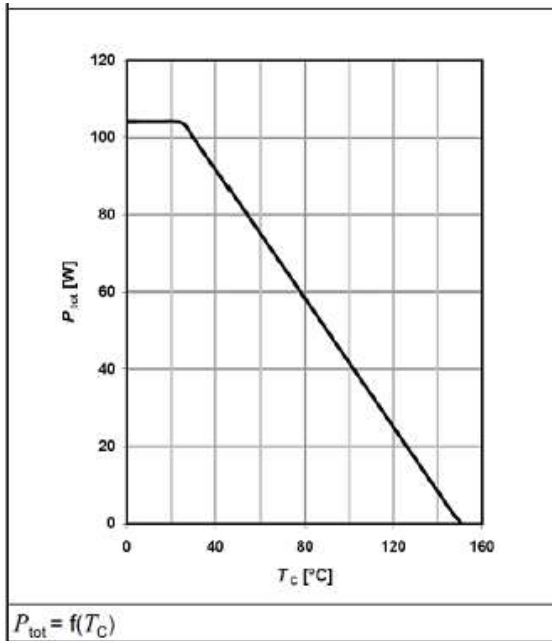
Max. transient thermal impedance

$Z_{(thJC)} = f(tp)$; parameter: $D = t_p/T$
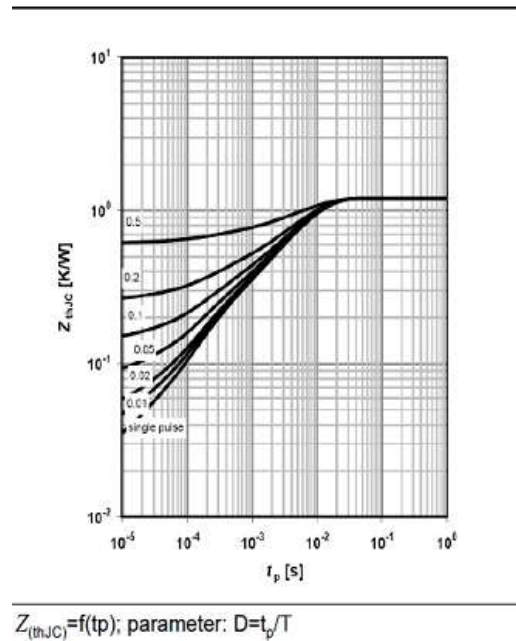
Safe operation area TC=25℃

$I_D = f(V_{DS})$; $T_C = 25$ °C; D=0; parameter t_p
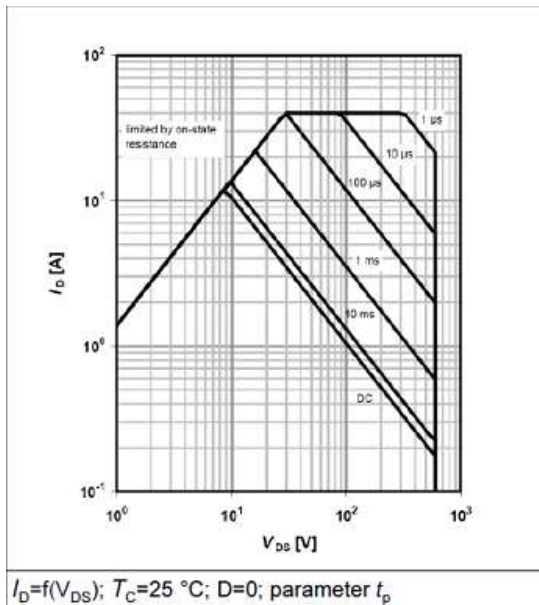
Typ.output characteristics

$I_D = f(V_{DS})$; $T_j = 25$ °C; parameter: V_{GS}

ShangHai Sino-IC Microelectronic Co., Ltd.
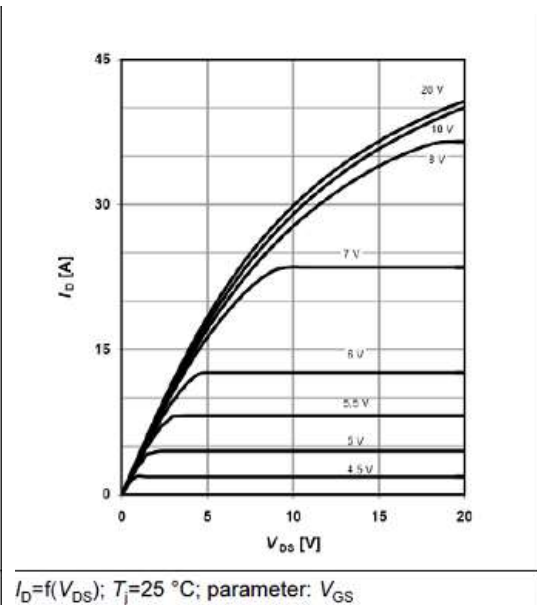
Typ. drain-source on-state resistance
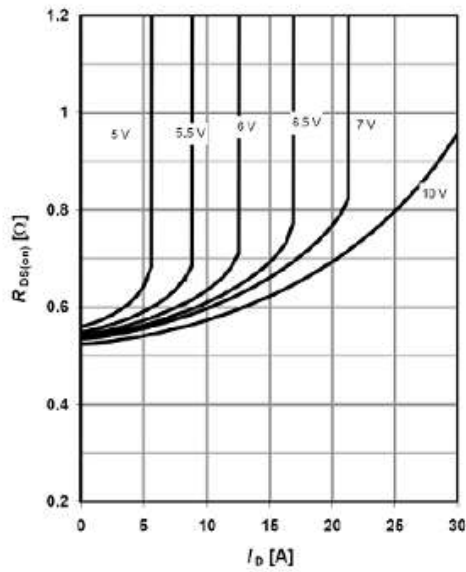
$R_{DS(on)}$=f(I_D); T_j=125 °C; parameter: V_{GS}
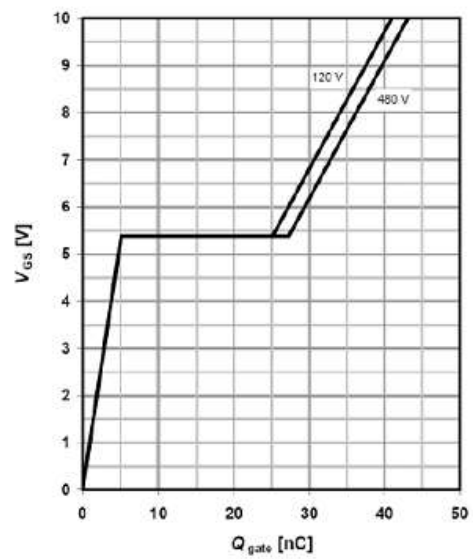
Drain-source on-state resistance
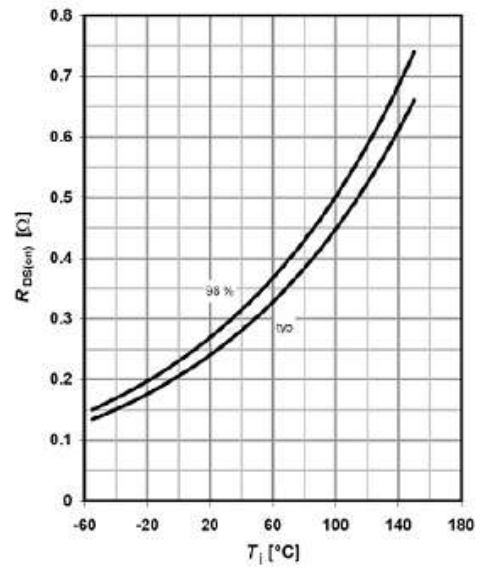
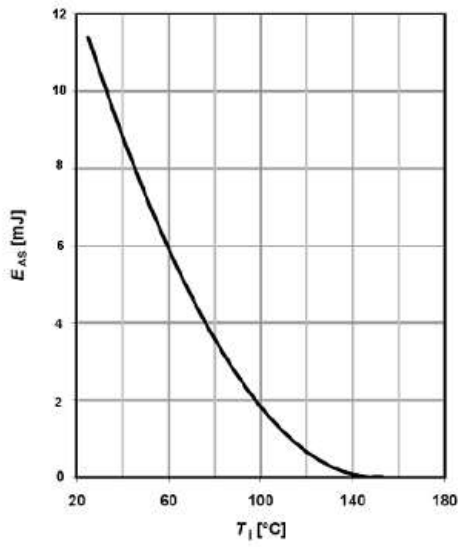$R_{DS(on)}$=f(T_j); I_D=6.5 A; V_{GS}=10 V

Typ. transfer characteristics
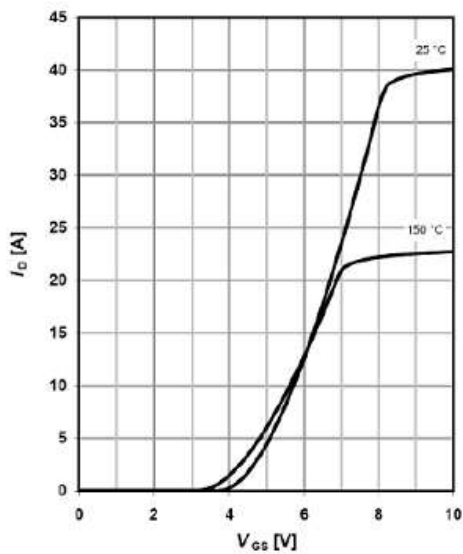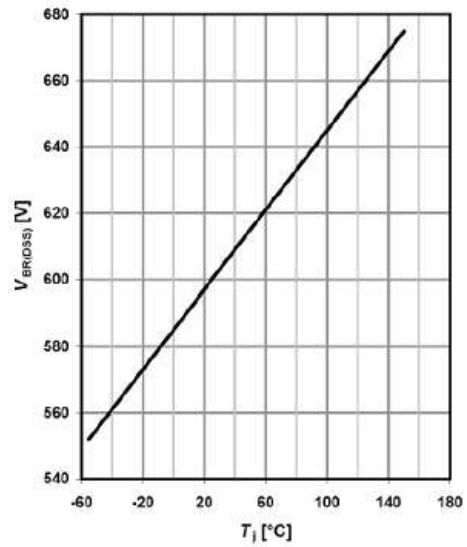
I_D=f(V_{GS}); V_{DS}=20V

Typ. gate charge

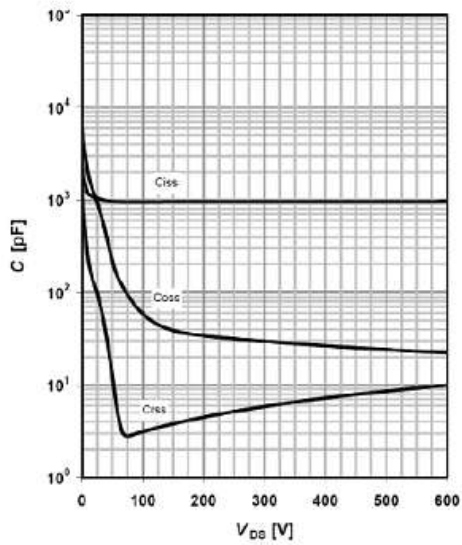V_{GS}=f(Q_{gate}), I_D=6.5A pulsed

Avalanche energy

E_{AS}=f(T_j); I_D= 6.5 A; V_{DD}=50 V

Drain-source breakdown voltage
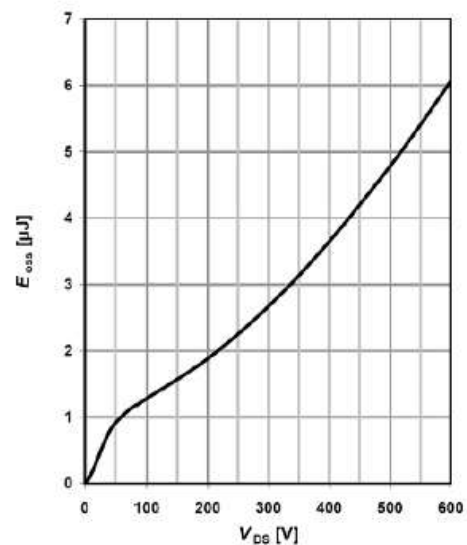

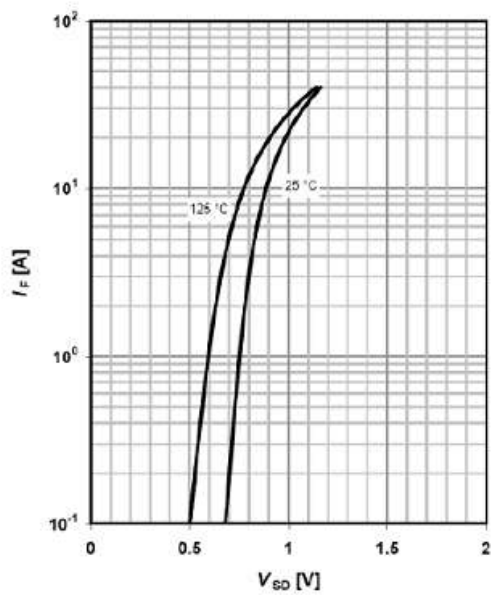$V_{BR(DSS)}$=f(T_j); I_D=0.25 mA

Typ. capacitances

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

Typ. C_{oss} stored energy

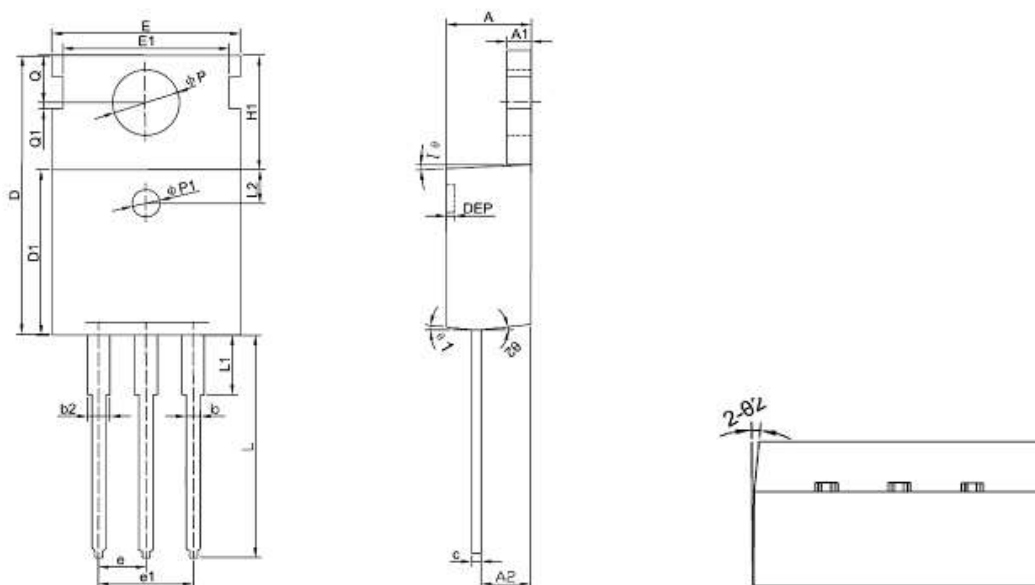E_{OSS}=f(V_{DS})

Forward characteristics of reverse diode

I_F=f(V_{SD}); parameter: T_j

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Package Outline Dimension

TO-220

Symbol	Dimension In Millimeters			Dimension In Inches		
	Min	Nom	Max	Min	Nom	Max
A	4.400	4.550	4.700	0.173	0.179	0.185
A1	1.270	1.300	1.330	0.050	0.051	0.052
A2	2.590	2.690	2.790	0.102	0.106	0.110
b	0.770	-	0.900	0.030	-	0.035
b2	1.230	-	1.360	0.048	-	0.054
c	0.480	0.500	0.520	0.019	0.020	0.020
D	15.100	15.400	15.700	-	0.606	-
D1	9.000	9.100	9.200	0.354	0.358	0.362
DEP	0.050	0.285	0.520	0.002	0.011	0.020
E	10.060	10.160	10.260	0.396	0.400	0.404
E1	-	8.700	-	-	0.343	-
ΦP1	1.400	1.500	1.600	0.055	0.059	0.063
e	2.54BSC			0.1BSC		
e1	5.08BSC			0.2BSC		
H1	6.100	6.300	6.500	0.240	0.248	0.256
L	12.750	12.960	13.170	0.502	0.510	0.519
L1	-	-	3.950	-	-	0.156
L2	1.85REF			0.073REF		
ΦP	3.570	3.600	3.630	0.141	0.142	0.143
Q	2.730	2.800	2.870	0.107	0.110	0.113
Q1	-	0.200	-	-	0.008	-
Θ1	5^0	7^0	9^0	5^0	7^0	9^0
Θ2	1^0	3^0	5^0	1^0	3^0	5^0

TO-220F
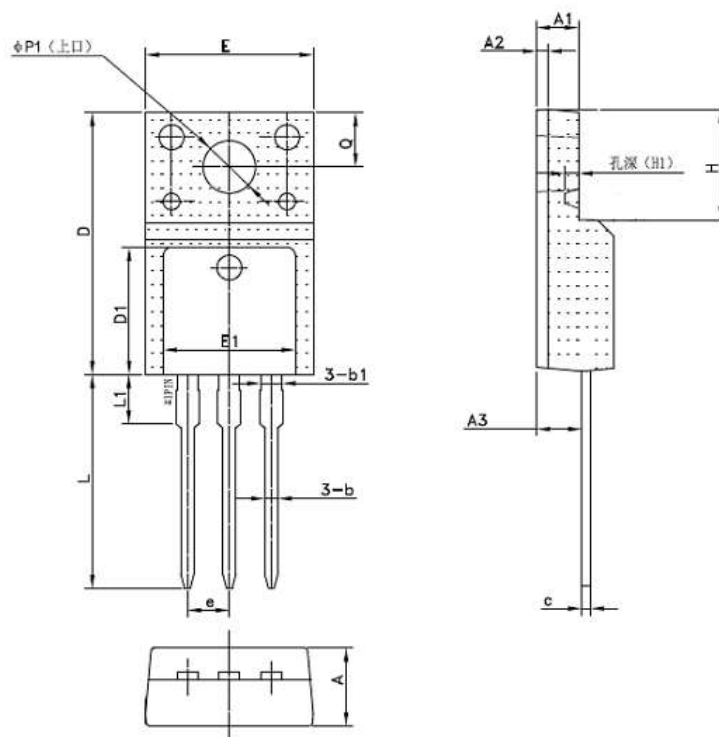
Symbol	Dimensions(mm)		
	Min.	Typ.	Max.
A	4.50	4.70	4.90
A1	2.44	2.54	2.64
A2	0.60	0.70	0.80
A3	2.56	2.76	2.96
b	0.70	0.80	0.95
b1	-	1.28	-
c	0.45	0.50	0.65
D	15.67	15.87	16.07
D1	-	7.70	-
E	9.96	10.16	10.36
E1	-	8.00	-
e	2.54(BSC)		
H	6.50	6.70	6.90
(H1)	-	(0.81)	-
L	12.48	12.98	13.20
L1	-	2.93	-
ΦP1	2.98	3.18	3.38
Q	3.10	3.30	3.50

Package Outline Dimension

DFN8x8
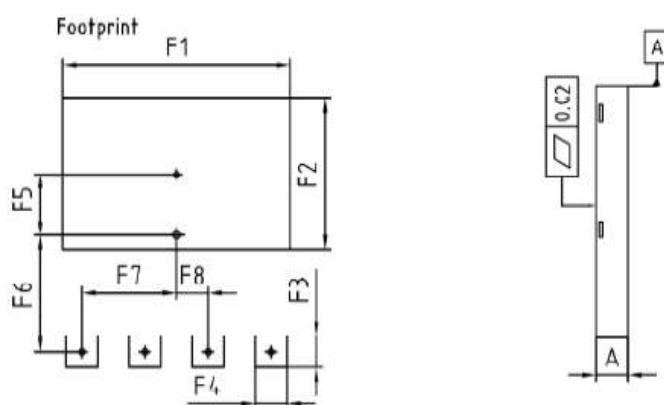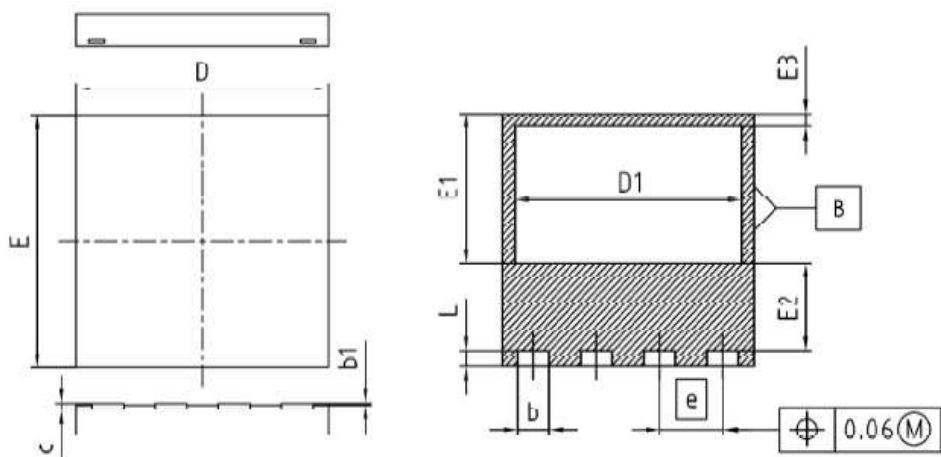
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.90	1.10	0.035	0.043
b	0.90	1.10	0.035	0.043
b1	0.00	0.05	0.000	0.002
c	0.10	0.30	0.004	0.012
D	7.90	8.10	0.311	0.319
D1	7.10	7.30	0.280	0.287
E	7.90	8.10	0.311	0.319
E1	4.65	4.85	0.183	0.191
E2	2.65	2.85	0.104	0.112
E3	0.30	0.50	0.012	0.020
e	2.00 (BSC)		0.079 (BSC)	
L	0.40	0.60	0.016	0.024
N	4		4	
F1	7.20		0.283	
F2	4.75		0.187	
F3	1.00		0.039	
F4	1.00		0.039	
F5	1.43		0.056	
F6	4.20		0.165	
F7	3.00		0.118	
F8	1.00		0.039	

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SCALE

EUROPEAN PROJECTION

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REVISION
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