SHANGHAI SINO-IC MICROELECTRONICS CO., LTD.

Apr 2015

SE18NS60

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

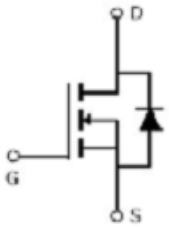
Features

For a single MOSFET

- V_{DS} = 600V
- $R_{DS(ON)}$ = 160mΩ @ V_{GS}=10V @I_{DS}=5A

Pin configurations

See Diagram below



Absolute Maximum Ratings

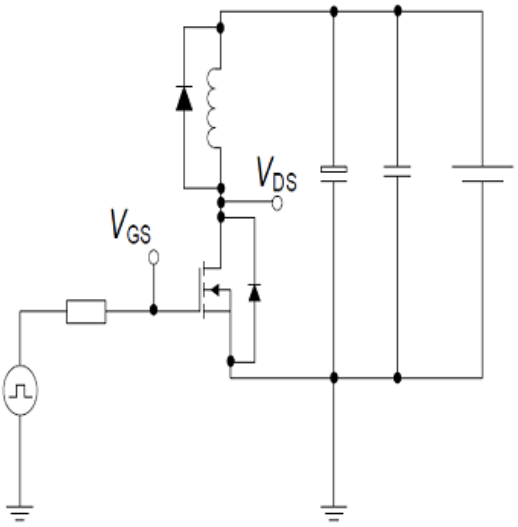
Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	600	V
Gate-Source Voltage		V_{GS}	±30	V
Drain Current	Continuous	I_D	18	A
	Pulsed		55	
Total Power Dissipation	@TA=25℃	P_D	208	W
Operating Junction Temperature Range		T_J	-55 to 150	℃

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	600			V
I_{DSS}	Drain to Source Leakage Current	V_{DS}= 600V, V_{GS}=0V			1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=30 V			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=5A		160	190	mΩ
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		1440		pF
C_{oss}	Output Capacitance			300		pF
C_{rss}	Reverse Transfer Capacitance			10		pF
SWITCHING PARAMETERS						
Q_g	Total Gate Charge [2]	V_{GS}=10V, V_{DS}=480V, I_D=10A		70	90	nC
Q_{gs}	Gate Source Charge			7.8		nC
Q_{gd}	Gate Drain Charge			9		nC
$t_{d(on)}$	Turn-On Delay Time	V_{GS}=10V, V_{DS}=400V, R_{GEN}=20Ω I_D=5A		25		ns
$t_{d(off)}$	Turn-Off Delay Time			70		ns
$t_{d(r)}$	Turn-On Rise Time			55		ns
$t_{d(f)}$	Turn-Off Fall Time			40		ns

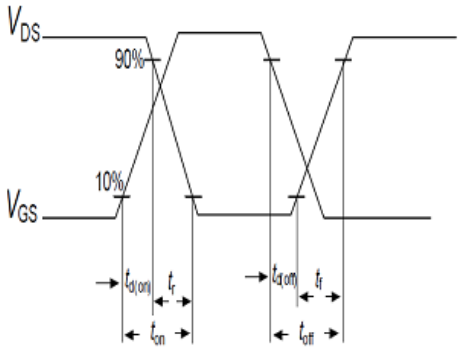
Thermal Resistance				
Symbol	**Parameter**	**Min**	**Typ**	**Units**
$R_{\theta JC}$	Junction to Case		0.6	℃/W
$R_{\theta JA}$	Junction to Ambient (t≦10s)		62	℃/W

Test Circuits and Waveform

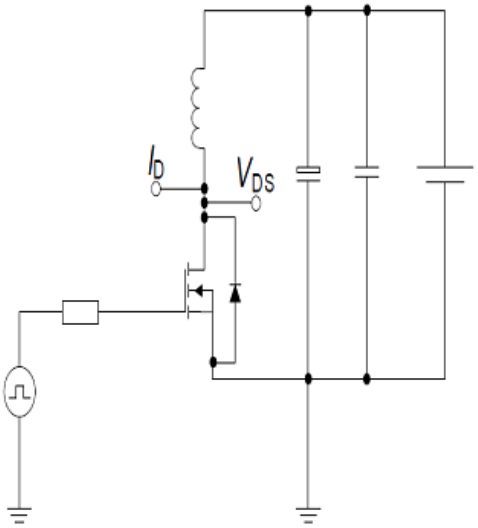
Switching times test circuit for inductive load



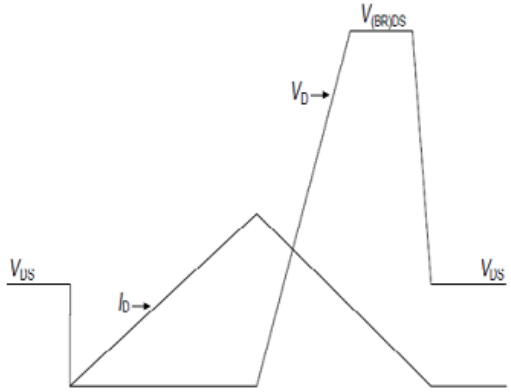
Switching time waveform



Unclamped inductive load test circuit

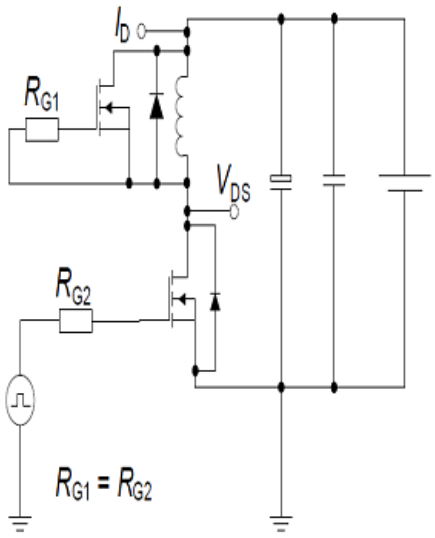


Unclamped inductive waveform

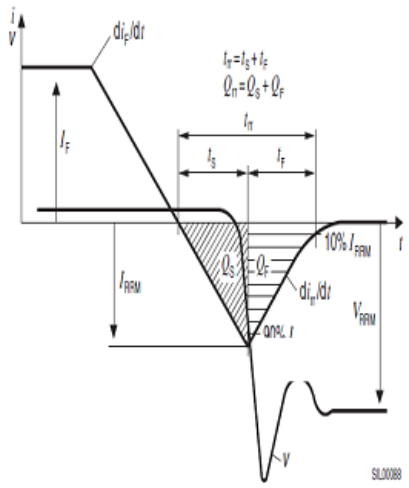


Test Circuits and Waveform

Test circuit for diode characteristics

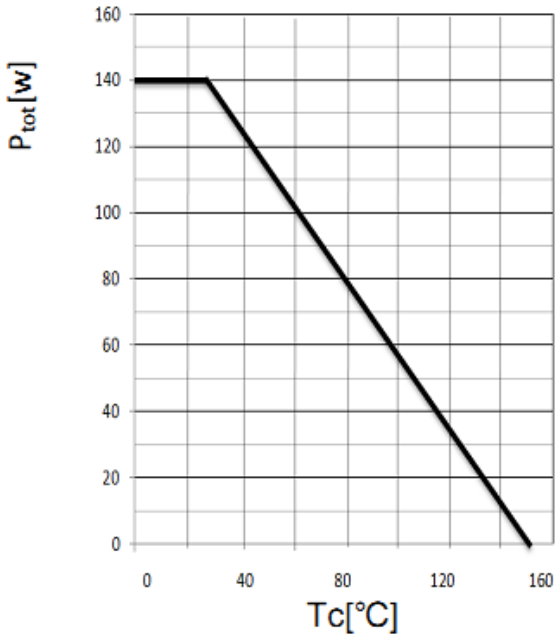


Diode recovery waveform

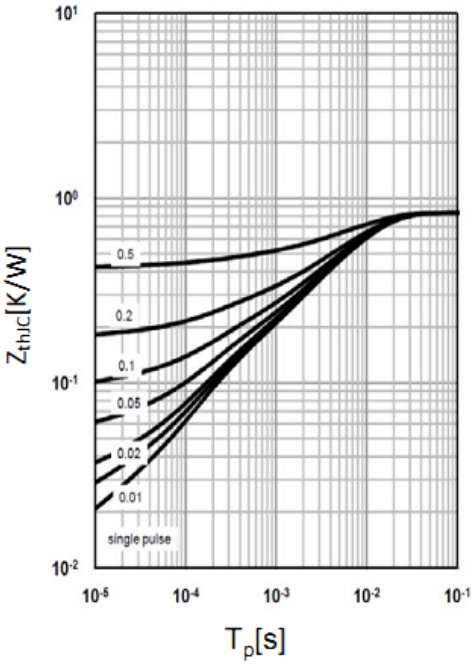


Typical Characteristics

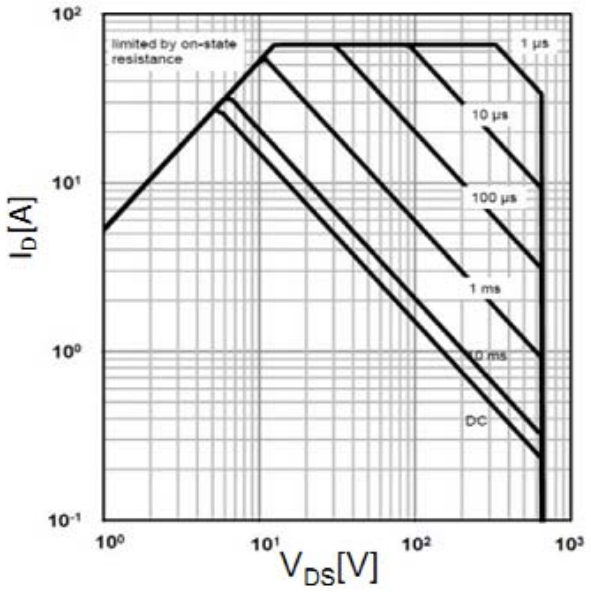
Power dissipation
TO-220P



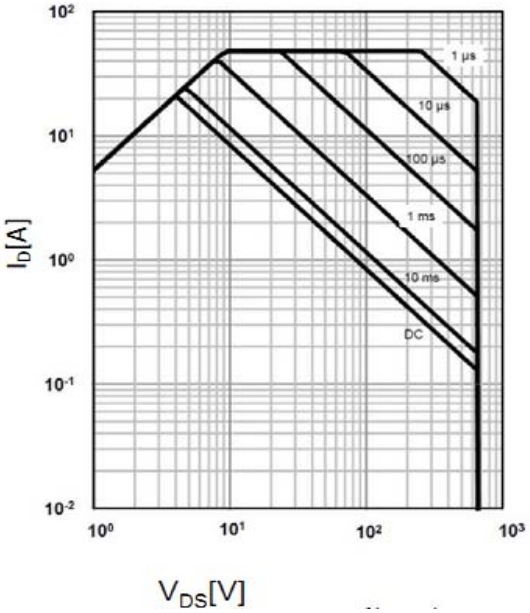
Max. transient thermal impedance
TO-220P



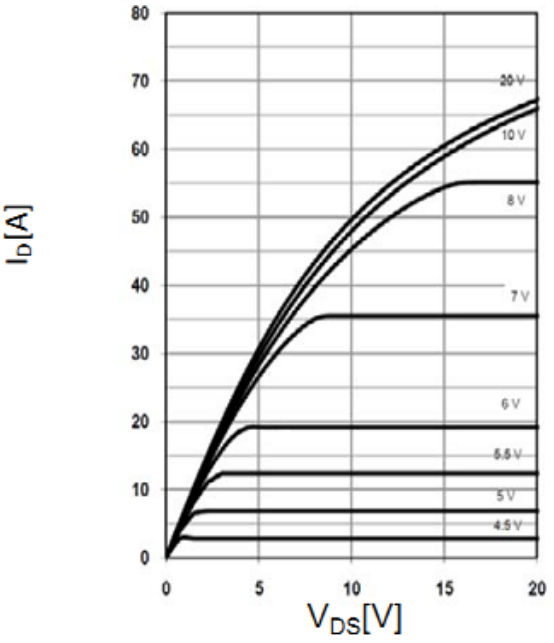
Safe operation area TC=25℃



Safe operation area TC=80℃

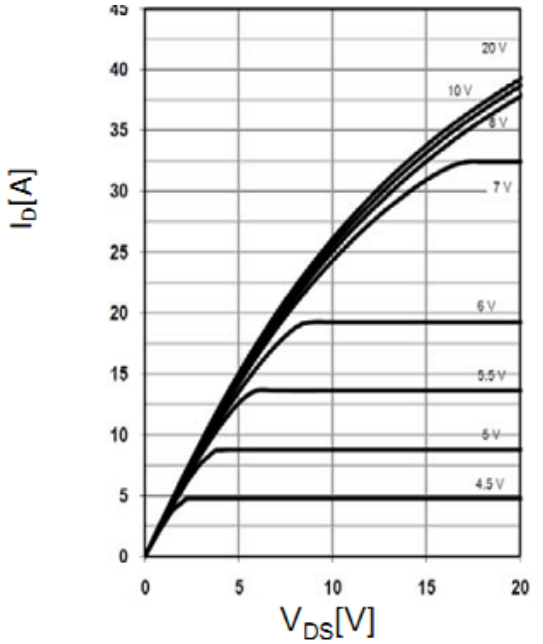


Output characteriscts at TC=25℃



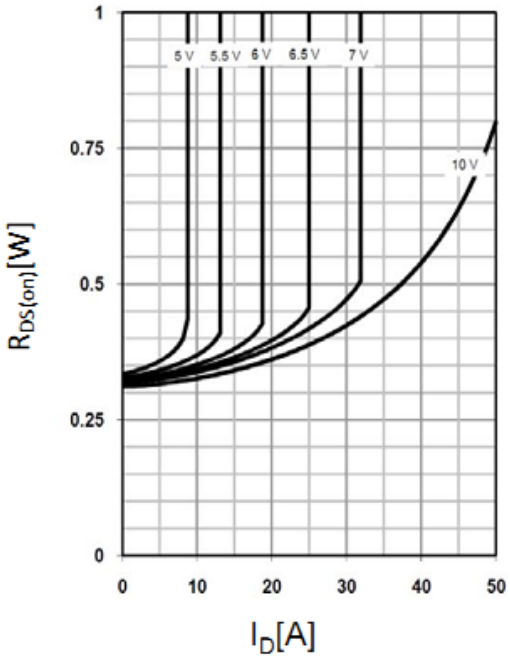
$I_D=f(V_{DS})$; T_j=25 ℃ ; parameter: V_{GS}

Output characteriscts at TC=125℃



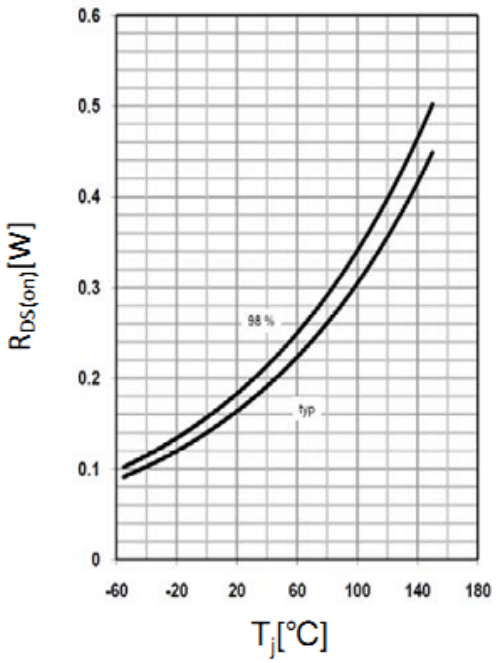
$I_D=f(V_{DS})$; T_j=125 ℃ ; parameter: V_{GS}

Typ. drain-source on-state resistance



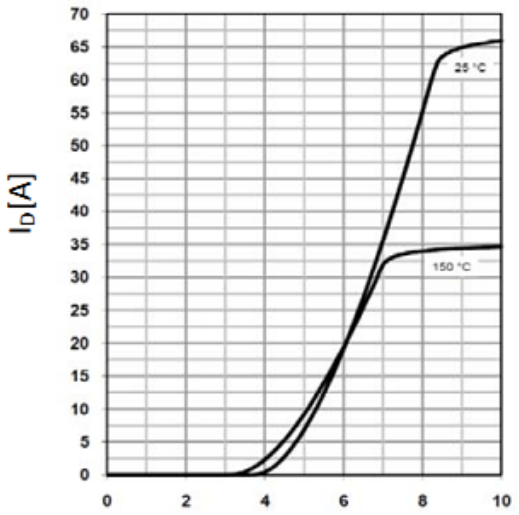
$R_{DS}(on)=f(I_D)$; T_j=125 ℃ ; parameter:V_{GS}

Typ. drain-source on-state resistance



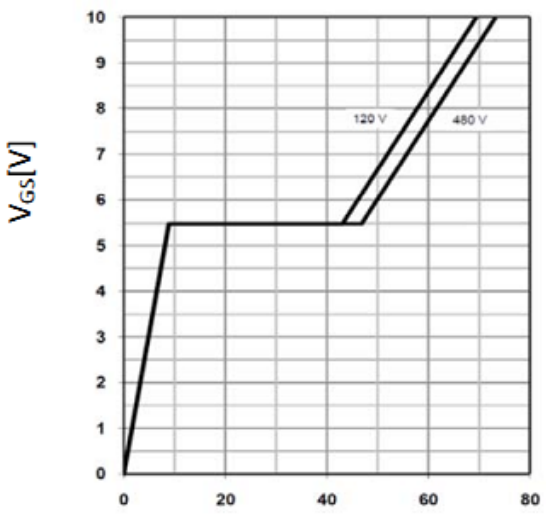
$R_{DS}(on)=f(T_j)$; I_D=7.3 A; V_{GS}=10 V

Typ. transfer characteristics



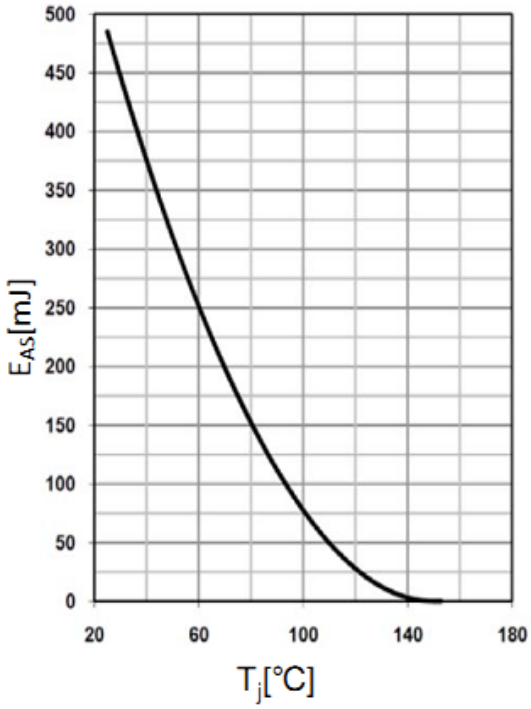
$I_D=f(V_{GS})$; V_{DS}=20V

Typ. gate charge



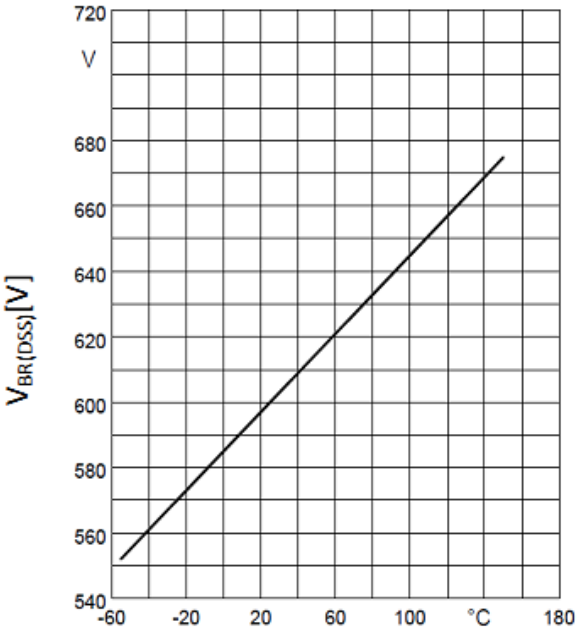
$V_{GS}=f(Q_g)$, I_D=11 A pulsed

Avalanche energy



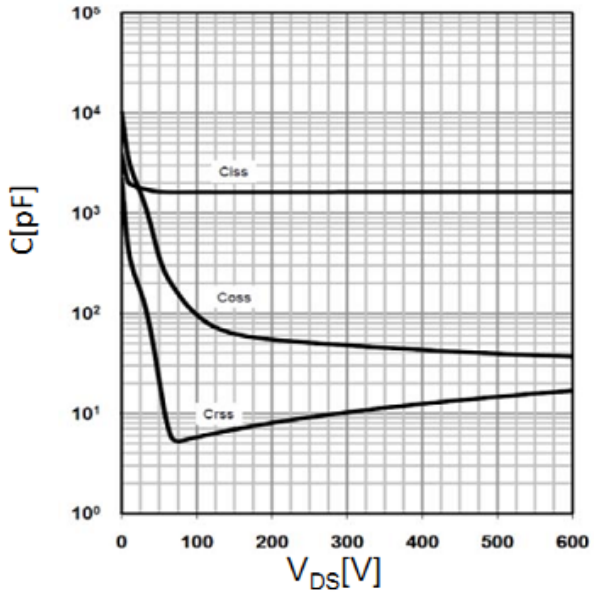
$E_{AS}=f(T_j)$; I_D=3.5 A; V_{DD}=50 V

Drain-source breakdown voltage



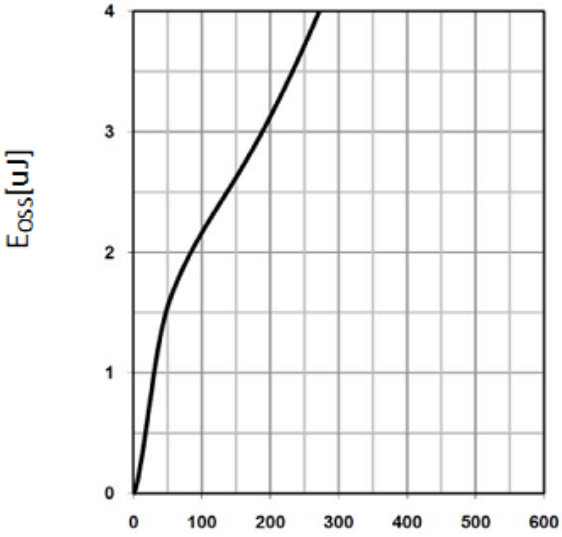
$V_{BR(DSS)}=f(T_j)$; I_D=1.0 mA

Typ. capacitances



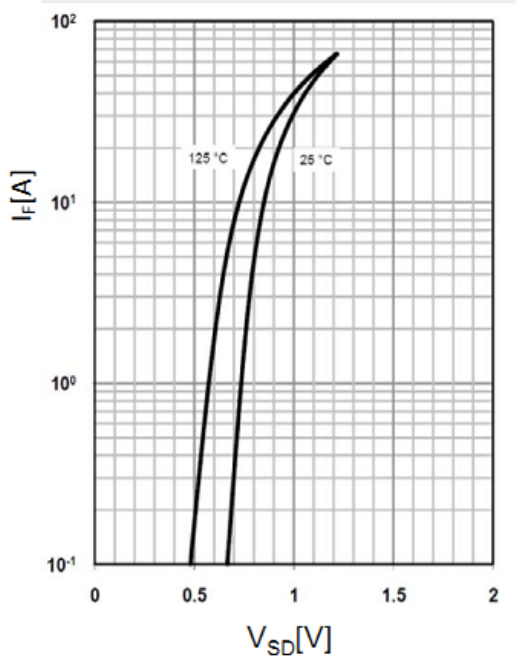
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz

Typ. *Coss stored energy*



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

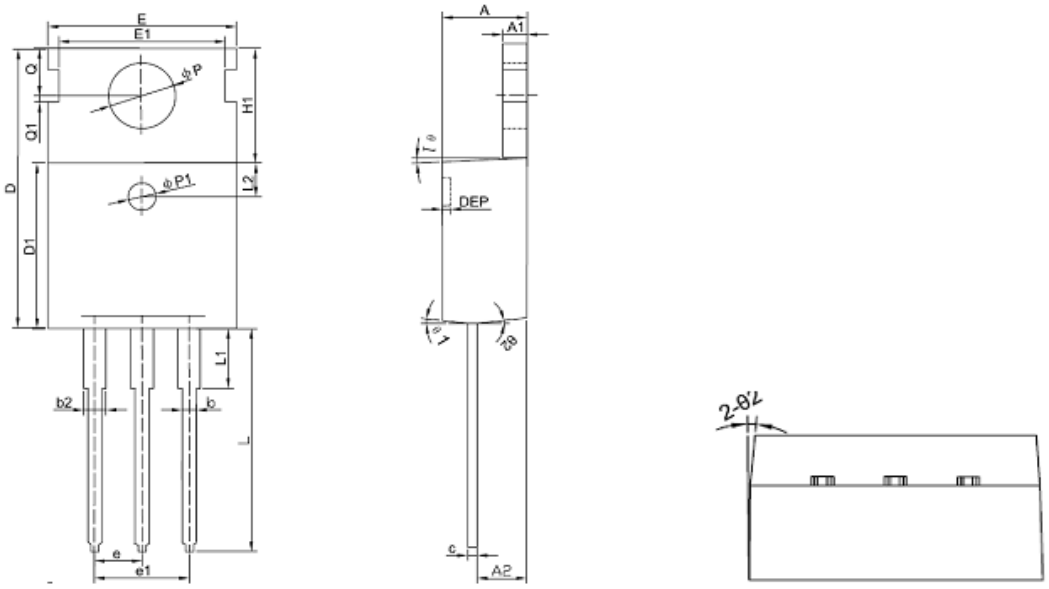
Forward characteristics of reverse diode



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

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

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