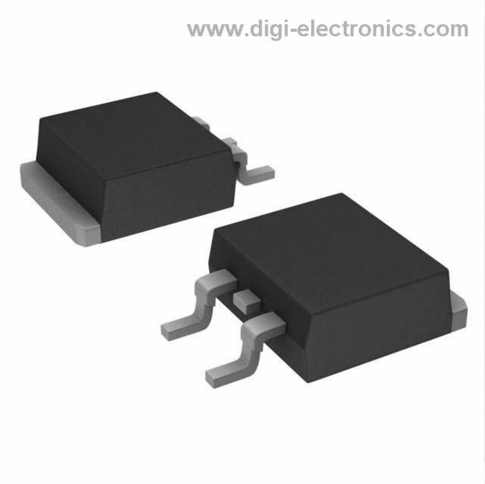
IPB50R299CPATMA1 Datasheet



https://www.DiGi-Electronics.com

DiGi Electronics Part Number	IPB50R299CPATMA1-DG
Manufacturer	Infineon Technologies
Manufacturer Product Number	IPB50R299CPATMA1
Description	MOSFET N-CH 550V 12A TO263-3
Detailed Description	N-Channel 550 V 12A (Tc) 104W (Tc) Surface Mount PG-TO263-3-2

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
IPB50R299CPATMA1	Infineon Technologies
Series:	Product Status:
CoolMOS™	Obsolete
FET Type:	Technology:
N-Channel	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	Current - Continuous Drain (Id) @ 25°C:
550 V	12A (Tc)
Drive Voltage (Max Rds On, Min Rds On):	Rds On (Max) @ Id, Vgs:
10V	299mOhm @ 6.6A, 10V
Vgs(th) (Max) @ Id:	Gate Charge (Qg) (Max) @ Vgs:
3.5V @ 440μA	31 nC @ 10 V
Vgs (Max):	Input Capacitance (Ciss) (Max) @ Vds:
±20V	1190 pF @ 100 V
FET Feature:	Power Dissipation (Max):
-	104W (Tc)
Operating Temperature:	Mounting Type:
-55°C ~ 150°C (TJ)	Surface Mount
Supplier Device Package:	Package / Case:
PG-TO263-3-2	TO-263-3, D2PAK (2 Leads + Tab), TO-263AB
Base Product Number:	
IPB50R	

Environmental & Export classification

Moisture Sensitivity Level (MSL):	REACH Status:
1 (Unlimited)	REACH Unaffected
ECCN:	HTSUS:
EAR99	8541.29.0095

CoolMOS™ Power Transistor

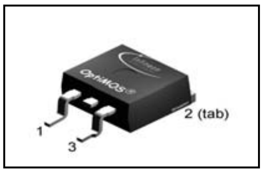
Features

- Lowest figure of merit R_{ON} x Q_g
- Ultra low gate charge
- Extreme dv/dt rated
- High peak current capability
- Pb-free lead plating; RoHS compliant; Halogen free for mold compound
- Qualified for industrial grade applications according to JEDEC[1]

Product Summary

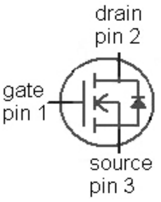
V_{DS} @T_{jmax}	550	V
$R_{DS(on),max}$	0.299	Ω
$Q_{g,typ}$	23	nC

PG-TO263



CoolMOS CP is designed for:

- Hard- & Softswitching SMPS topologies
- CCM PFC for Notebook adapter, PDP and large LCD power supplies
- PWM for Notebook adapter, PDP and large LCD power supplies



Type	Package	Marking
IPB50R299CP	PG-TO263	5R299P

Maximum ratings, at T_j=25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	T_C=25 °C	12	A
		T_C=100 °C	8	
Pulsed drain current[2]	$I_{D,pulse}$	T_C=25 °C	26	
Avalanche energy, single pulse	E_{AS}	I_D=4.4 A, V_{DD}=50 V	289	mJ
Avalanche energy, repetitive t_{AR}[2],[3]	E_{AR}	I_D=4.4 A, V_{DD}=50 V	0.44	
Avalanche current, repetitive t_{AR}[2],[3]	I_{AR}		4.4	A
MOSFET dv/dt ruggedness	dv/dt	V_{DS}=0...400 V	50	V/ns
Gate source voltage	V_{GS}	static	±20	V
		AC (f>1 Hz)	±30	
Power dissipation	P_{tot}	T_C=25 °C	104	W
Operating and storage temperature	T_j, T_{stg}		-55 ... 150	°C

Maximum ratings, at T_j=25 °C, unless otherwise specified

Parameter	**Symbol**	**Conditions**	**Value**	**Unit**
Continuous diode forward current	I_S	T_C=25 °C	6.6	A
Diode pulse current[2)	$I_{S,pulse}$		26	
Reverse diode dv/dt[4)	dv/dt		15	V/ns

Parameter	**Symbol**	**Conditions**	**Values**			**Unit**
			min.	**typ.**	**max.**	
Thermal characteristics						
Thermal resistance, junction - case	R_{thJC}		-	-	1.2	K/W
Thermal resistance, junction - ambient	R_{thJA}	SMD version, device on PCB, minimal footprint	-	-	62	
		SMD version, device on PCB, 6 cm^2 cooling area[3)	-	35	-	
Soldering temperature, wave- and reflowsoldering allowed	T_{sold}	reflow MSL 1	-	-	260	°C

Electrical characteristics, at T_j=25 °C, unless otherwise specified

Static characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0 V, I_D=250 µA	500	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=0.44 mA	2.5	3	3.5	
Zero gate voltage drain current	I_{DSS}	V_{DS}=500 V, V_{GS}=0 V, T_j=25 °C	-	-	1	µA
		V_{DS}=500 V, V_{GS}=0 V, T_j=150 °C	-	10	-	
Gate-source leakage current	I_{GSS}	V_{GS}=20 V, V_{DS}=0 V	-	-	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=6.6 A, T_j=25 °C	-	0.27	0.299	Ω
		V_{GS}=10 V, I_D=6.6 A, T_j=150 °C	-	0.68	-	
Gate resistance	R_G	f=1 MHz, open drain	-	2.2	-	Ω

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics						
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=100 V, f=1 MHz	-	1190	-	pF
Output capacitance	C_{oss}		-	53	-	
Effective output capacitance, energy related[5]	$C_{o(er)}$	V_{GS}=0 V, V_{DS}=0 V to 400 V	-	50	-	
Effective output capacitance, time related[6]	$C_{o(tr)}$		-	110	-	
Turn-on delay time	$t_{d(on)}$	V_{DD}=400 V, V_{GS}=10 V, I_D=6.6 A, R_G=27.9 Ω	-	35	-	ns
Rise time	t_r		-	14	-	
Turn-off delay time	$t_{d(off)}$		-	80	-	
Fall time	t_f		-	12	-	
Gate Charge Characteristics						
Gate to source charge	Q_{gs}	V_{DD}=400 V, I_D=6.6 A, V_{GS}=0 to 10 V	-	5	-	nC
Gate to drain charge	Q_{gd}		-	7	-	
Gate charge total	Q_g		-	23	31	
Gate plateau voltage	$V_{plateau}$		-	5.2	-	V
Reverse Diode						
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=6.6 A, T_j=25 °C	-	0.9	1.2	V
Reverse recovery time	t_{rr}	V_R=400 V, I_F=I_S, di_F/dt=100 A/µs	-	260	-	ns
Reverse recovery charge	Q_{rr}		-	2.6	-	µC
Peak reverse recovery current	I_{rrm}		-	21	-	A

[1] J-STD20 and JESD22

[2] Pulse width t_p limited by $T_{j,max}$

[3] Repetitive avalanche causes additional power losses that can be calculated as $P_{AV}=E_{AR}*f$.

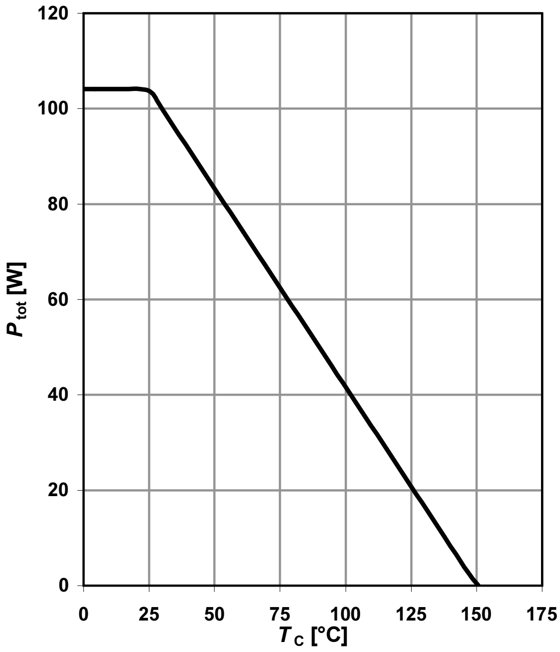
[4] $I_{SD} \le I_D$, $di/dt \le$200A/µs, V_{DClink}=400V, $V_{peak}<V_{(BR)DSS}$, $T_j<T_{jmax}$, identical low and high side switch

[5] $C_{o(er)}$ is a fixed capacitance that gives the same stored energy as C_{oss} while V_{DS} is rising from 0 to 80% $V_{DSS.}$

[6] $C_{o(tr)}$ is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 80% $V_{DSS.}$

1 Power dissipation

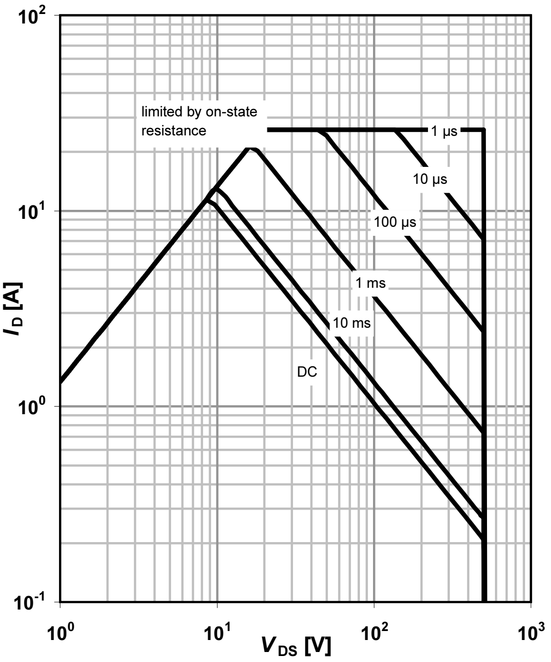
P_{tot}=f(T_C)



2 Safe operating area

I_D=f(V_{DS}); T_C=25 °C; D=0

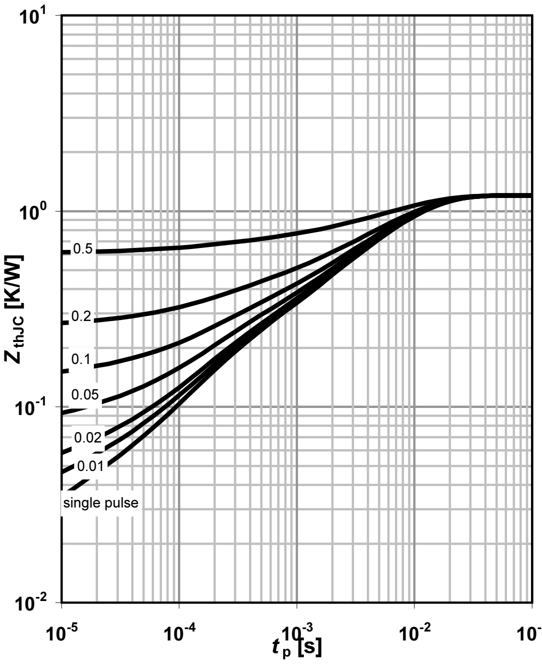
parameter: t_p



3 Max. transient thermal impedance

$Z_{(thJC)}$=f(t_p);

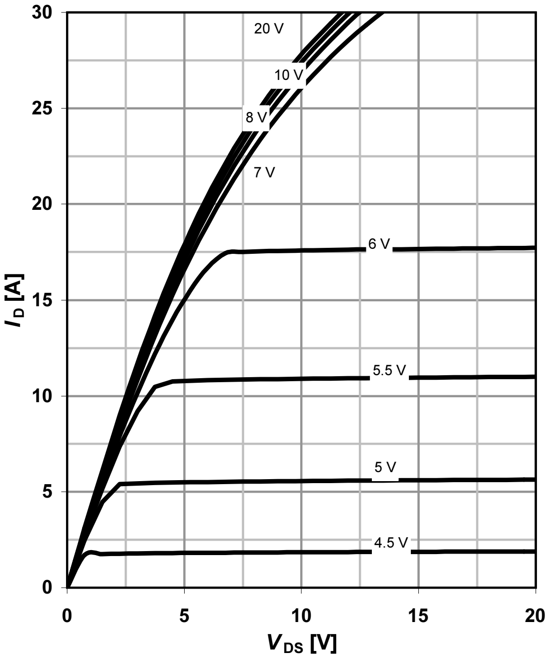
parameter: D=t_p/T



4 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

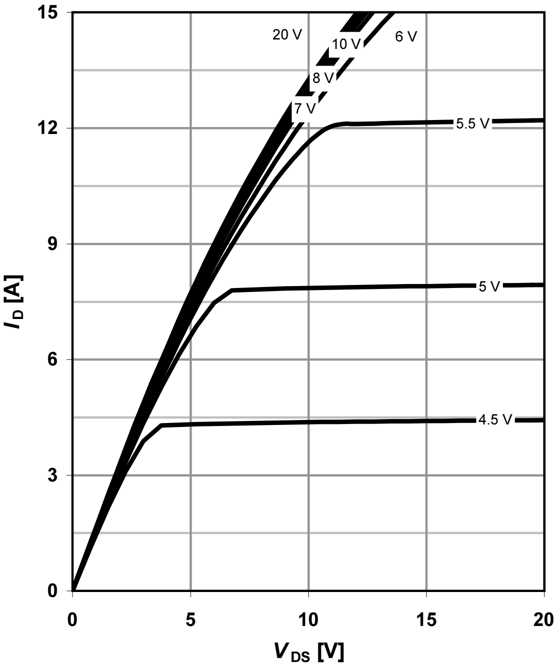
parameter: V_{GS}



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=150 °C

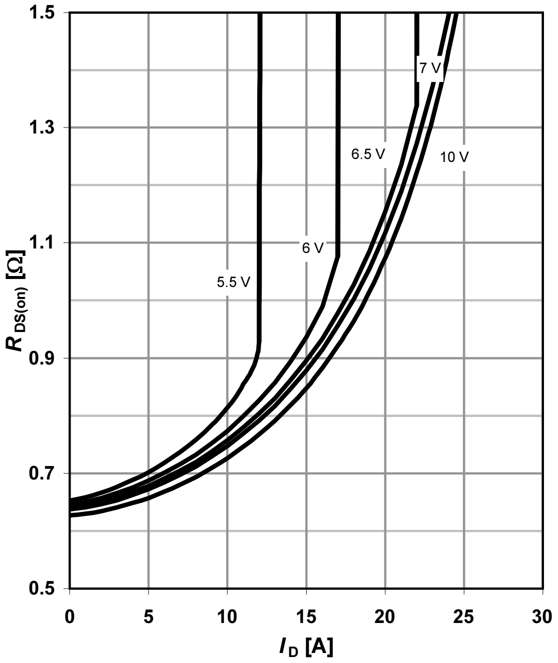
parameter: V_{GS}



6 Typ. drain-source on-state resistance

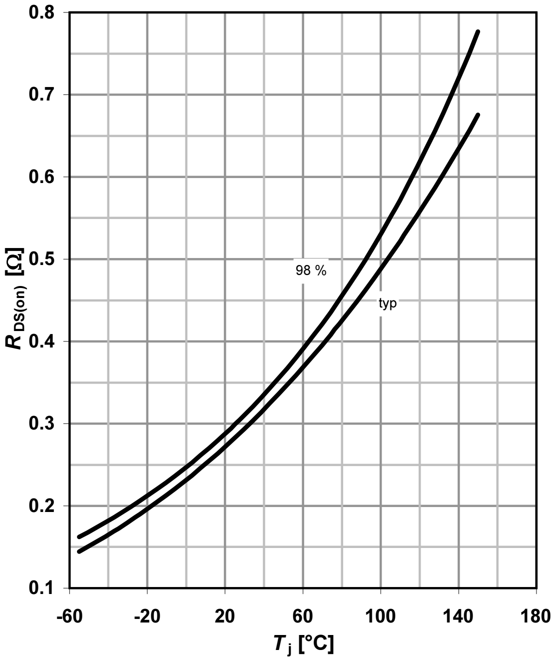
$R_{DS(on)}$=f(I_D); T_j=150 °C

parameter: V_{GS}



7 Drain-source on-state resistance

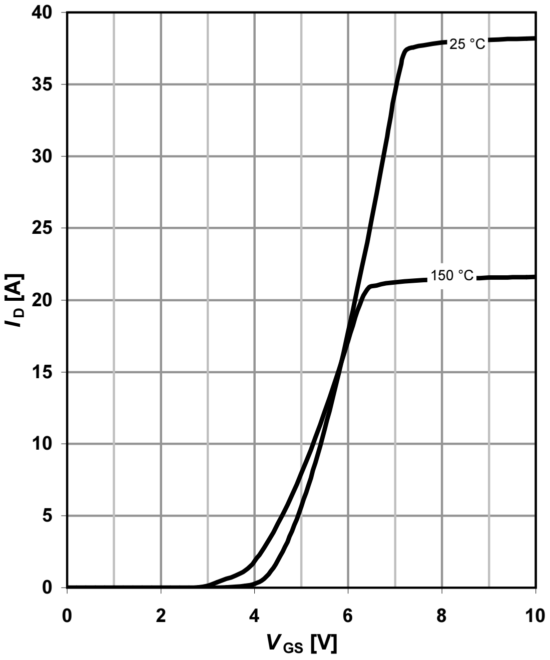
$R_{DS(on)}$=f(T_j); I_D=6.6 A; V_{GS}=10 V



8 Typ. transfer characteristics

I_D=f(V_{GS}); |V_{DS}|>2|I_D|$R_{DS(on)max}$

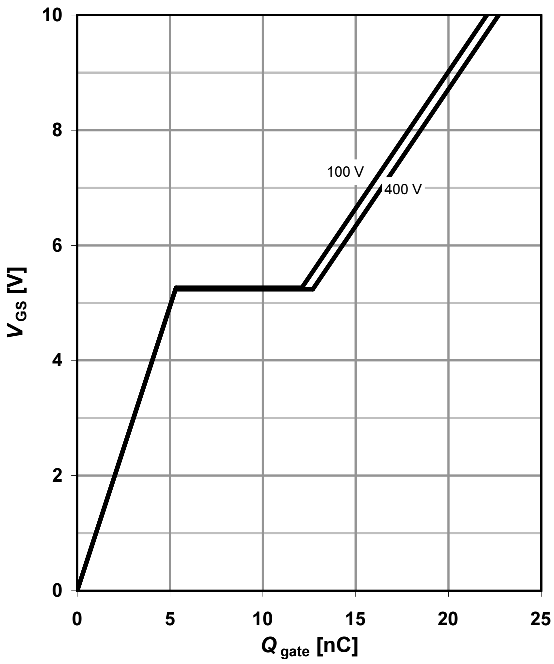
parameter: T_j



9 Typ. gate charge

V_{GS}=f(Q_{gate}); I_D=6.6 A pulsed

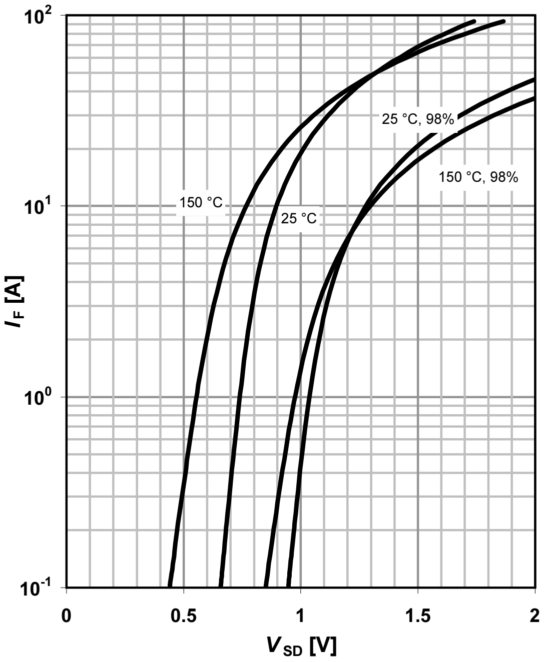
parameter: V_{DD}



10 Forward characteristics of reverse diode

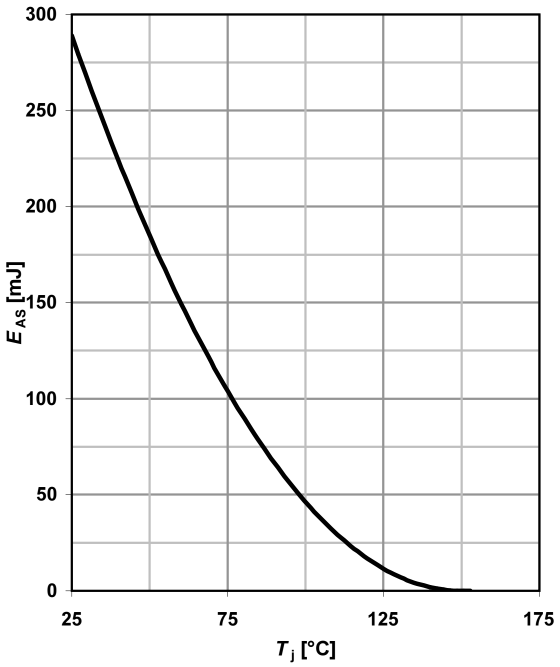
I_F=f(V_{SD})

parameter: T_j



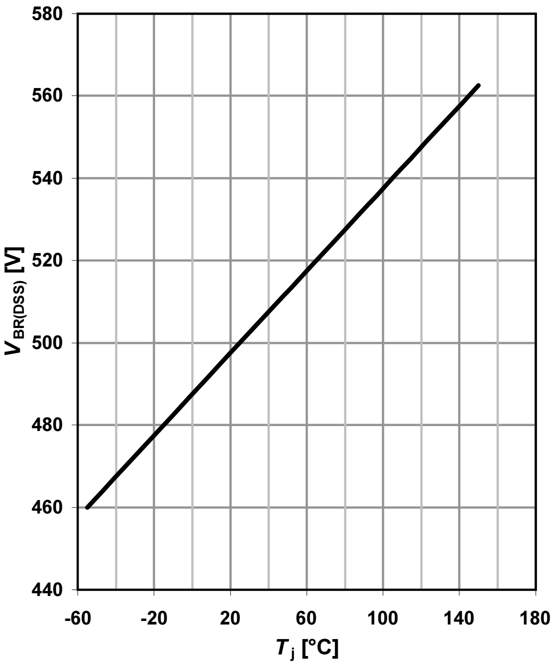
11 Avalanche energy

E_{AS}=f(T_j); I_D=4.4 A; V_{DD}=50 V



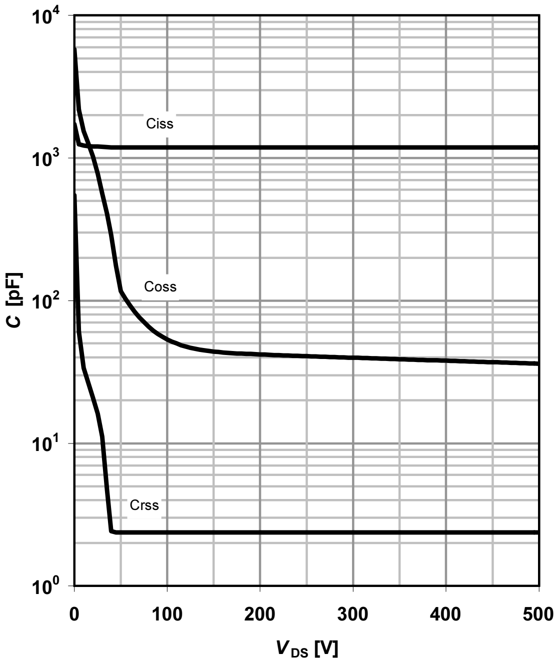
12 Drain-source breakdown voltage

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



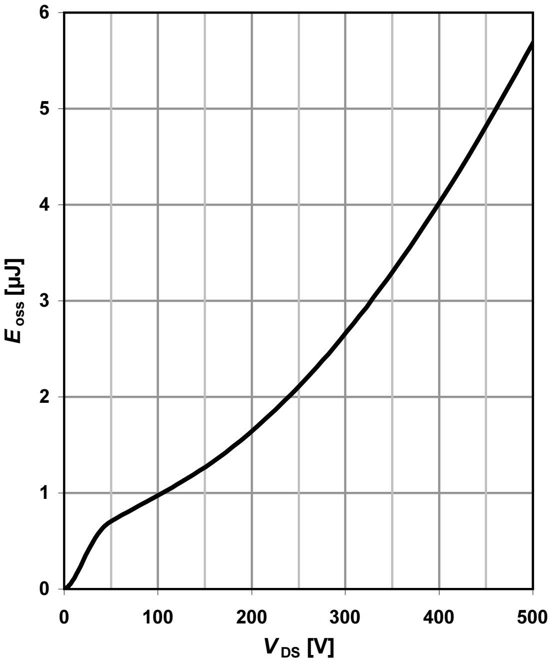
13 Typ. capacitances

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

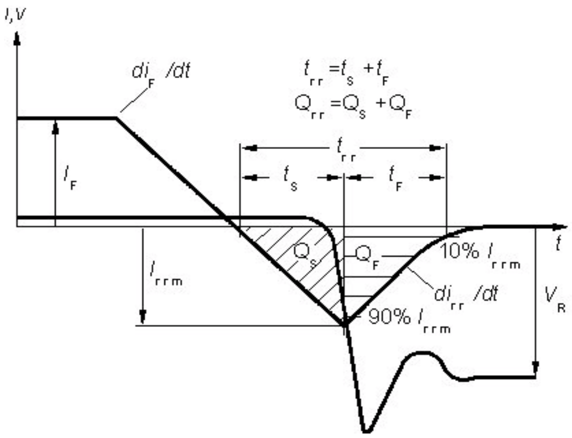


14 Typ. Coss stored energy

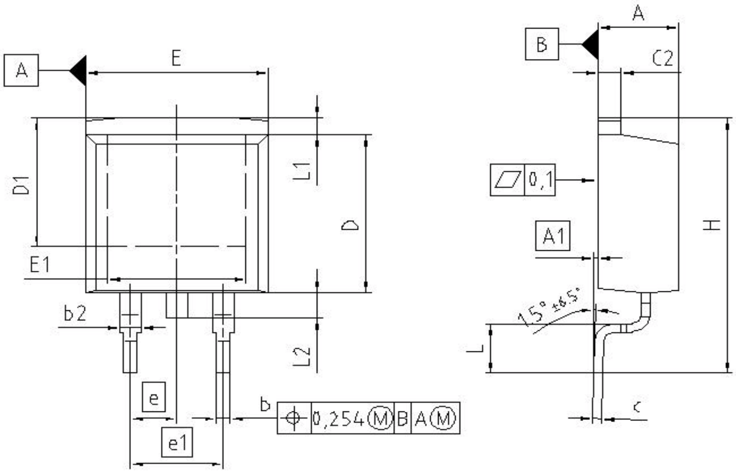
$E_{oss} = f(V_{DS})$



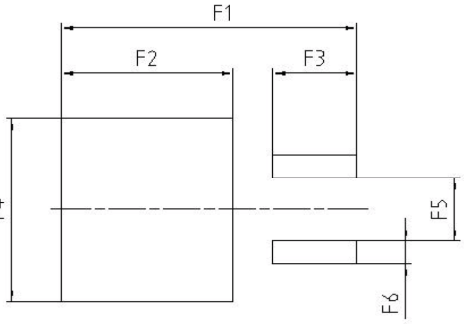
Definition of diode switching characteristics



PG-TO263-3-1/PG-TO263-3-4/PG-TO263-3-2: Outlines



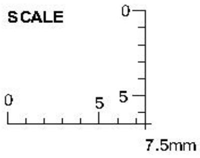
FOOTPRINT



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.300	4.572	0.169	0.180
A1	0.000	0.254	0.000	0.010
b	0.650	0.850	0.026	0.033
b2	0.950	1.321	0.037	0.052
c	0.330	0.650	0.013	0.026
c2	0.170	1.400	0.046	0.055
D	8.509	9.450	0.335	0.372
D1	7.100	-	0.280	-
E	9.800	10.312	0.386	0.406
E1	6.500		0.256	
e	2.540		0.100	
e1	5.080		0.200	
N	2		2	
H	14.605	15.875	0.575	0.625
L	2.200	3.000	0.087	0.118
L1	-	1.600	-	0.063
L2	1.000	1.778	0.039	0.070
F1	16.050	16.250	0.632	0.640
F2	9.300	9.500	0.366	0.374
F3	4.500	4.700	0.177	0.185
F4	10.700	10.900	0.421	0.429
F5	3.630	3.830	0.143	0.151
F6	1.100	1.300	0.043	0.051

REFERENCE
JEDEC TO263

SCALE



EUROPEAN PROJECTION

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