

SE47NS65TS

N-Channel Enhancement-Mode COOLMOSFET

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

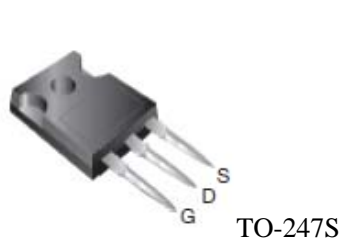
Features

For a single MOSFET

- $V_{DS} = 650V$
- $R_{DS(ON)} = 60m\Omega @ V_{GS}=10V$

Pin configurations

See Diagram below



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	47	A
	Pulsed		140	
Total Power Dissipation	@TC=25°C	P_D	391	W
Operating Junction Temperature Range		T_J	-55 to 150	°C

Thermal Resistance

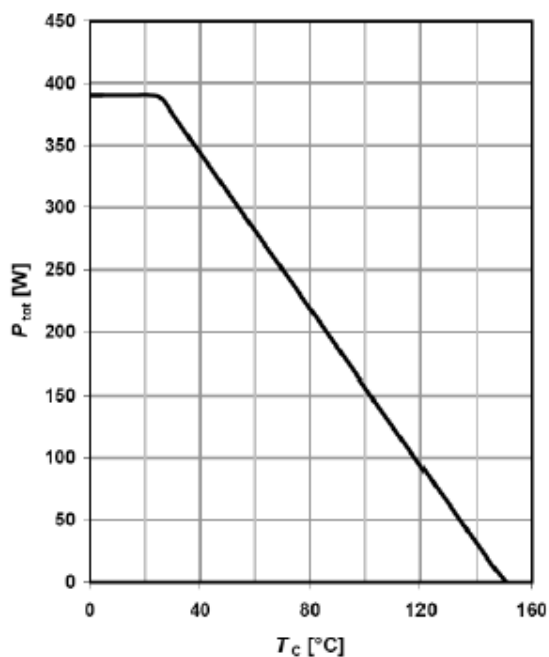
Symbol	Parameter	Min	Max	Units
$R_{\theta JC}$	Junction to Case		0.32	°C/W
$R_{\theta JA}$	Junction to Ambient ($t \leq 10s$)		62	°C/W

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Electrical Characteristics (T _J =25°C unless otherwise noted)						
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS (Note 2)						
B _V DSS	Drain-Source Breakdown Voltage	I _D =250μA, V _{GS} =0 V	650			V
I _{DSS}	Drain to Source Leakage Current	V _{DS} = 600V, V _{GS} =0V			1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =20 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 =23A		60	70	mΩ
g _{FS}	Forward Transconductance	V _{DS} = 40V, I _D =25A		30		S
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, f=1MHz		3800		pF
C _{oss}	Output Capacitance			215		pF
C _{rss}	Reverse Transfer Capacitance			70		pF
SWITCHING PARAMETERS						
Q _g	Total Gate Charge ²	V _{GS} =10V, V _{DD} =480V, I _D =23A		170		nC
Q _{gs}	Gate Source Charge			21		nC
Q _{gd}	Gate Drain Charge			87		nC
t _{d(on)}	Turn-On Delay Time	V _{GS} =13V, V _{DS} =480V, R _{GEN} =20Ω I _D =23A		16		ns
t _{d(off)}	Turn-Off Delay Time			83		ns
t _{d(r)}	Turn-On Rise Time			12		ns
t _{d(f)}	Turn-Off Fall Time			5		ns
Source-Drain Diode						
Symbol	Parameter	Test Condition	Min	Typ	Max	Units
I _S	Drain-Source Diode Forward Current				47	A
I _{SM}	Pulse Drain-Source Diode Forward Current				140	A
V _{SD}	Diode Forward Voltage	I _F =23A, V _{GS} =0V,		0.9	1.5	V
Q _{rr}	Reverse Recovery Charge	dI/dt=100A/μs		19		μC

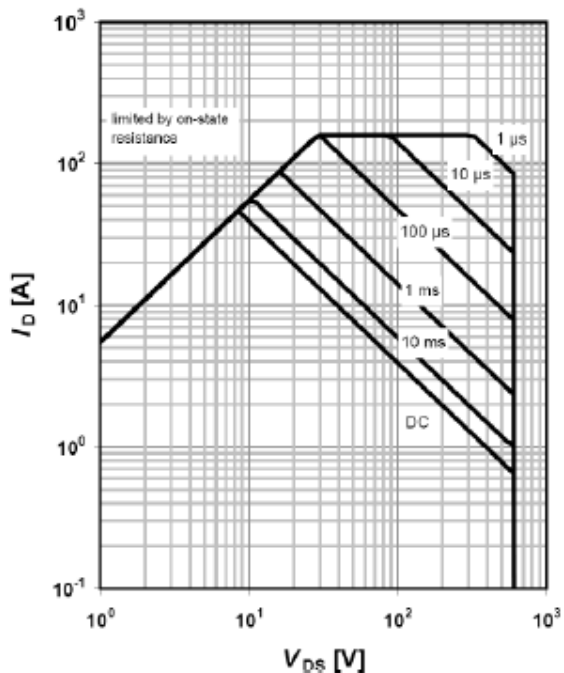
Typical Characteristics

Power dissipation



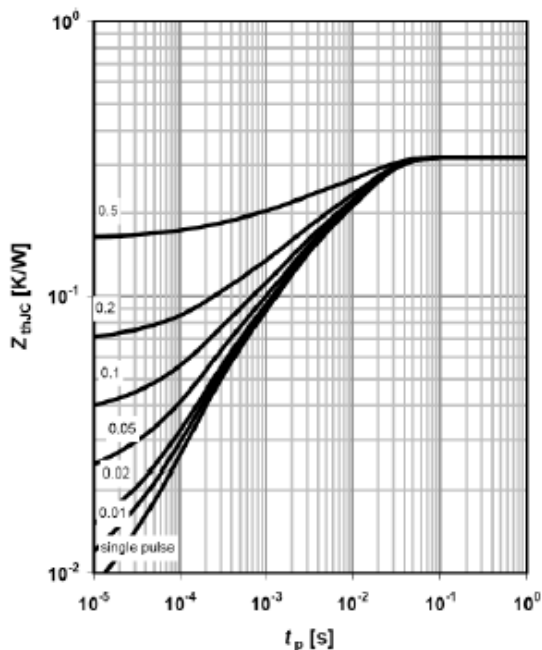
$P_{tot}=f(T_c)$

Safe operating area TC=25 °C



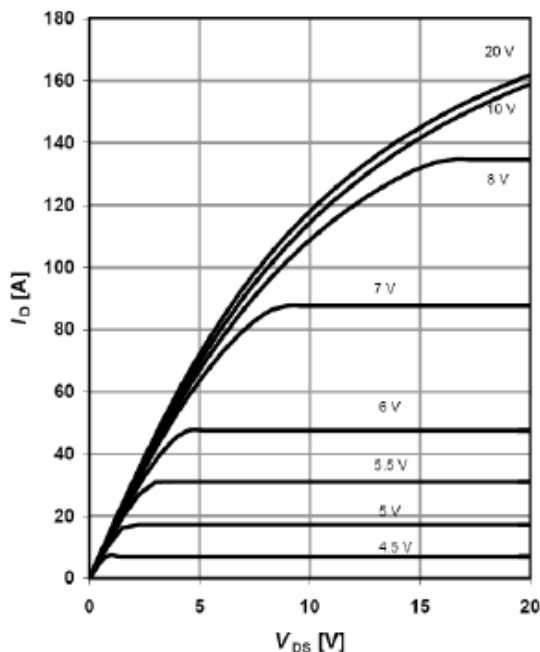
$I_D=f(V_{DS}); T_c=25\text{ }^\circ\text{C}; D=0$; parameter t_p

Max. transient thermal impedance



$Z_{(th)C}=f(t_p)$; parameter $D=t_p/T$

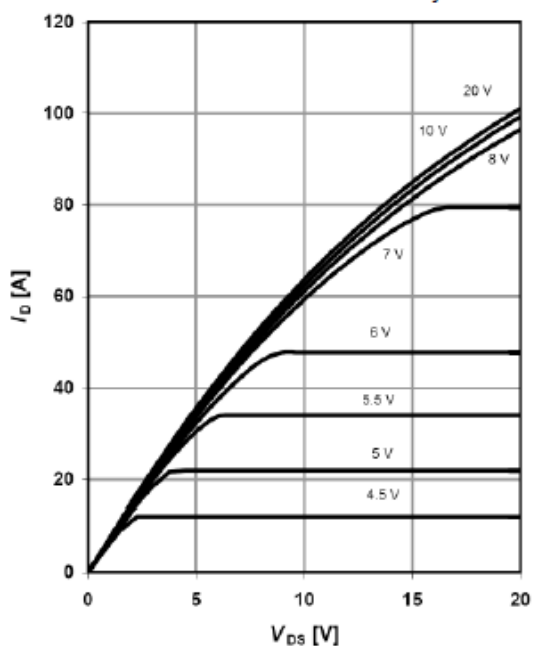
Typ. output characteristics $T_j=25\text{ }^\circ\text{C}$



$I_D=f(V_{DS}); T_j=25\text{ }^\circ\text{C}$; parameter: V_{GS}

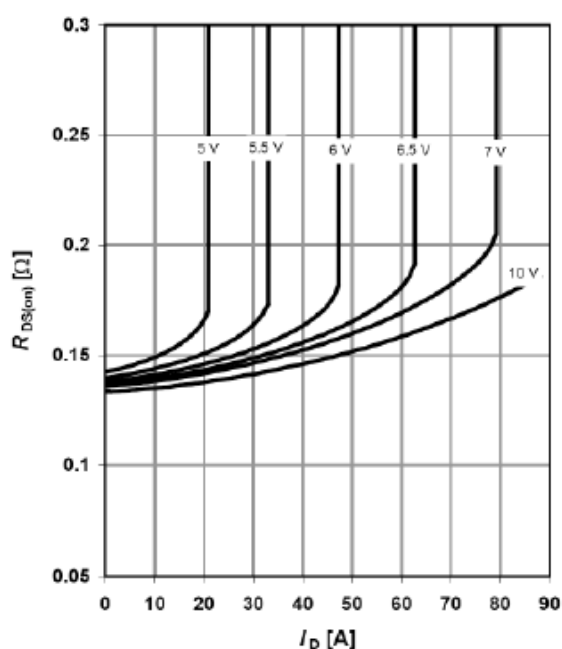
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Typ. output characteristics $T_j=125\text{ }^\circ\text{C}$



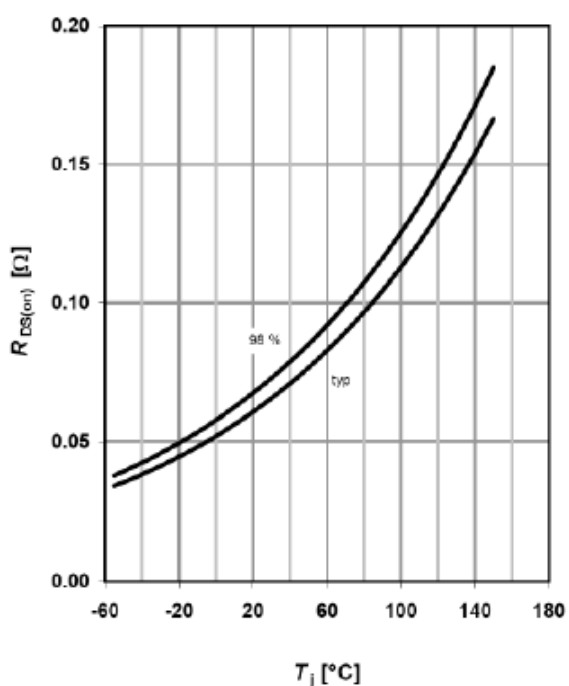
$I_D=f(V_{DS}); T_j=125\text{ }^\circ\text{C}$; parameter: V_{GS}

Typ. drain-source on-state resistance



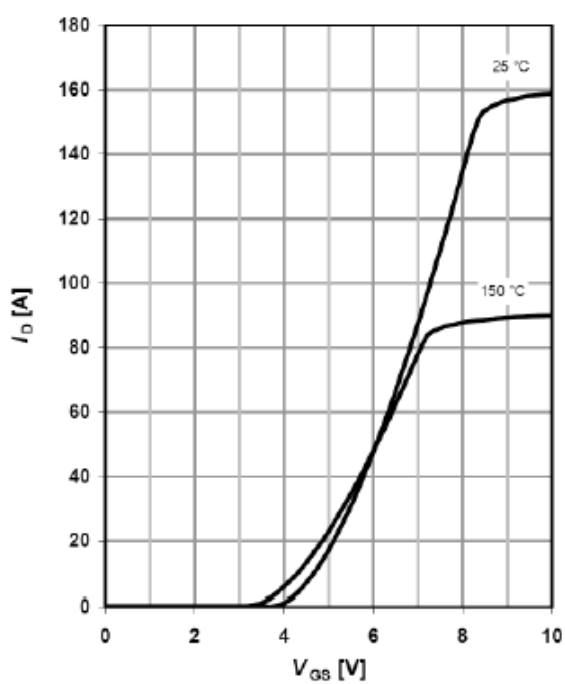
$R_{DS(on)}=f(I_D); T_j=125\text{ }^\circ\text{C}$; parameter: V_{GS}

Typ. drain-source on-state resistance



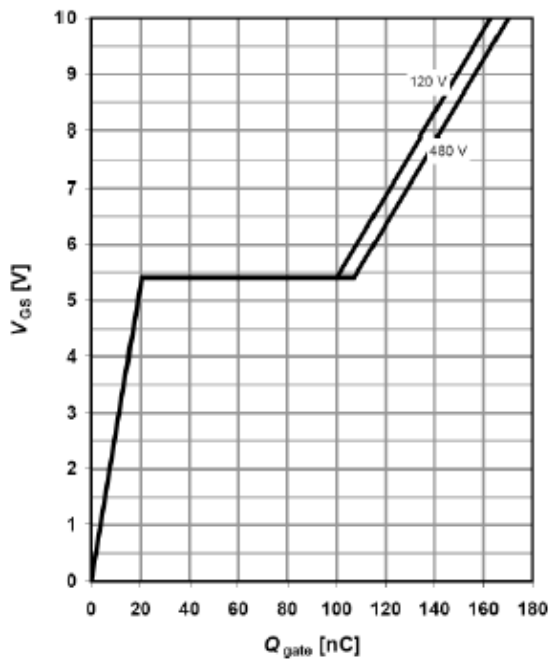
$R_{DS(on)}=f(T_j); I_D=23\text{ A}; V_{GS}=10\text{ V}$

Typ. transfer characteristics



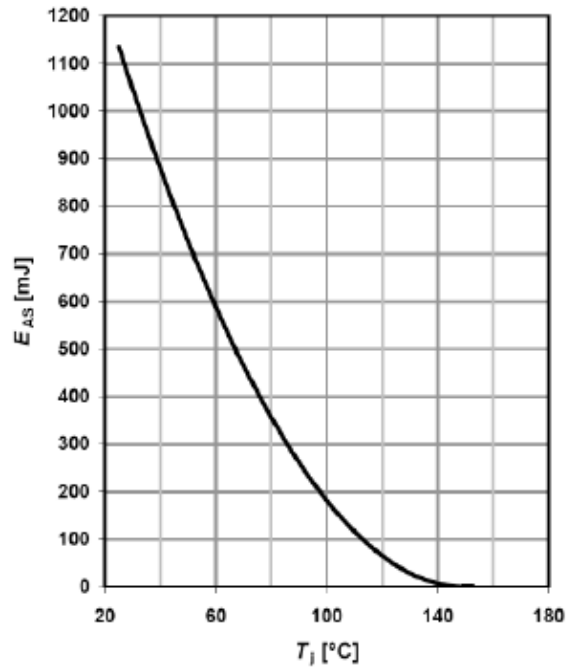
$I_D=f(V_{GS}); V_{DS}=40\text{ V}$

Typ. gate charge



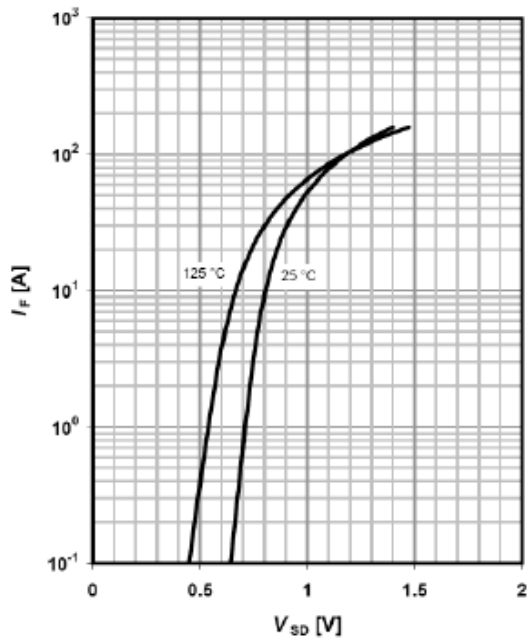
$V_{GS}=f(Q_g), I_D=23A$ pulsed

Avalanche energy



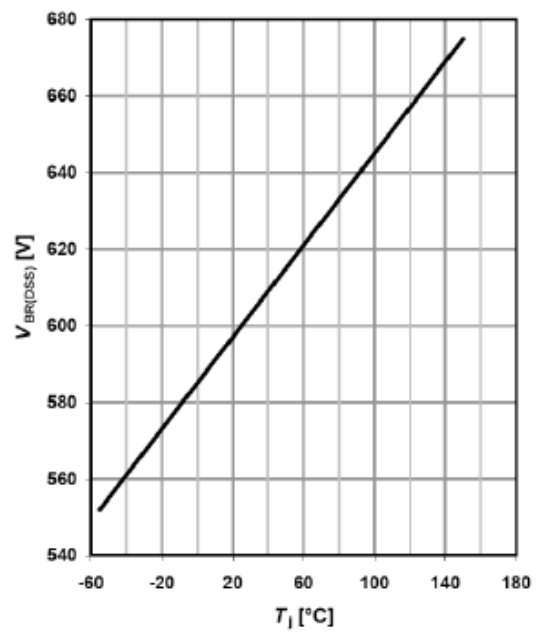
$E_{AS}=f(T_j); I_D=9.3A; V_{DD}=50 V$

Forward characteristics of reverse diode

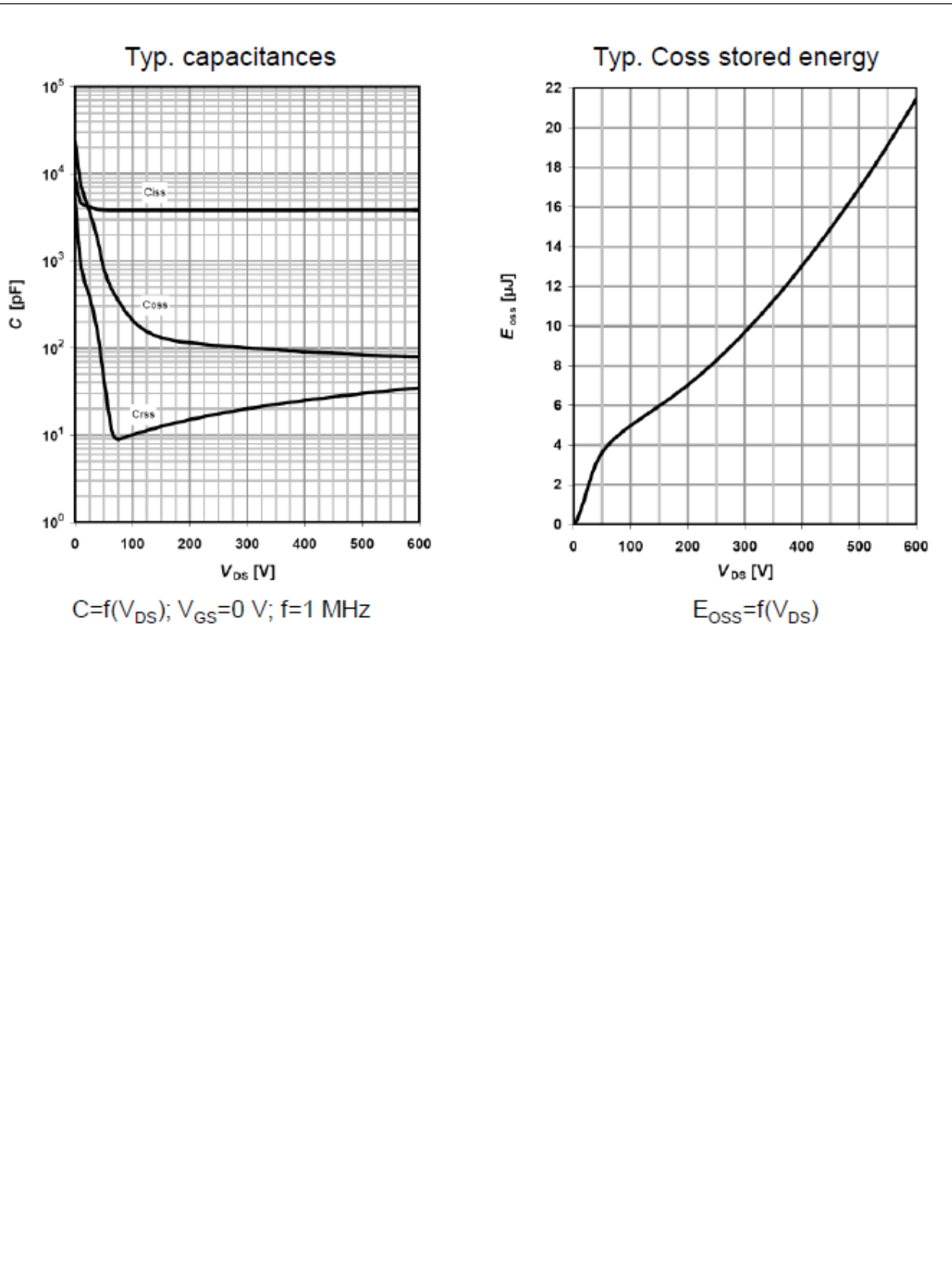


$I_F=f(V_{SD});$ parameter: T_j

Drain-source breakdown voltage



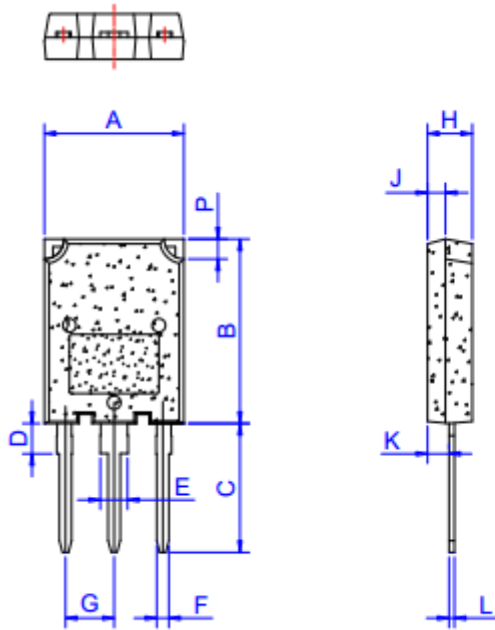
$V_{BR(DSS)}=f(T_j); I_D=0.25mA$



SE47NS65TS

Package Outline Dimension

TO-247S



TO-247S

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.1		16.1	0.594		0.634
B	19.8		20.8	0.78		0.819
C	13.8		14.8	0.543		0.583
D	3.00		4.00	0.118		0.157
E	2.75		3.35	0.108		0.132
F	1.30		1.50	0.051		0.059
G	5.10		5.80	0.201		0.228
H	4.50		5.50	0.177		0.217
J	1.45		2.15	0.057		0.085
K	1.90		2.80	0.075		0.110
L	0.55		0.80	0.022		0.031
P	2.00		2.40	0.079		0.094

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