

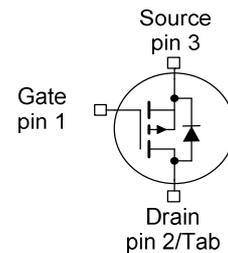
**OptiMOS®-P2 Power-Transistor**

**Features**

- P-channel - Logic Level - Enhancement mode
- AEC qualified
- MSL1 up to 260°C peak reflow
- 175°C operating temperature
- Green package (RoHS compliant)
- 100% Avalanche tested

**Product Summary**

$V_{DS}$	-40	V
$R_{DS(on)}$	7.8	mΩ
$I_D$	-70	A

**PG-TO252-3-313**


Type	Package	Marking
IPD70P04P4L-08	PG-TO252-3-313	4P04L08

**Maximum ratings, at  $T_j=25\text{ °C}$ , unless otherwise specified**

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	$I_D$	$T_C=25\text{ °C}$ , $V_{GS}=-10\text{V}$	-70	A
		$T_C=100\text{ °C}$ , $V_{GS}=-10\text{V}^{1)}$	-55	
Pulsed drain current <sup>1)</sup>	$I_{D,pulse}$	$T_C=25\text{ °C}$	-280	
Avalanche energy, single pulse <sup>1)</sup>	$E_{AS}$	$I_D=-35\text{A}$	24	mJ
Avalanche current, single pulse	$I_{AS}$	-	-70	A
Gate source voltage	$V_{GS}$	-	$\pm 16^{2)}$	V
Power dissipation	$P_{tot}$	$T_C=25\text{ °C}$	75	W
Operating and storage temperature	$T_j, T_{stg}$	-	-55 ... +175	°C
IEC climatic category; DIN IEC 68-1	-	-	55/175/56	

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
<b>Thermal characteristics<sup>1)</sup></b>						
Thermal resistance, junction - case	$R_{thJC}$	-	-	-	2.0	K/W
SMD version, device on PCB	$R_{thJA}$	minimal footprint	-	-	62	
		6 cm <sup>2</sup> cooling area <sup>3)</sup>	-	-	40	

**Electrical characteristics**, at  $T_j=25\text{ }^\circ\text{C}$ , unless otherwise specified

#### Static characteristics

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-1mA$	-40	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-120\mu A$	-1.2	-1.7	-2.2	
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=-32V, V_{GS}=0V, T_j=25^\circ C$	-	-0.05	-1	$\mu A$
		$V_{DS}=-32V, V_{GS}=0V, T_j=125^\circ C^{1)}$	-	-20	-200	
Gate-source leakage current	$I_{GSS}$	$V_{GS}=-16V, V_{DS}=0V$	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-40A$	-	9.0	12.9	m $\Omega$
		$V_{GS}=-10V, I_D=-70A$	-	5.7	7.8	

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

**Dynamic characteristics<sup>1)</sup>**

Input capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=-25V,$ $f=1MHz$	-	4177	5430	pF
Output capacitance	$C_{oss}$		-	1185	1778	
Reverse transfer capacitance	$C_{rss}$		-	45	90	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=-20V,$ $V_{GS}=-10V, I_D=-70A,$ $R_G=3.5\Omega$	-	12	-	ns
Rise time	$t_r$		-	10	-	
Turn-off delay time	$t_{d(off)}$		-	50	-	
Fall time	$t_f$		-	41	-	

**Gate Charge Characteristics<sup>1)</sup>**

Gate to source charge	$Q_{gs}$	$V_{DD}=-32V, I_D=-70A,$ $V_{GS}=0$ to $-10V$	-	14	18	nC
Gate to drain charge	$Q_{gd}$		-	10	20	
Gate charge total	$Q_g$		-	71	92	
Gate plateau voltage	$V_{plateau}$		-	-3.5	-	V

**Reverse Diode**

Diode continuous forward current <sup>1)</sup>	$I_S$	$T_C=25^\circ C$	-	-	-70	A
Diode pulse current <sup>1)</sup>	$I_{S,pulse}$		-	-	-280	
Diode forward voltage	$V_{SD}$	$V_{GS}=0V, I_F=-70A,$ $T_j=25^\circ C$	-	-1	-1.3	V
Reverse recovery time <sup>1)</sup>	$t_{rr}$	$V_R=-20V, I_F=-50A,$ $di_F/dt=-100A/\mu s$	-	46	-	ns
Reverse recovery charge <sup>1)</sup>	$Q_{rr}$		-	43	-	nC

<sup>1)</sup> Defined by design. Not subject to production test.

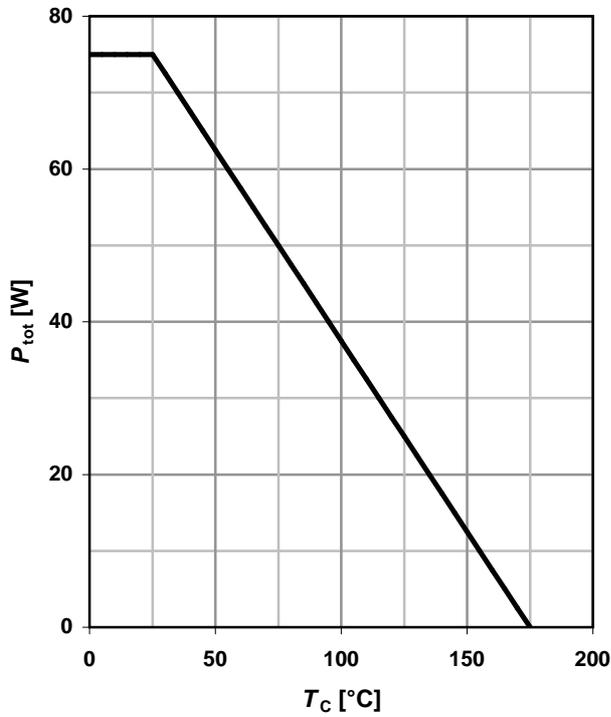
<sup>2)</sup>  $V_{GS}=+5V/-16V$  according AEC;

$V_{GS}=+16V$  for max 168h at  $T_i=175^\circ C$

<sup>3)</sup> Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm<sup>2</sup> (one layer, 70 μm thick) copper area for drain connection. PCB is vertical in still air.

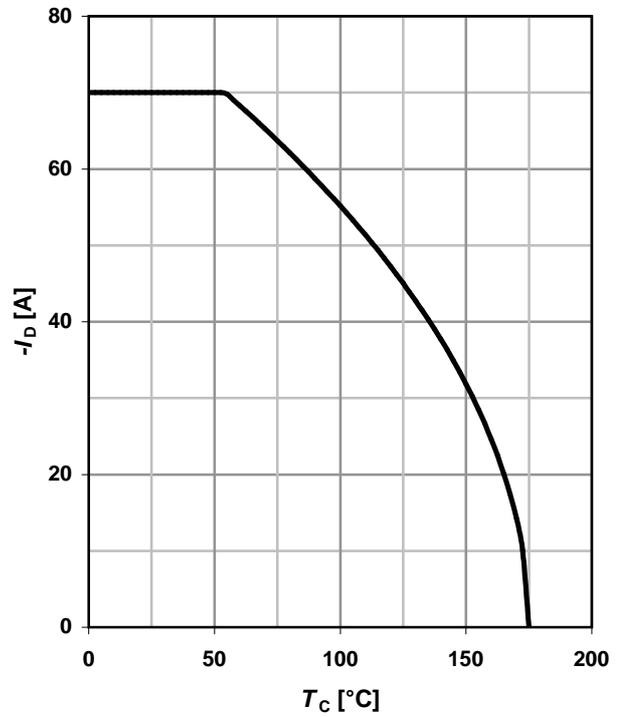
**1 Power dissipation**

$P_{tot} = f(T_C); V_{GS} \leq -6V$



**2 Drain current**

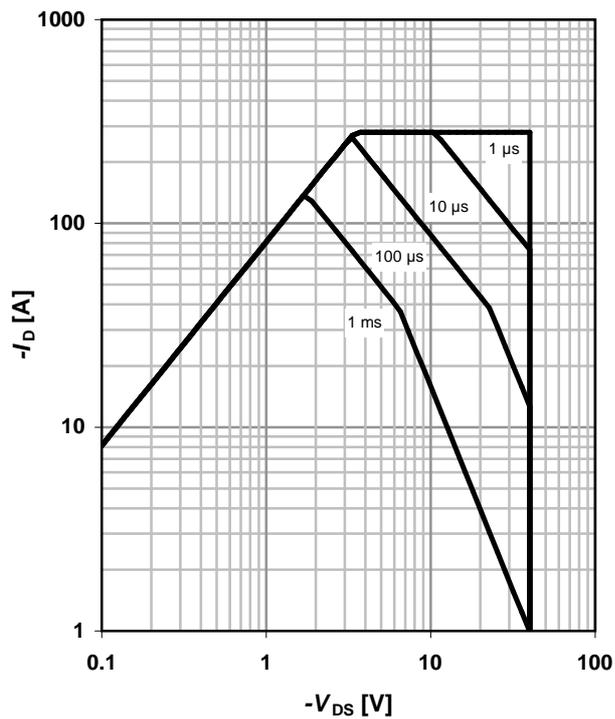
$I_D = f(T_C); V_{GS} = -10V$



**3 Safe operating area**

$I_D = f(V_{DS}); T_C = 25\text{ °C}; D = 0$

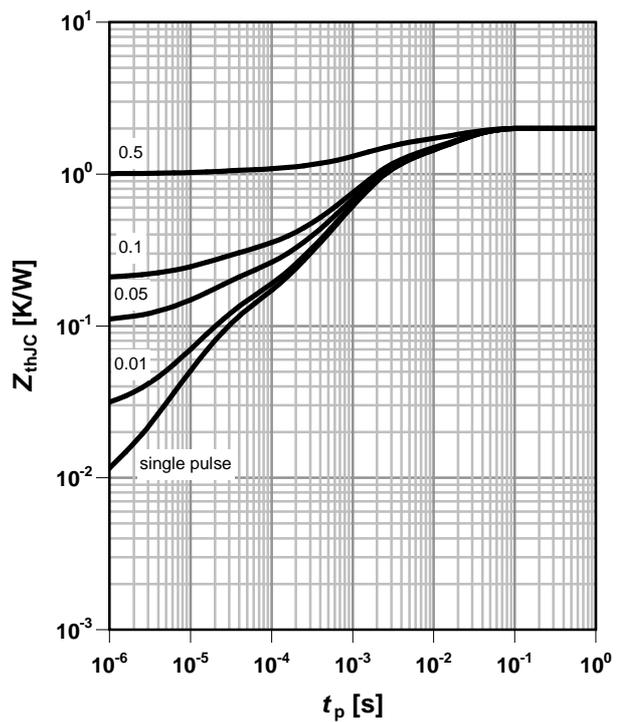
parameter:  $t_p$



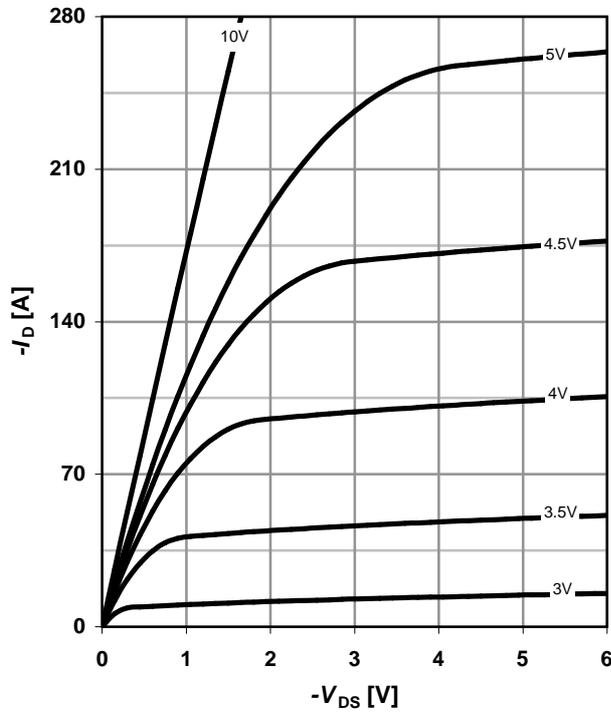
**4 Max. transient thermal impedance**

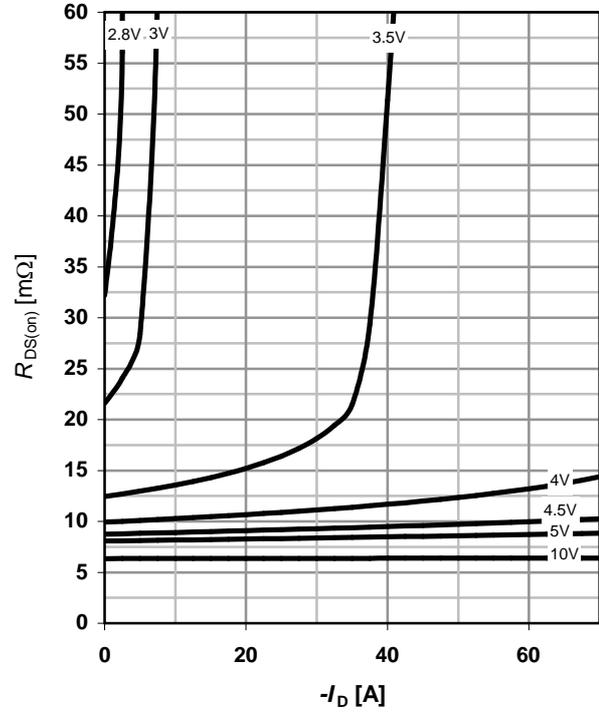
$Z_{thJC} = f(t_p)$

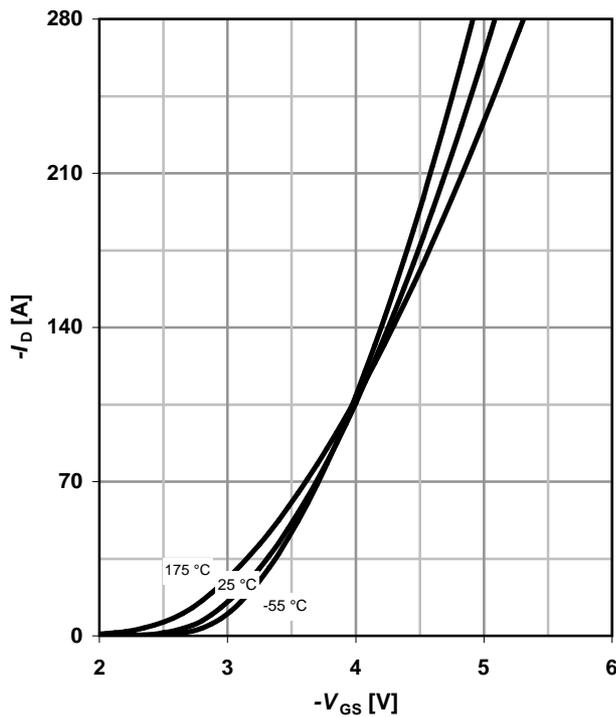
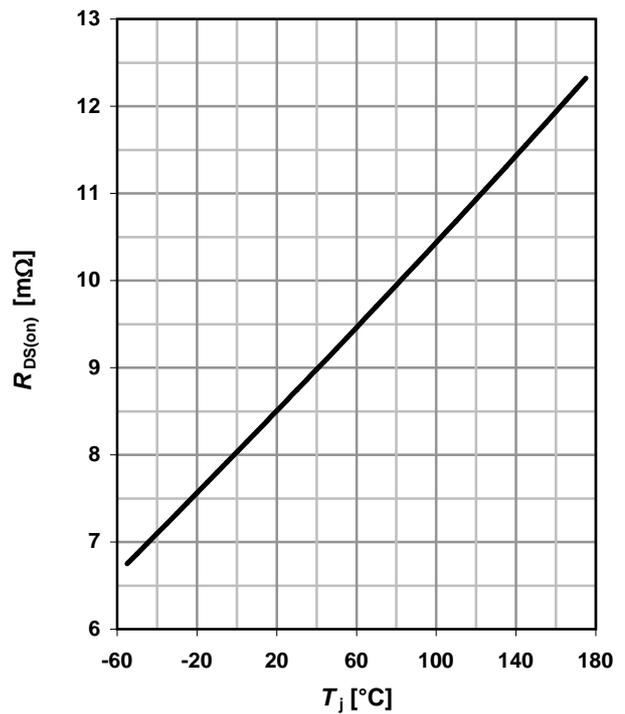
parameter:  $D = t_p/T$



**5 Typ. output characteristics**
 $I_D = f(V_{DS}); T_j = 25\text{ °C}$ 

 parameter:  $-V_{GS}$ 

**6 Typ. drain-source on-state resistance**
 $R_{DS(on)} = f(I_D); T_j = 25\text{ °C}$ 

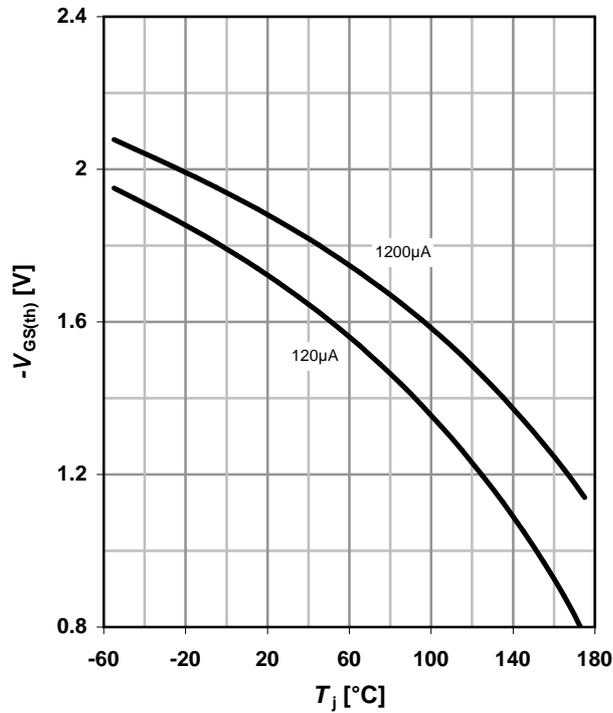
 parameter:  $-V_{GS}$ 

**7 Typ. transfer characteristics**
 $I_D = f(V_{GS}); V_{DS} = -6V$ 

 parameter:  $T_j$ 

**8 Typ. drain-source on-state resistance**
 $R_{DS(on)} = f(T_j); I_D = -70\text{ A}; V_{GS} = -10\text{ V}$ 


**9 Typ. gate threshold voltage**

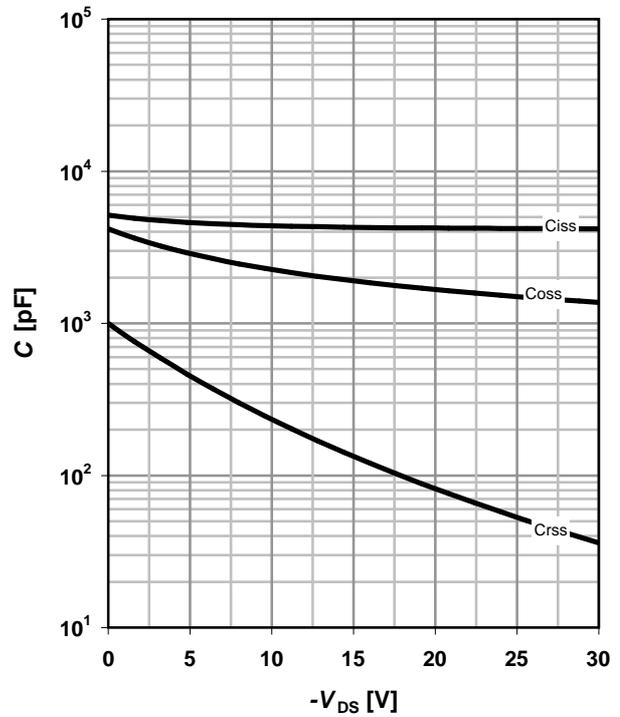
$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$

parameter:  $-I_D$



**10 Typ. capacitances**

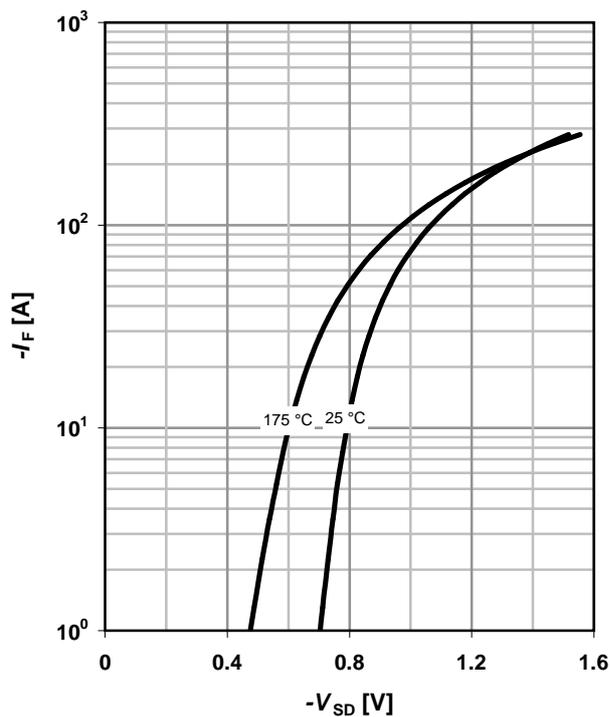
$C = f(V_{DS}); V_{GS} = 0 V; f = 1 MHz$



**11 Typical forward diode characteristics**

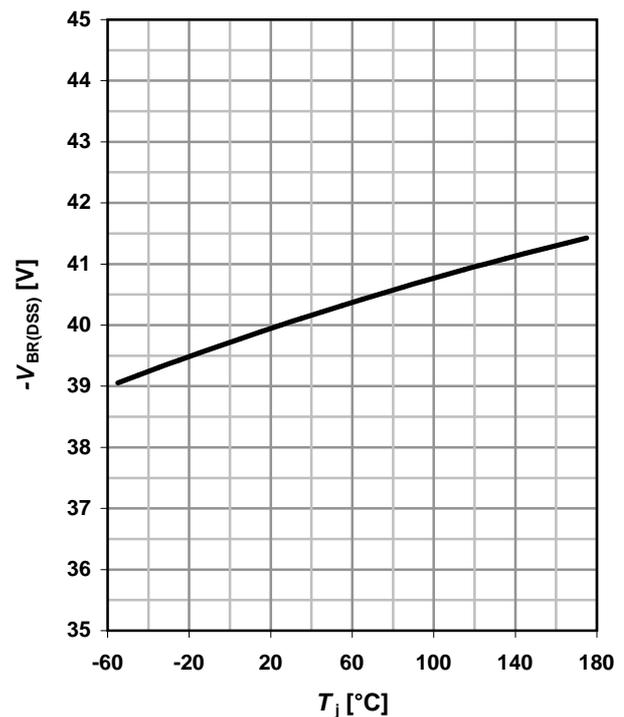
$I_F = f(V_{SD})$

parameter:  $T_j$



**12 Drain-source breakdown voltage**

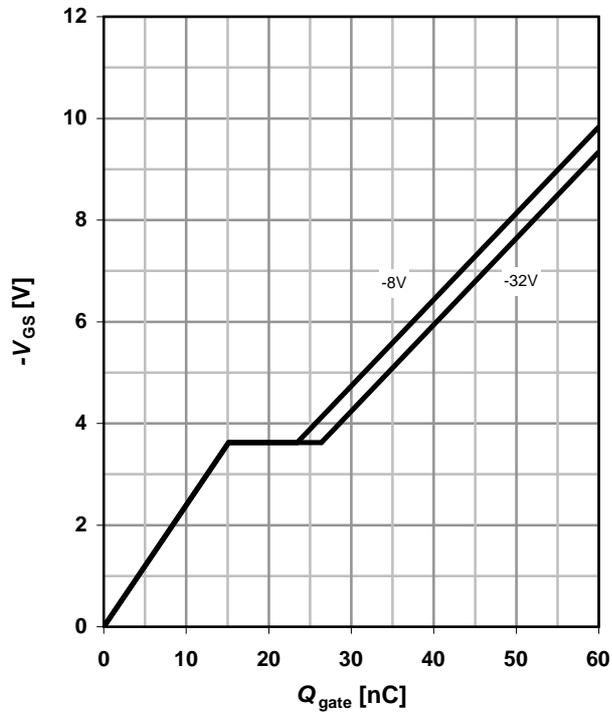
$V_{BR(DSS)} = f(T_j); I_D = -1 mA$



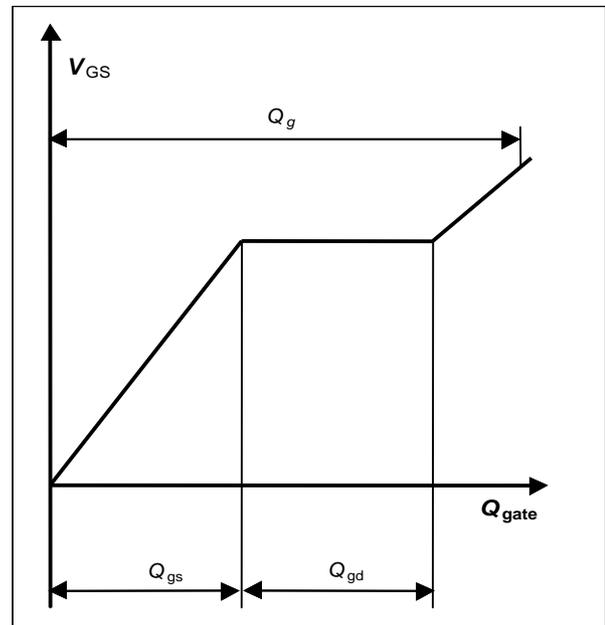
**13 Typ. gate charge**

$V_{GS} = f(Q_{gate}); I_D = -70 \text{ A pulsed}$

parameter:  $V_{DD}$



**14 Gate charge waveforms**



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Revision History

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Version	Date	Changes
0.1	08.03.2010	Initial Target Data Sheet
0.2	20.12.2010	Preliminary Data Sheet
1.0	14.03.2011	Final Data Sheet



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
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- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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