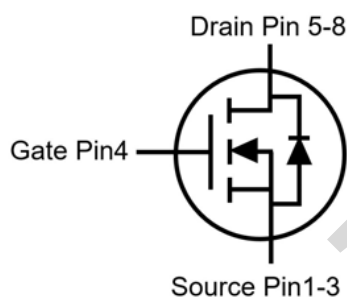
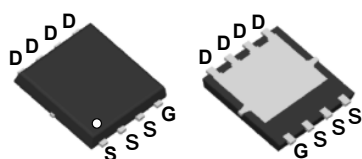


SGT N-channel Power MOSFET

MTR1R3N06SD PDFN5x6



V_{DS}	60	V
$R_{DS(on),TYP@ V_{GS}=10V}$	0.9	mΩ
I_D	280	A

Features

- 1、Low on – resistance
- 2、High power package (PDFN5X6)
- 3、SGT N-channel Power MOSFET

Applications

- 1、Battery management
- 2、UPS (Uninterruptible Power Supplies)

Maximum ratings, at $T_A = 25^\circ\text{C}$, unless otherwise specified

Symbol	Parameter		Rating	Unit
V(BR)DSS	Drain-Source breakdown voltage		60	V
VGS	Gate-Source voltage		±20	V
ID	Continuous drain current @VGS=10V	Tc =25°C	280	A
		Tc =100°C	177	A
IDM	Pulse drain current tested ①	Tc =25°C	1120	A
EAS	Avalanche energy, single pulsed ②		900	mJ
PD	Maximum power dissipation	Tc =25°C	178	W
TSTG,TJ	Storage and Junction Temperature Range		-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typ	Max	Unit
R _{θJC}	Thermal Resistance, Junction-to-Case	0.6	0.8	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	-	50	°C/W

Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
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Static Electrical Characteristics @T_j=25°C (unless otherwise stated)

V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	60	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =60V, V _{GS} =0V	--	--	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.0	1.6	2.2	V
R _{DS(on)}	Drain-Source On-State Resistance ④	V _{GS} =10V, I _D =50A	--	0.9	1.3	mΩ

Dynamic Electrical Characteristics@T_j = 25°C (unless otherwise stated)

C _{iss}	Input Capacitance	V _{GS} =0V , V _{DS} =30V, f=1MHz	--	8500	--	pF
C _{oss}	Output Capacitance		--	1700	--	pF
C _{rss}	Reverse Transfer Capacitance		--	68	--	pF
R _g	Gate Resistance	V _{DS} =0V, f=1MHz	--	1.0	--	Ω
Q _g	Total Gate Charge	V _{GS} =4.5V V _{DS} =30V, I _D =50A ,	--	63	--	nC
Q _{gs}	Gate-Source Charge		--	21	--	nC
Q _{gd}	Gate-Drain Charge		--	18	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	V _{DS} =30V, V _{GS} =10V I _D =50A, R _G =1.6Ω	--	7	--	ns
Tr	Turn-on Rise Time		--	10	--	ns
Td(off)	Turn-Off Delay Time		--	78	--	ns
Tf	Turn-Off Fall Time		--	32	--	ns

Source- Drain Diode Characteristics@ T_j = 25°C (unless otherwise stated)

VSD	Forward on voltage	I _{SD} =50A, V _{GS} =0V	--	0.8	1.1	V
Trr	Reverse Recovery Time	I _F =50A	--	56	--	ns
Qrr	Reverse Recovery Charge	di/dt=100A/μs	--	73	--	nC

NOTE: ① Repetitive rating; pulse width limited by max junction temperature.

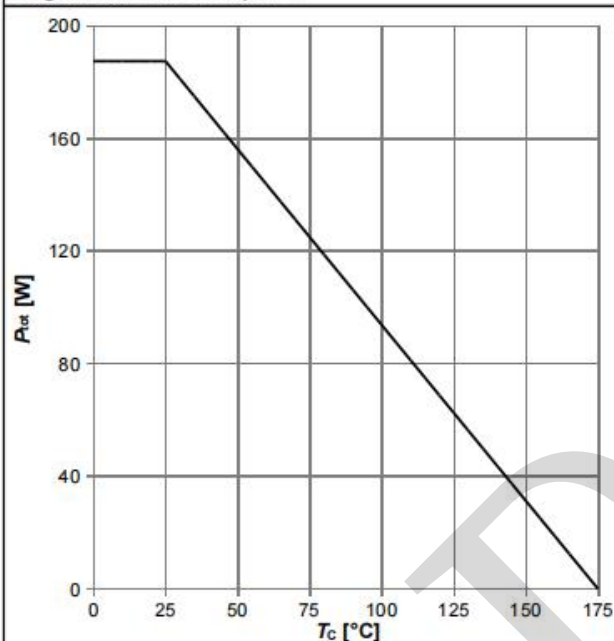
② Limited by T_{Jmax}, starting T_J = 25°C, L=0.5mH, R_G=25Ω. Part not recommended for use above this value.

③ The power dissipation P_{DSM} is based on R_{θJA} and the maximum allowed junction temperature of 150°C.

④ Pulse width ≤ 300μs; duty cycle ≤ 2%.

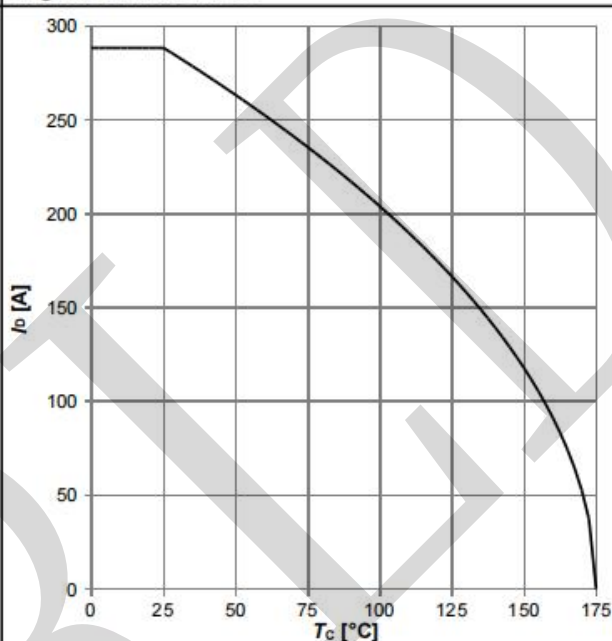
Typical Characteristics

Diagram 1: Power dissipation



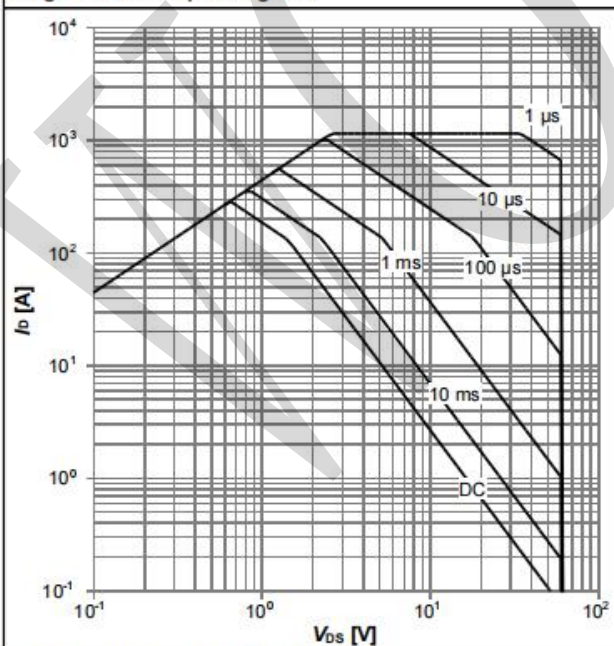
$$P_{tot}=f(T_c)$$

Diagram 2: Drain current



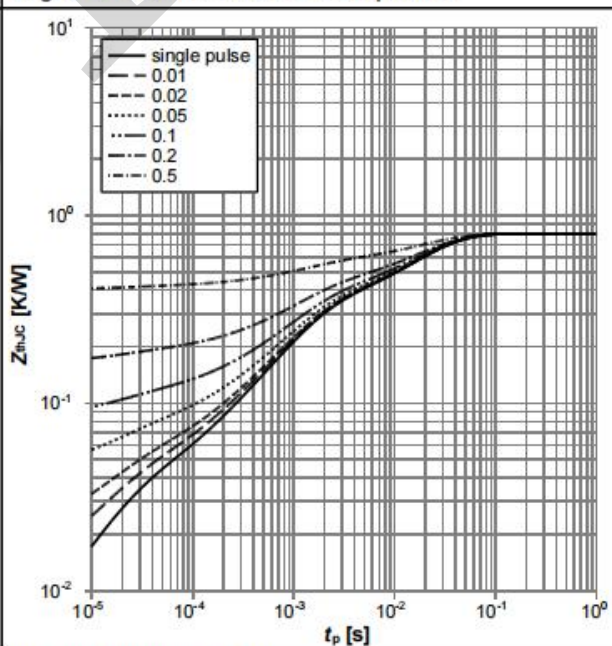
$$I_D=f(T_c); V_{GS} \geq 10 \text{ V}$$

Diagram 3: Safe operating area



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

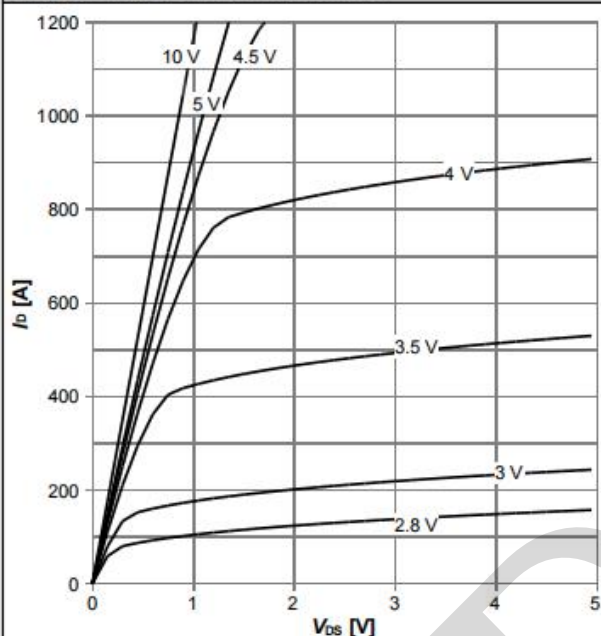
Diagram 4: Max. transient thermal impedance



$$Z_{thJC}=f(t_p); \text{parameter: } D=t_p/T$$

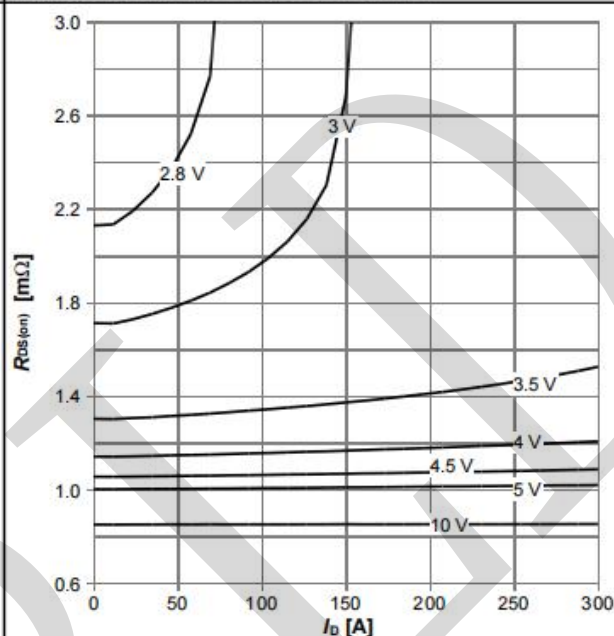
Typical Characteristics

Diagram 5: Typ. output characteristics



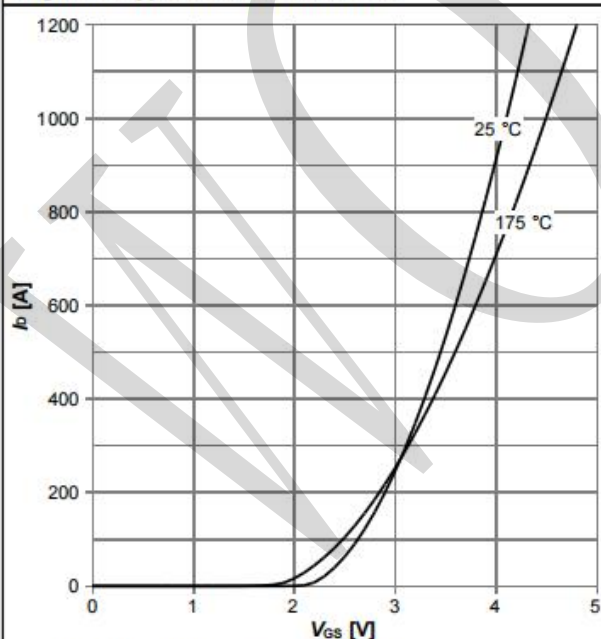
$I_D = f(V_{DS})$, $T_j = 25^\circ\text{C}$; parameter: V_{GS}

Diagram 6: Typ. drain-source on resistance



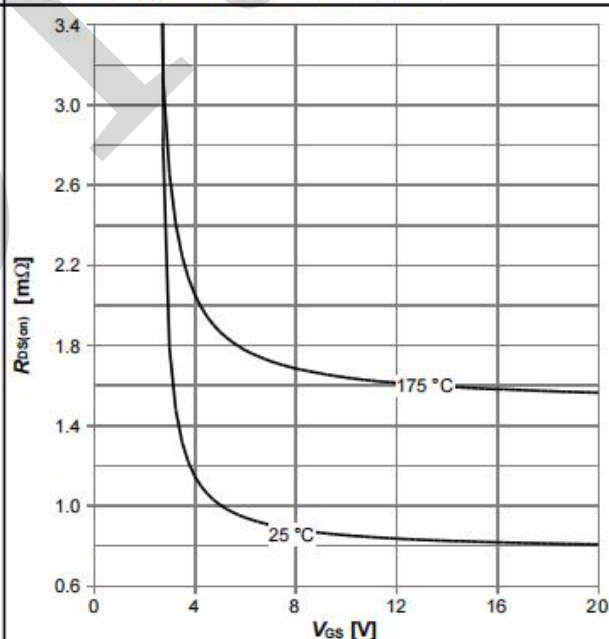
$R_{DS(on)} = f(I_D)$, $T_j = 25^\circ\text{C}$; parameter: V_{GS}

Diagram 7: Typ. transfer characteristics



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

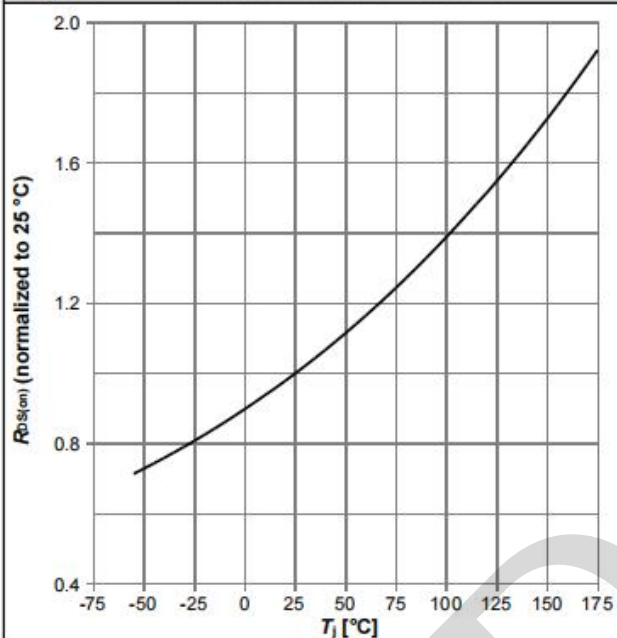
Diagram 8: Typ. drain-source on resistance



$R_{DS(on)} = f(V_{GS})$, $I_D = 50\text{ A}$; parameter: T_j

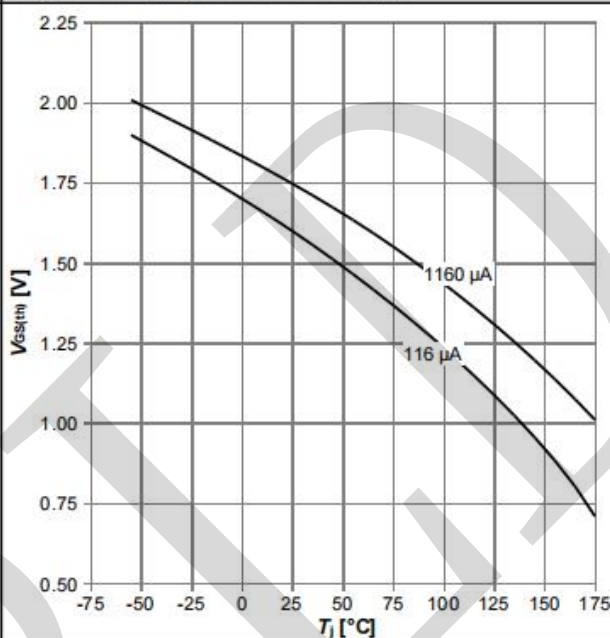
Typical Characteristics

Diagram 9: Normalized drain-source on resistance



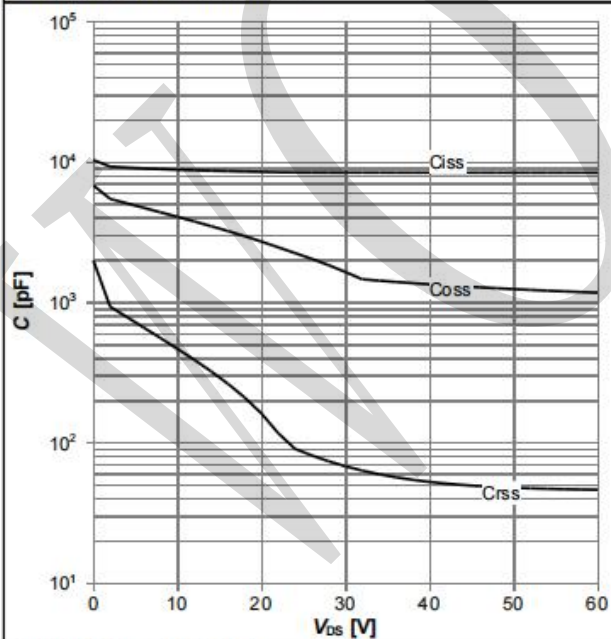
$R_{DS(on)} = f(T_J)$, $I_D = 50$ A, $V_{GS} = 10$ V

Diagram 10: Typ. gate threshold voltage



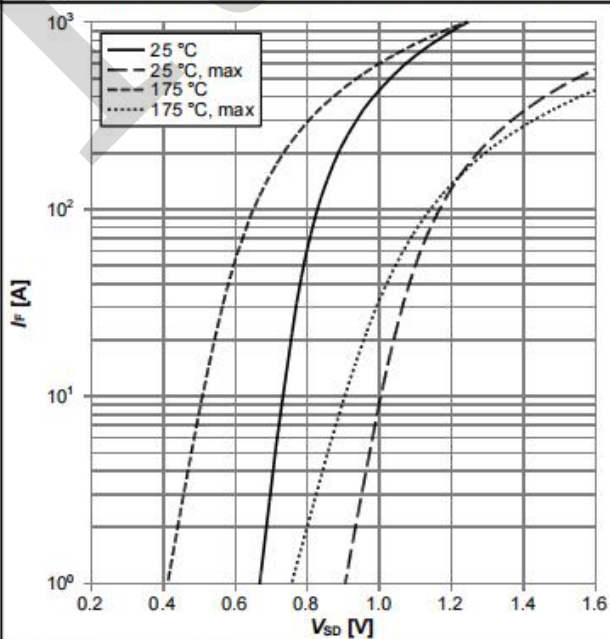
$V_{GS(th)} = f(T_J)$, $V_{GS} = V_{DS}$; parameter: I_D

Diagram 11: Typ. capacitances



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

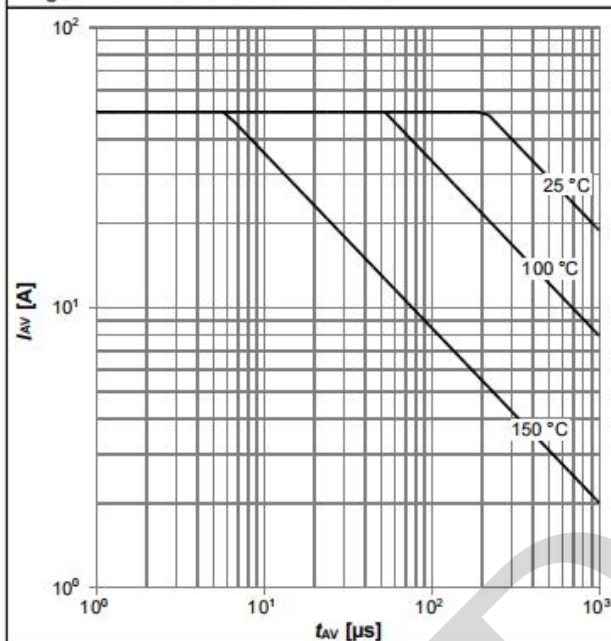
Diagram 12: Forward characteristics of reverse diode



$I_R = f(V_{SD})$; parameter: T_J

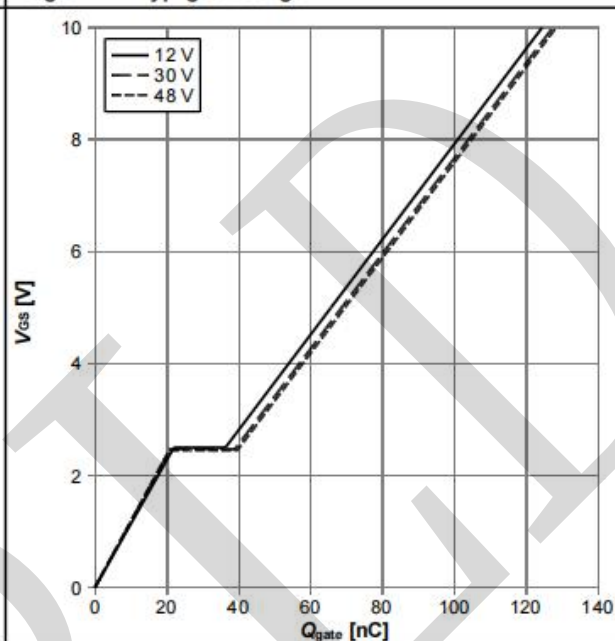
Typical Characteristics

Diagram 13: Avalanche characteristics



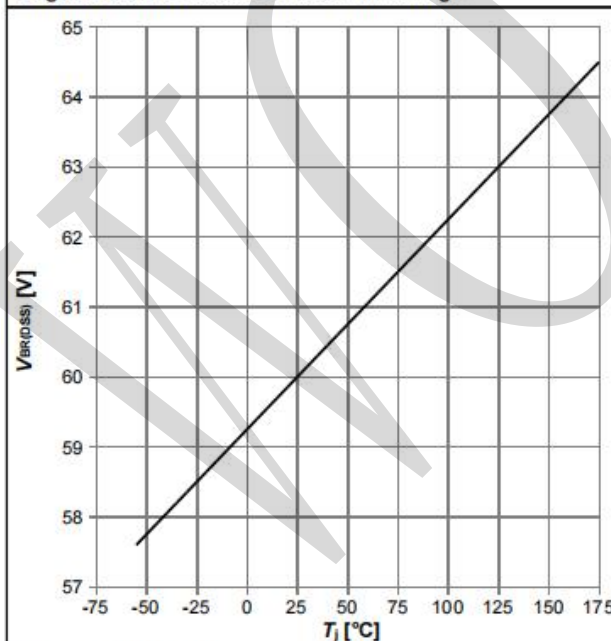
$I_{AS}=f(t_{AV})$; $R_{GS}=25\ \Omega$; parameter: $T_{j,start}$

Diagram 14: Typ. gate charge



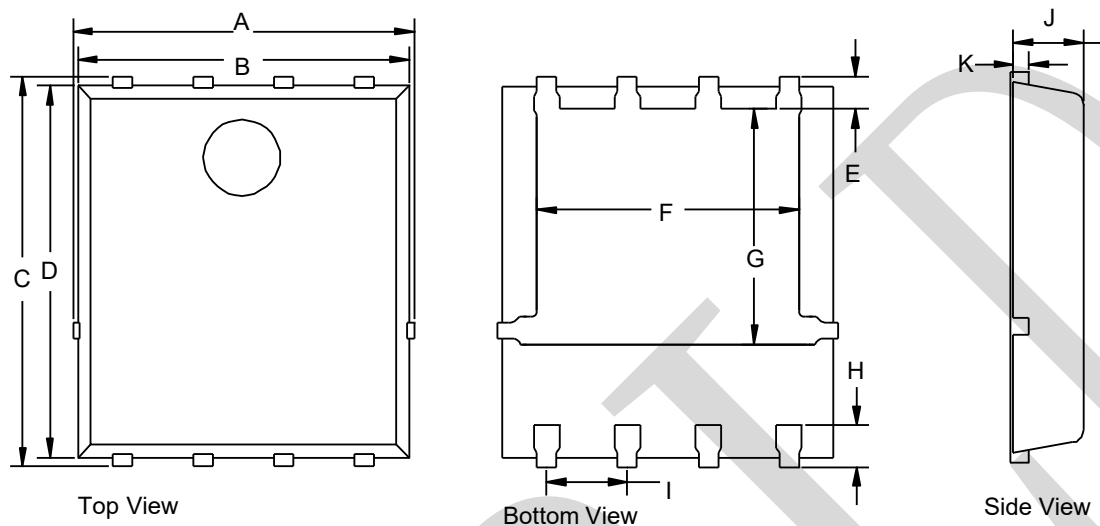
$V_{GS}=f(Q_{gate})$, $I_b=50\text{ A}$ pulsed, $T_f=25\text{ °C}$; parameter: V_{DD}

Diagram 15: Drain-source breakdown voltage



$V_{BR(DSS)}=f(T_j)$; $I_b=1\text{ mA}$

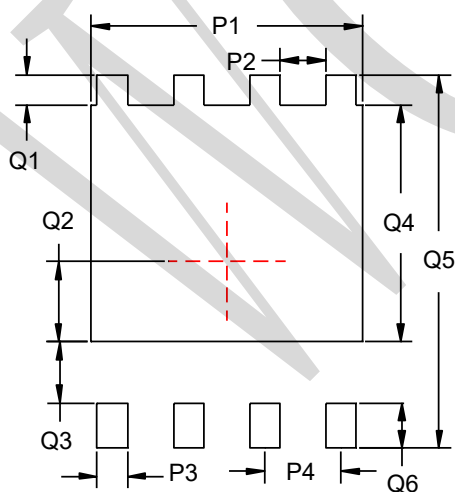
PACKAGE OUTLINE DIMENSIONS



PDFN5x6 mechanical data

UNIT		A	B	C	D	E	F	G	H	I	J	K
mm	min	4.90	4.8	5.90	5.66	0.60	3.90	3.30	0.53	1.27	0.9	0.254
	max	5.55	5.4	6.35	6.06		4.32	3.92	0.76		1.2	
mil	min	192.9	188.9	232.3	222.8	23.6	153.5	129.9	20.8	50.0	35.4	10.0
	max	218.5	212.6	250.0	238.6		170.1	154.3	29.9		47.2	

PDFN5x6 Suggested Pad Layout



UNIT		P1	P2	P3	P4	Q1
mm	min	4.52	0.76	0.51	1.27	0.50
mil	min	177.9	29.9	20.07	50.0	20.0

UNIT		Q2	Q3	Q4	Q5	Q6
mm	min	1.34	1.02	3.97	6.25	0.76
mil	min	52.75	40.15	156.30	246.06	29.92