RST015N06SM10

N-MOSFET 60V, 250A, 1.3mΩ

Features

- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- $R_{DS(on).typ}$=1.3mΩ@V_{GS}=10V
- High Reliability Capability

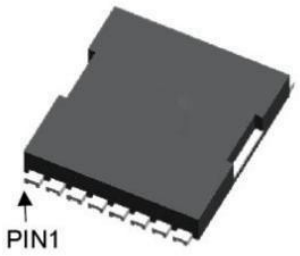
Product Summary

V_{DS}	60V
$R_{DS(on).typ}$@V_{GS}=10V	1.3mΩ
I_D	250A

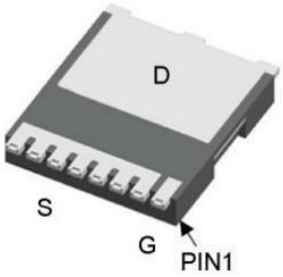
Application

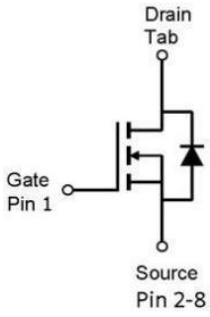
- Charger
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

TOLL Top View



TOLL Bottom View





Package Marking and Ordering Information

Type	Package	Marking	Reel Size	Qty
RST015N06SM10	TOLL	LR015N06SM10	-	2000

Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source Voltage	V_{DS}	60	V
Continuous Drain Current T_C = 25°C T_C = 100°C	I_D	 250 158	A
Pulsed Drain Current	$I_{D\ pulse}$	1000	A
Avalanche Energy, Single Pulse	E_{AS}	1296	mJ
Gate-emitter Voltage	V_{GS}	±20	V
Power Dissipation, T_C = 25℃	P_D	179	W
Operating Junction And Storage Temperature	T_j , T_{stg}	-55~150	℃

Thermal Resistance

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance, Junction to Case	R_{thJC}	0.5	0.7	℃/W
Thermal Resistance, Junction to Ambient	R_{thJA}	45	62	℃/W

Electrical Characteristic, at Tj = 25 °C, unless otherwise specified

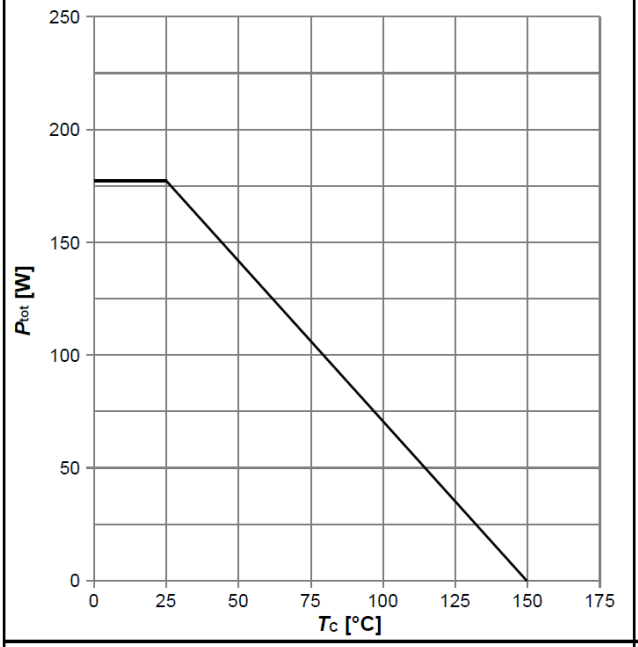
Parameter	Symbol	Test Condition	Value			Unit
			min.	typ.	max.	
Static Characteristic						
Drain-source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250uA	60	66	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	2.2	3	3.8	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V	-	-	1	μA
Gate-source leakage current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Drain-source on-state Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=40A	-	1.3	1.5	mΩ
Dynamic Characteristic						
Input Capacitance	C_{iss}	V_{GS}=0V,	-	6944	-	pF
Output Capacitance	C_{oss}	V_{DS}=30V,	-	1421	-	
Reverse Transfer Capacitance	C_{rss}	f=1MHz	-	256	-	
Gate Total Charge	Q_g	V_{GS}=10V,	-	131	-	nC
Gate-Source charge	Q_{gs}	V_{DS}=30V,	-	42	-	
Gate-Drain charge	Q_{gd}	I_D=50A	-	28	-	
Turn-on Delay Time	$t_{d(on)}$	V_{GS}=10V,	-	23	-	ns
Turn-on Rise Time	t_r	V_{DD}=30V,	-	40	-	
Turn-off Delay Time	$t_{d(off)}$	I_D=50A,	-	60	-	
Turn-off Fall Time	t_f	R_G=3Ω	-	27	-	

Body Diode Characteristic

Body Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_{SD}=50A	-	-	1.2	V
Reverse Recovery Time	t_{rr}	I_F=50A,	-	60	-	ns
Reverse Recovery Charge	Q_{rr}	dI_F/dt=100A/us	-	123	-	nC

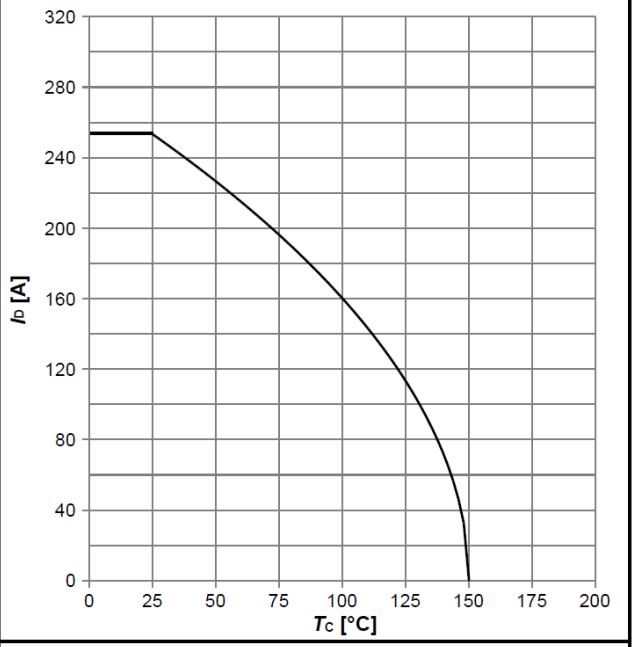
Typical Performance Characteristics

Diagram 1: Power dissipation



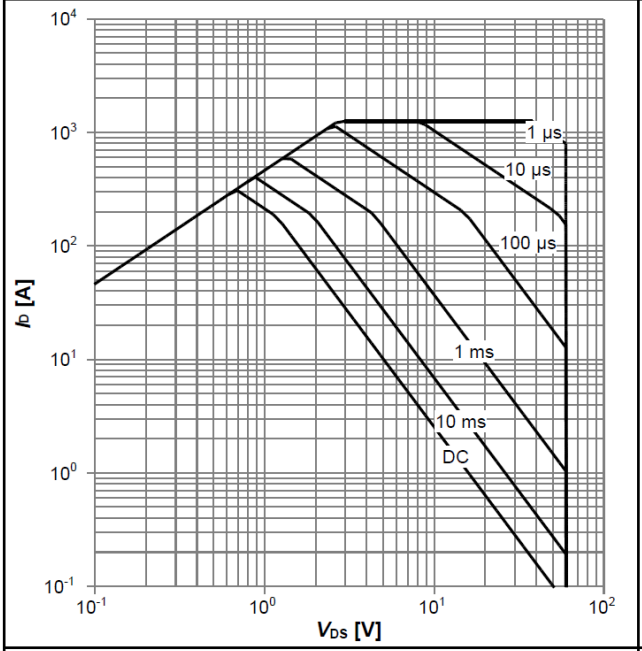
$P_{tot}=f(T_C)$

Diagram 2: Drain current



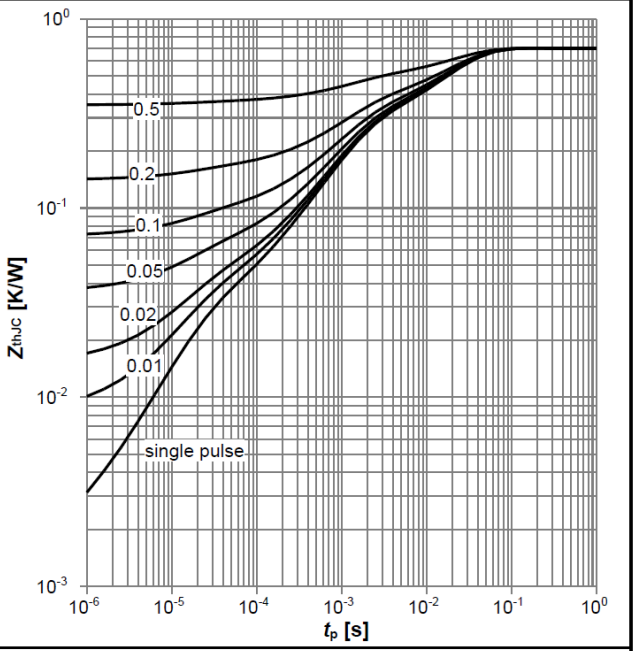
$I_D=f(T_C)$; $V_{GS}\geq 10$ V

Diagram 3: Safe operating area



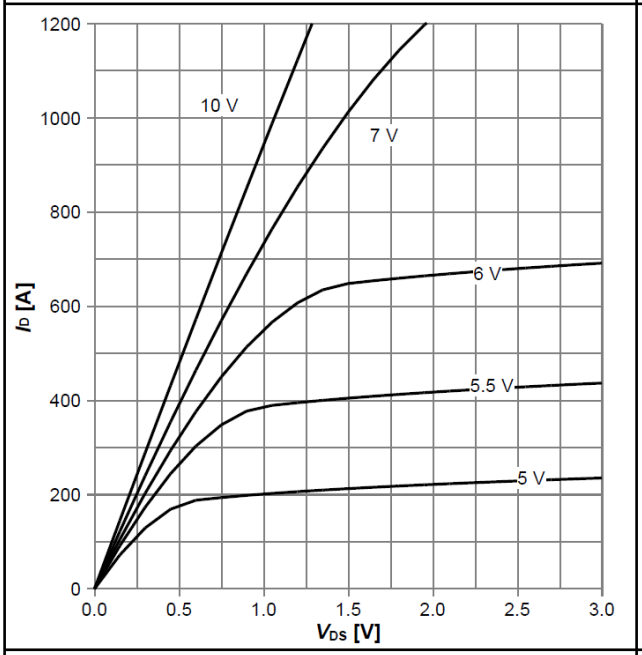
$I_D=f(V_{DS})$; $T_C=25$ °C; $D=0$; parameter: t_p

Diagram 4: Max. transient thermal impedance



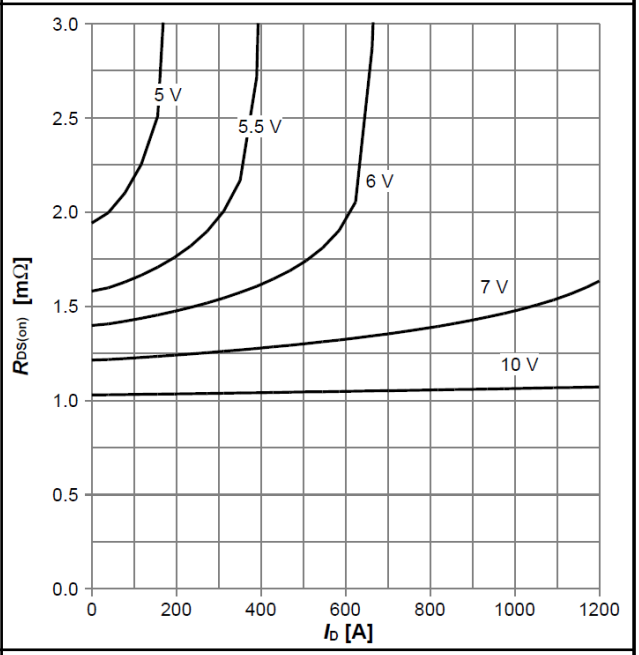
$Z_{thJC}=f(t_p)$; parameter: $D=t_p/T$

Diagram 5: Typ. output characteristics



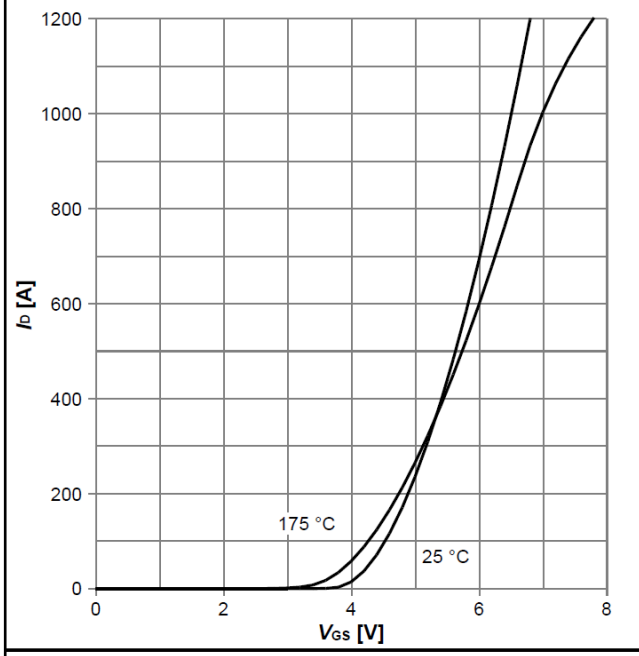
$I_D=f(V_{DS})$; $T_j=25$ °C; parameter: V_{GS}

Diagram 6: Typ. drain-source on resistance



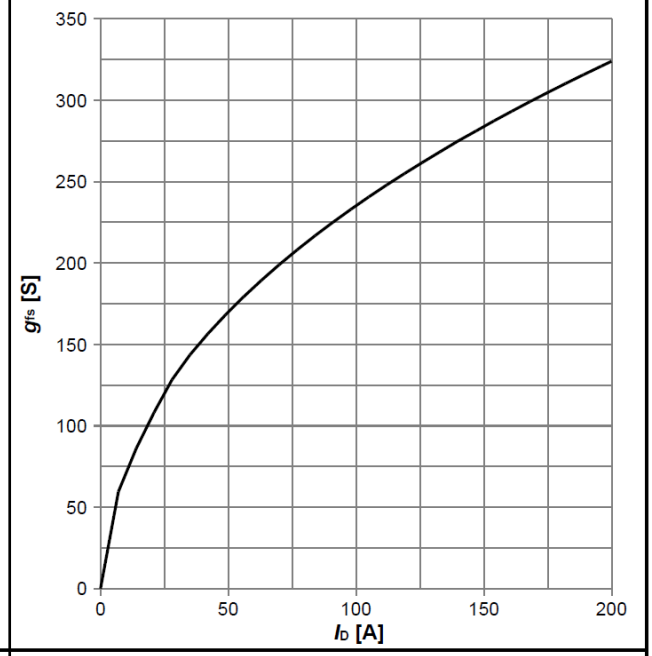
$R_{DS(on)}=f(I_D)$; $T_j=25$ °C; parameter: V_{GS}

Diagram 7: Typ. transfer characteristics



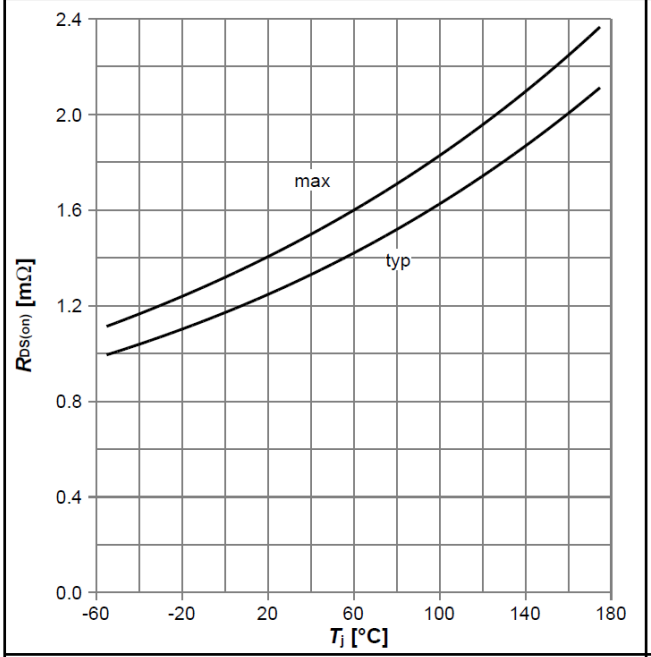
$I_D=f(V_{GS})$; $|V_{DS}|>2|I_D|R_{DS(on)max}$; parameter: T_j

Diagram 8: Typ. forward transconductance



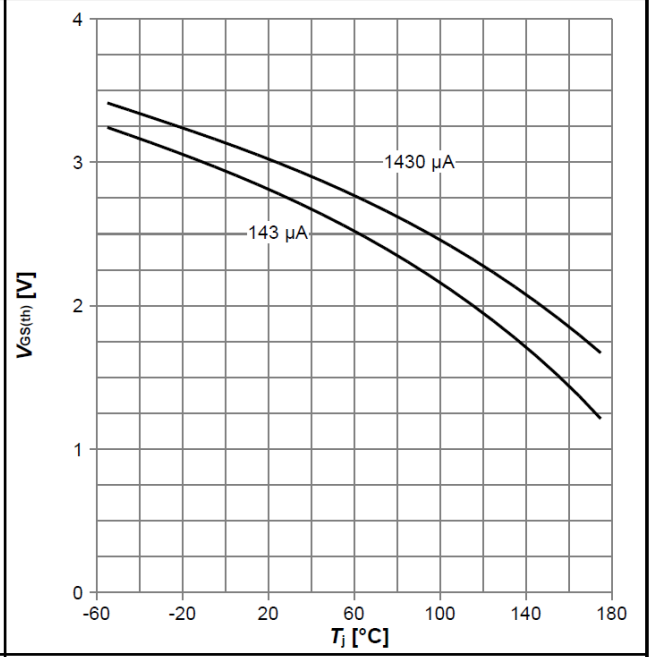
$g_{fs}=f(I_D)$; $T_j=25$ °C

Diagram 9: Drain-source on-state resistance



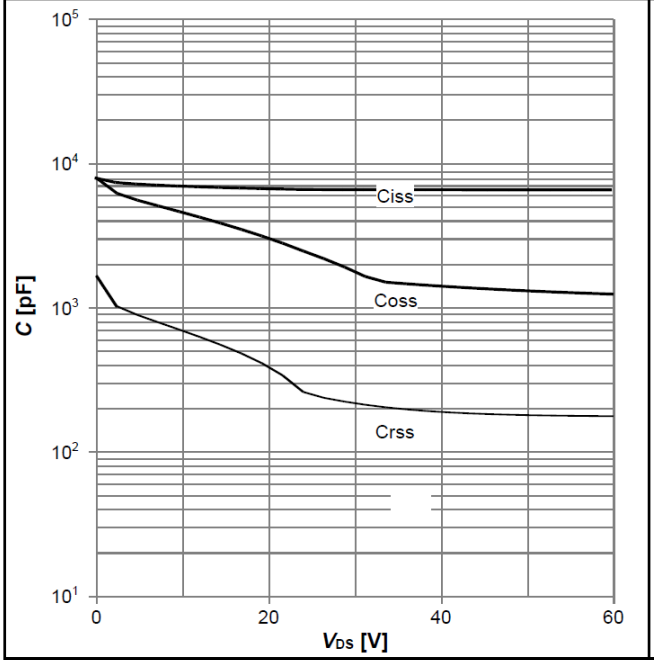
$R_{DS(on)}$=f(T_j); I_D=40 A; V_{GS}=10 V

Diagram 10: Typ. gate threshold voltage



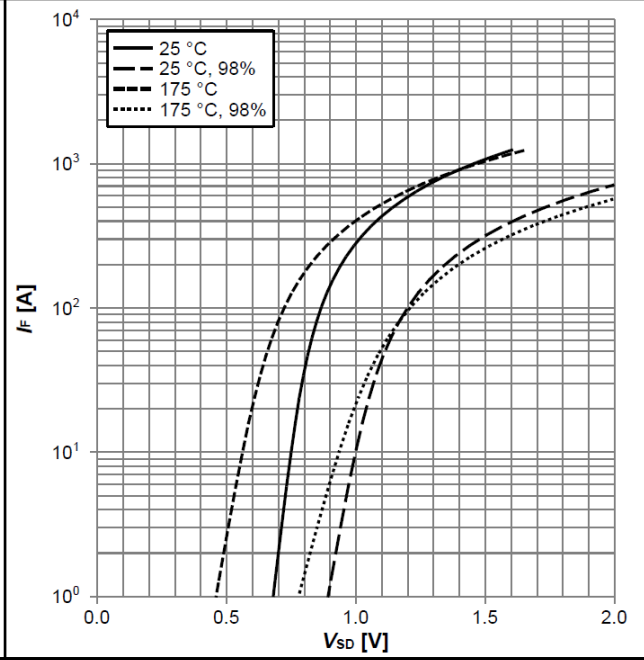
$V_{GS(th)}$=f(T_j); V_{GS}=V_{DS}

Diagram 11: Typ. capacitances



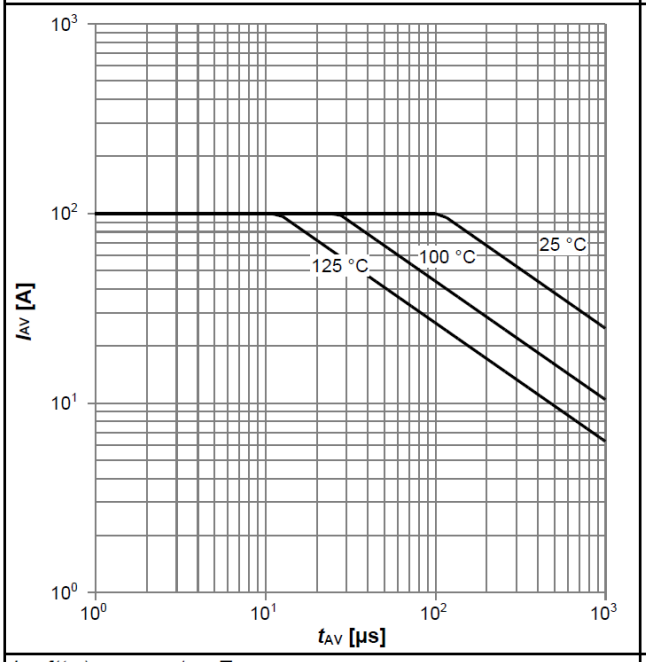
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz

Diagram 12: Forward characteristics of reverse diode



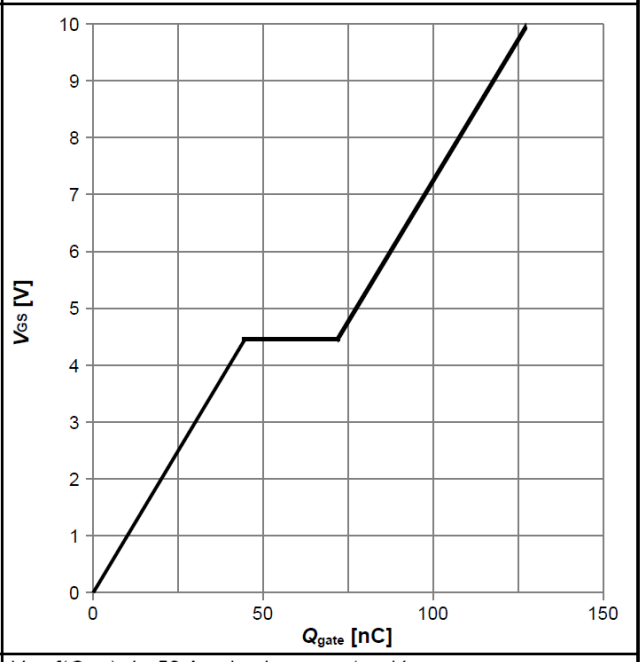
I_F=f(V_{SD}); parameter: T_j

Diagram 13: Avalanche characteristics



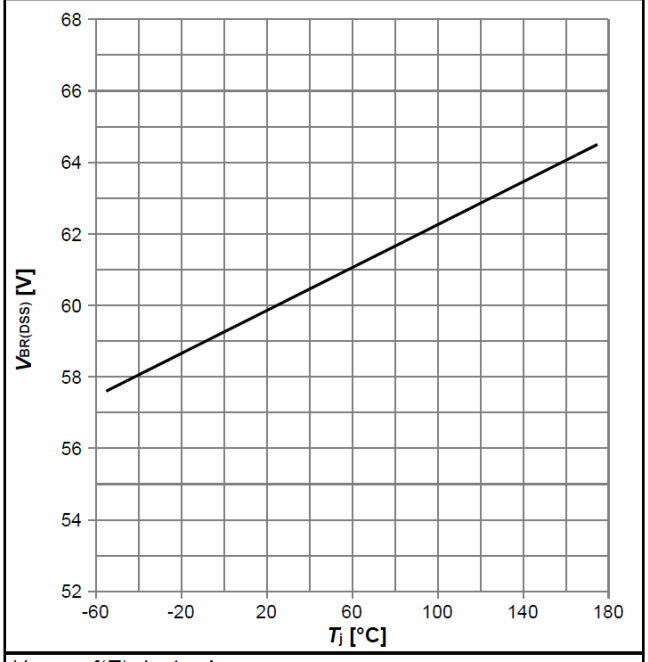
$I_{AS}=f(t_{AV})$; parameter: $T_{j(start)}$

Diagram 14: Typ. gate charge



$V_{GS}=f(Q_{gate})$; I_D=50 A pulsed; parameter: V_{DD}

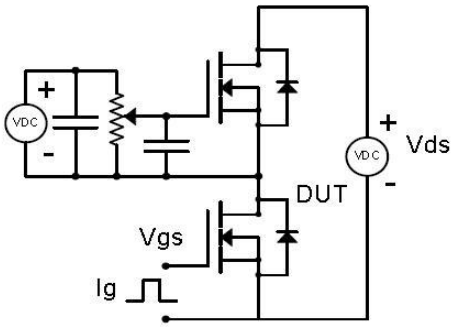
Diagram 15: Drain-source breakdown voltage

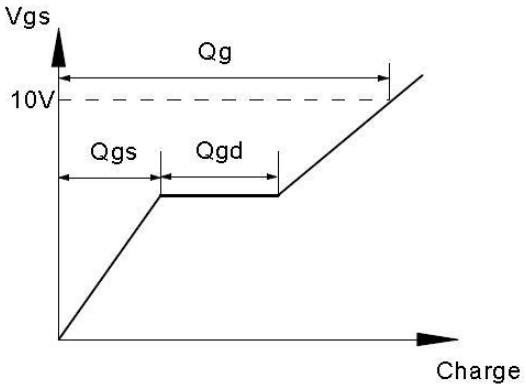


$V_{BR(DSS)}=f(T_j)$; I_D=1 mA

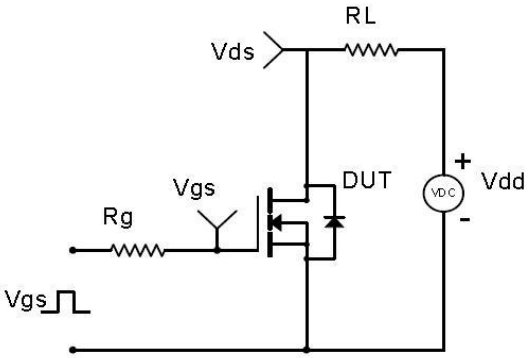
Test Circuit & Waveform

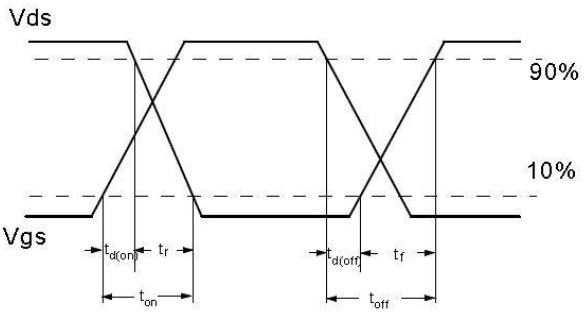
Gate Charge Test Circuit & Waveform



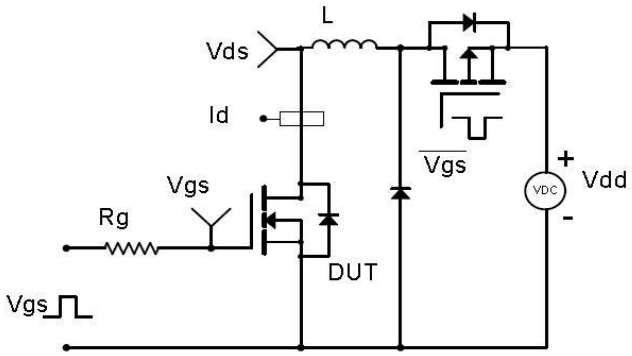


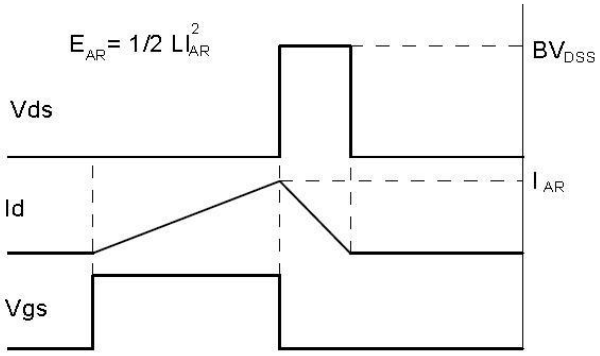
Resistive Switching Test Circuit & Waveforms



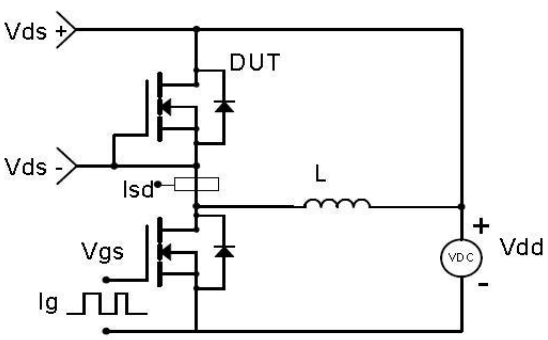


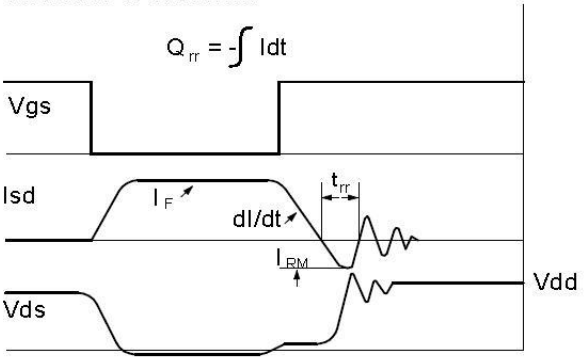
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



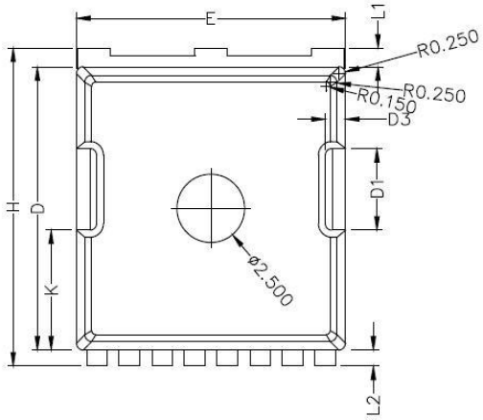


Diode Recovery Test Circuit & Waveforms

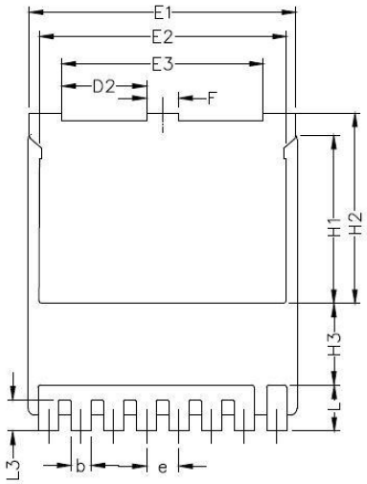




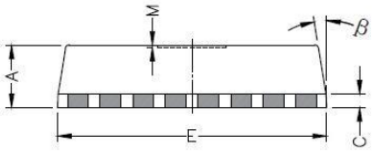
Package Outline: TOLL



Top View



Bottom View



Symbols	Millimeters		
	MIN.	NOM.	MAX.
A	2.20	2.30	2.40
b	0.65	0.75	0.85
C	0.508 REF		
D	10.25	10.40	10.55
D1	2.85	3.00	3.15
D2	2.95	3.10	3.25
D3	0.75 REF		
E	9.75	9.90	10.05
E1	9.65	9.80	9.95
E2	8.95	9.10	9.25
E3	7.25	7.40	7.55
e	1.20 BSC		
F	1.05	1.20	1.35
H	11.55	11.70	11.85
H1	6.03	6.18	6.33
H2	6.85	7.00	7.15
H3	3.00 BSC		
L	1.55	1.70	1.85
L1	0.55	0.70	0.85
L2	0.45	0.60	0.75
L3	1.00	1.15	1.30
M	0.08 REF		
β	8°	10°	12°
K	4.25	4.40	4.55