

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
650V	28mΩ@10V	95A



合肥矽普半导体

Siliup Semiconductor Technology Co., Ltd

技术 品质 服务

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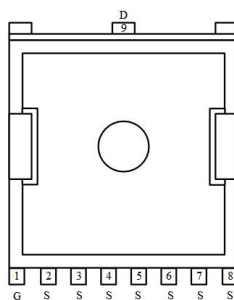
Feature

- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low $R_{DS(on)}$
- Easy to Parallel
- Simple to Drive
- RoHS Compliant

Applications

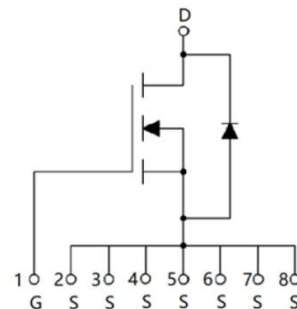
- Power Factor Correction Modules
- Switch Mode Power Supplies
- Photovoltaic Inverter
- UPS Power Supply
- Motor Drive
- High Voltage DC/DC Converter
- Switching Mode Power Supply

Package

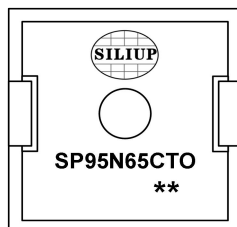


TOLL

Circuit diagram



Marking



SP95N65CTO : Product code
** : Week code

Order Information

Device	Package	Unit/Tape
SP95N65CTO	TOLL	2000

Absolute maximum ratings (Ta=25°C, unless otherwise noted)

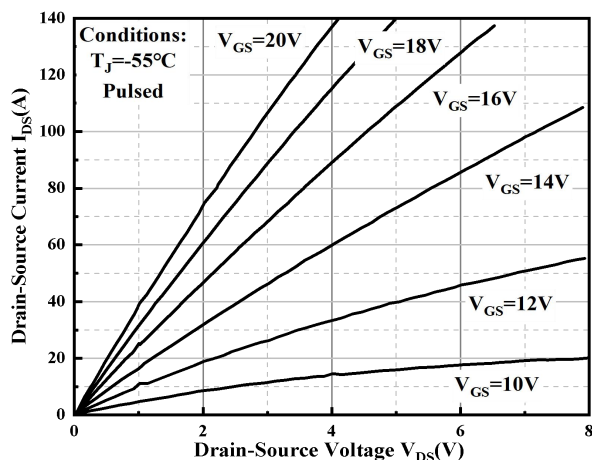
Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GSMAX}	-10/+22	V
Recommend Gate-Source Voltage	V_{GSop}	-5/+18	V
Continuous Drain Current (Tc=25°C)	I_D	135	A
Continuous Drain Current (Tc=100°C)	I_D	95	A
Pulsed Drain Current	I_{DM}	280	A
Total Power Dissipation (Tc=25°C)	P_D	720	W
Total Power Dissipation (Tc=100°C)	P_D	352	W
Thermal Resistance Junction-Case	$R_{\theta JC}$	0.21	°C/W
Storage Temperature Range	T_{STG}	-55 to 175	°C
Operating Junction Temperature Range	T_J	-55 to 175	°C

Electrical characteristics (Ta=25°C, unless otherwise noted)

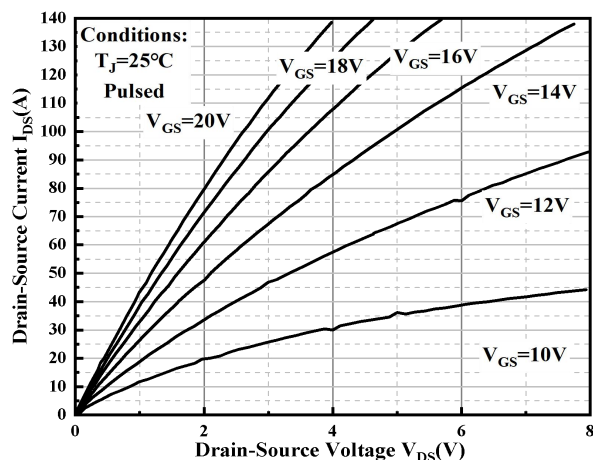
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V , ID=100uA	650	---	---	V
Drain-Source Leakage Current	IDSS	VDS=650, VGS=0V, TJ=25℃	---	3	100	uA
Gate-Source Leakage Current	IGSS	VGS=-5V~+20V , VDS=0V, TJ=25℃	---	---	100	nA
Gate Threshold Voltage	VGS(th)	VGS=VDS , ID =12mA, TJ=25℃	2.0	2.8	4.0	V
		VGS=VDS , ID =12mA, TJ=175℃	---	2.0	---	
Static Drain-Source On-Resistance	RDS(ON)	VGS=18V , ID=40A, TJ=25℃	---	28	32	mΩ
		VGS=18V , ID=40A, TJ=175℃	---	38	---	
		VGS=15V , ID=40A, TJ=25℃	---	35	---	
		VGS=15V , ID=40A, TJ=175℃	---	42	---	
Dynamic characteristics						
Input Capacitance	Ciss	VDS=600V , VGS=0V , f=1MHz, VAC=25mV	---	3090	---	pF
Output Capacitance	Coss		---	251	---	
Reverse Transfer Capacitance	Crss		---	19	---	
Switching Characteristics						
Total Gate Charge	Qg	VDS=400V , VGS= -3/+18V , ID=40A	---	125	---	nC
Gate-Source Charge	Qgs		---	36	---	
Gate-Drain Charge	Qgd		---	38	---	
Turn-On Delay Time	Td(on)	VDS=400V , VGS= 3.5/+18V , ID=40A RG=3.3Ω	---	4.4	---	ns
Rise Time	Tr		---	21.3	---	
Turn-Off Delay Time	Td(off)		---	20.6	---	
Fall Time	Tf		---	9.7	---	
Turn-On Energy	Eon		---	30	---	μJ
Turn-Off Energy	Eoff		---	71	---	
Total Switching Loss	Etot		---	101	---	

Reverse Diode Characteristics						
Diode Forward Voltage	V_{SD}	$V_{GS} = -5V, I_{SD} = 20A, T_J = 25^\circ C$	---	3.7	---	V
		$V_{GS} = -5V, I_{SD} = 20A, T_J = 175^\circ C$	---	3.5	---	
Diode forward current	I_S	$V_{GS} = -2V, T_J = 25^\circ C$	---	---	133	A
		$V_{GS} = -2V, T_J = 175^\circ C$	---	---	90	
Reverse Recovery Time	t_{rr}	$V_{GS} = -3.5V/+18V, I_{SD} = 40A,$ $V_R = 400V,$ $di/dt = 3000A/\mu s$	---	16	---	ns
Reverse Recovery Charge	Q_{rr}		---	125	---	nC
Peak Reverse Recovery Current	I_{rm}		---	28	---	A

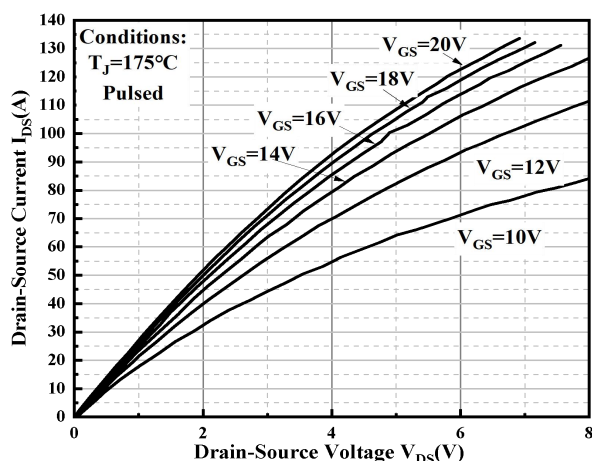
Typical Characteristics



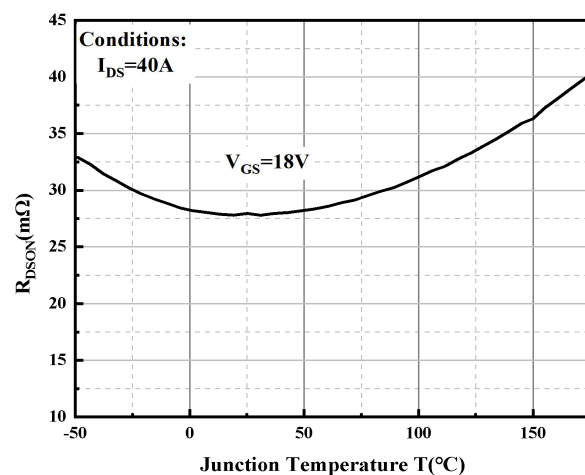
Typical output characteristic(-55°C)



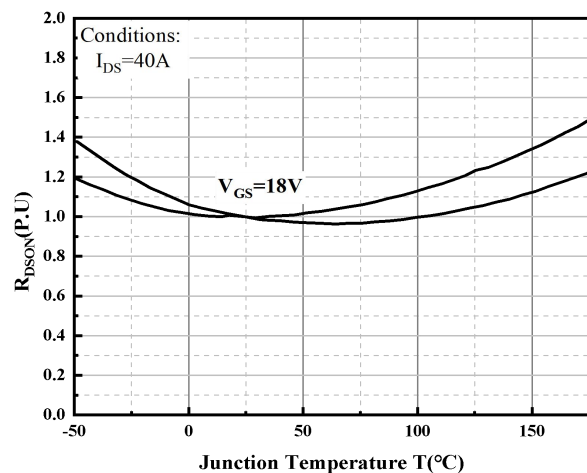
Typical output characteristic(25°C)



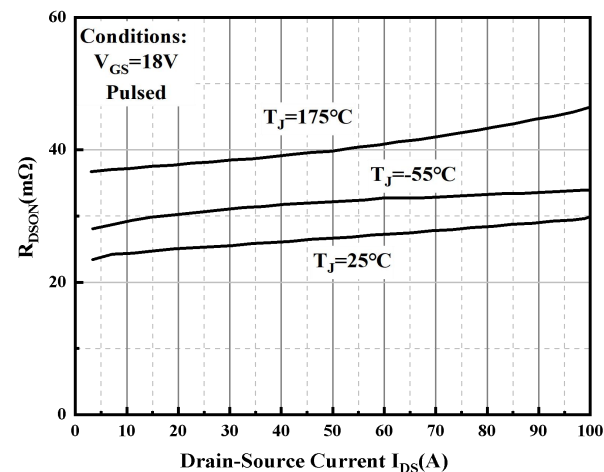
Typical output characteristic(175°C)



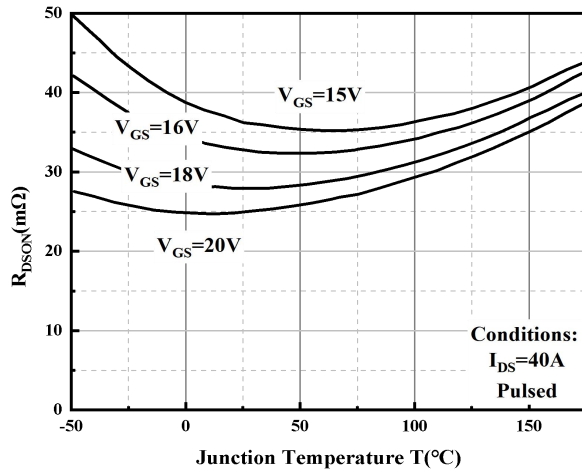
Normalized On-Resistance with Temperature



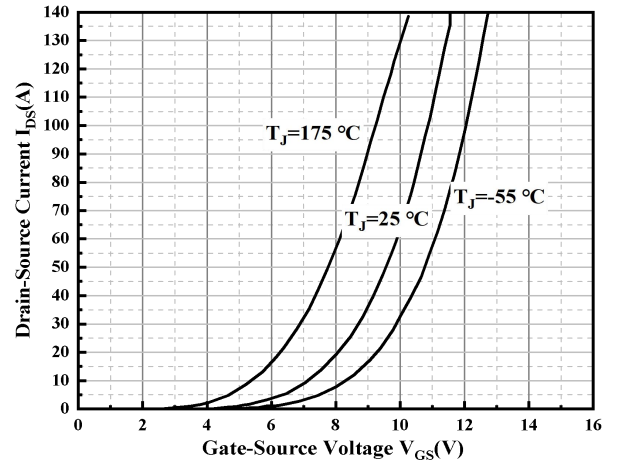
Normalized Ron vs. Temperature



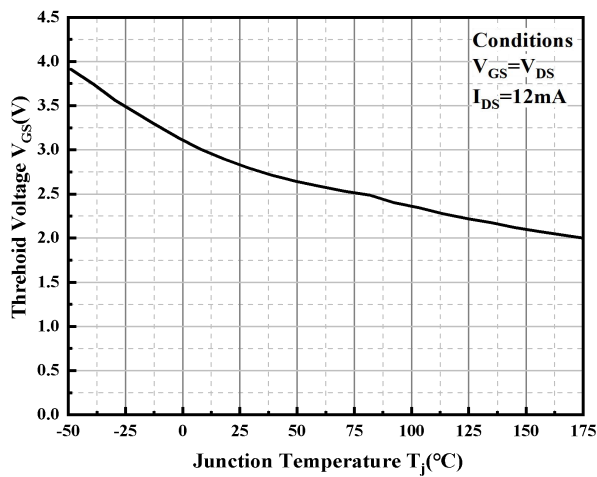
On-Resistance vs. Drain-Source Current



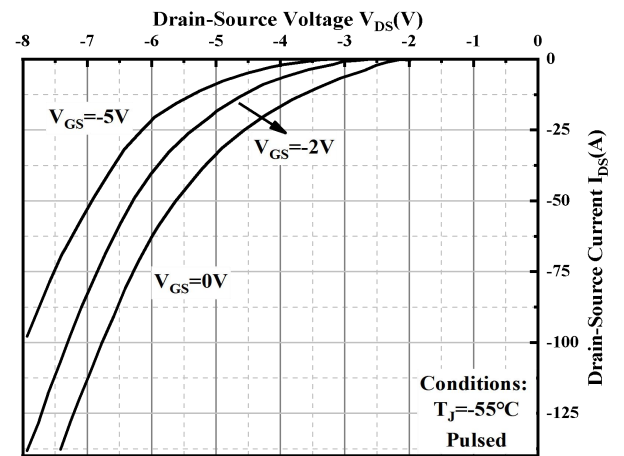
On-Resistance Variation with Temperature



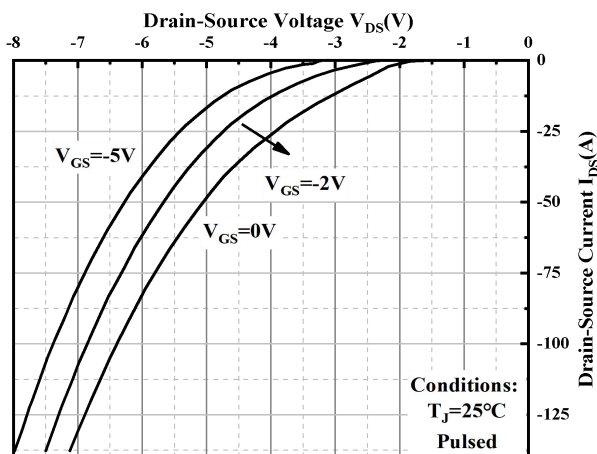
Transfer Curves



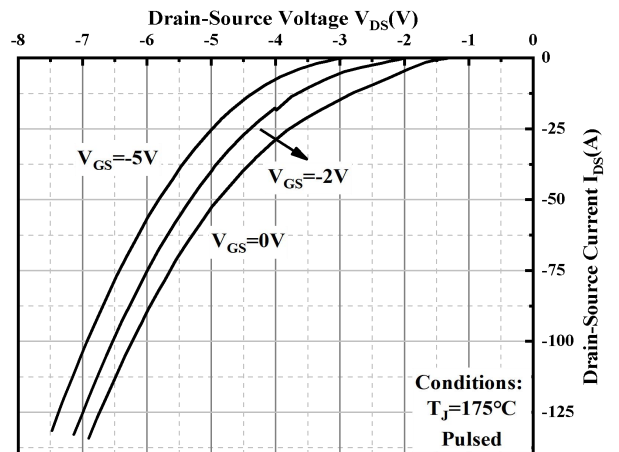
Threshold Voltages.Temperature



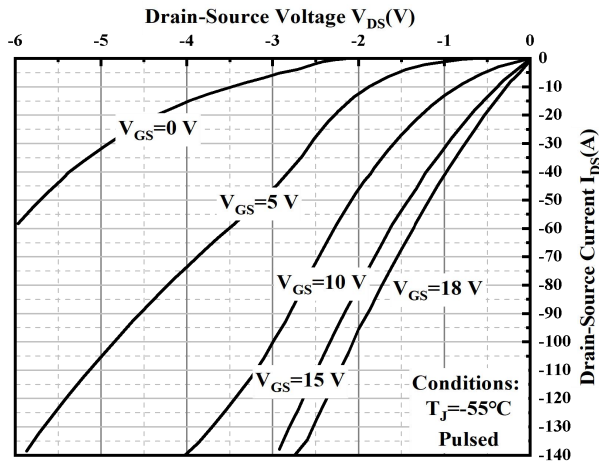
Body Diode curves($-55^{\circ}C$)



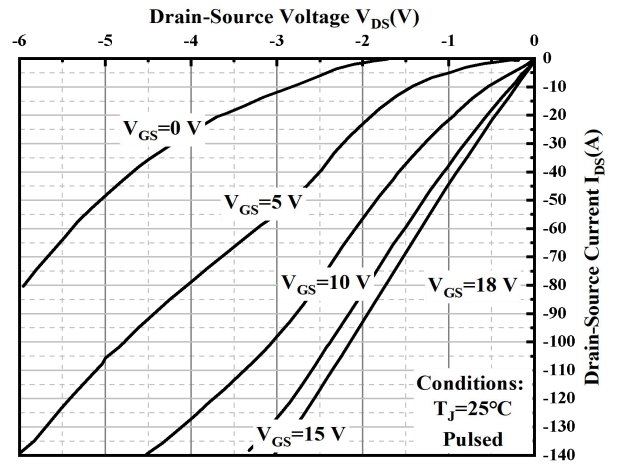
Body Diode curves($25^{\circ}C$)



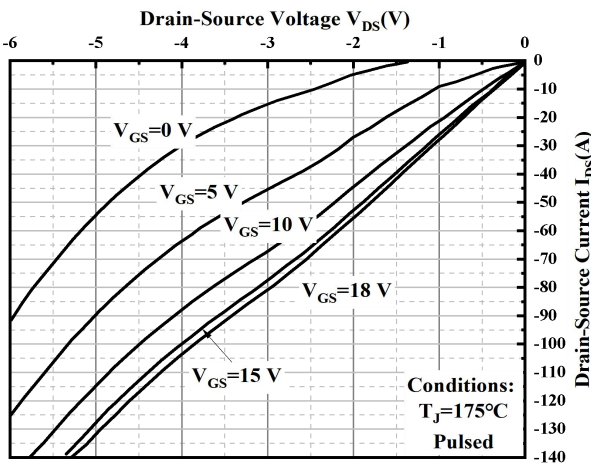
Body Diode curves($175^{\circ}C$)



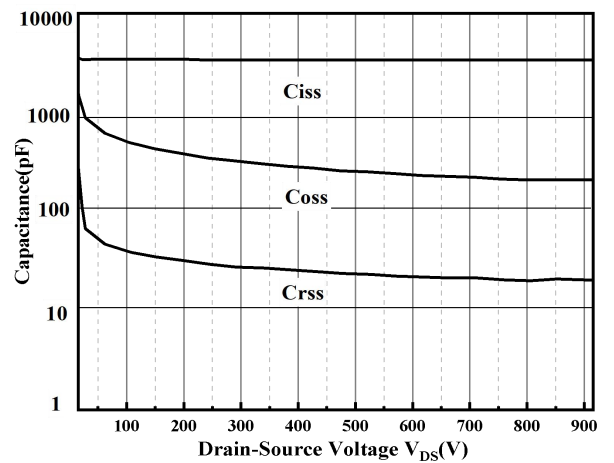
3rd Quadrant curves(-55°C)



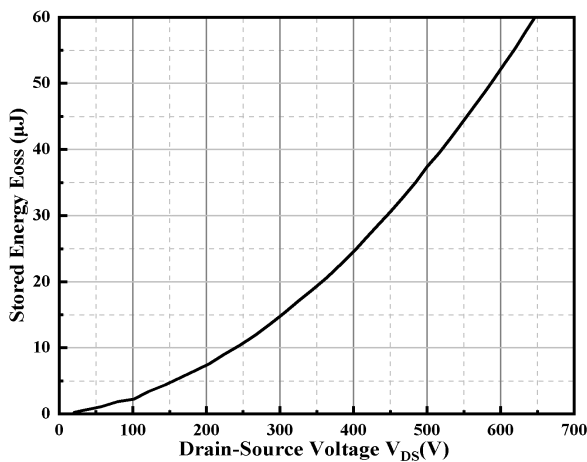
3rd Quadrant curves(175°C)



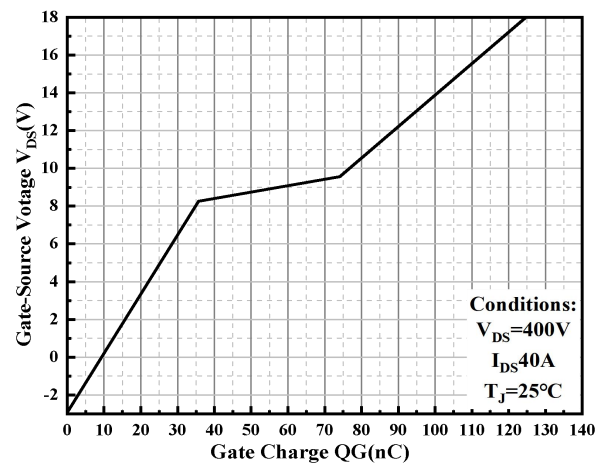
3rd Quadrant curves(175°C)



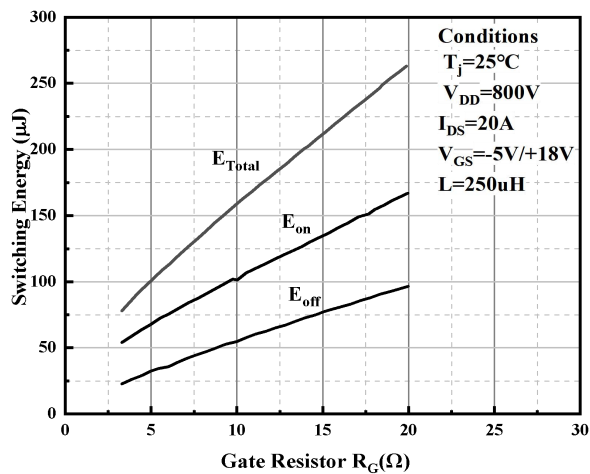
Capacitance vs. V_{DS}



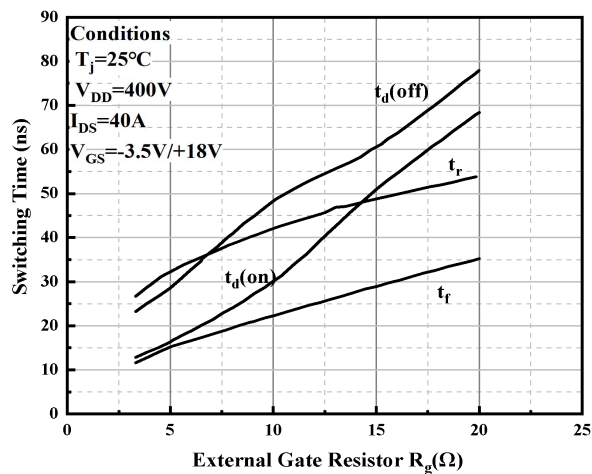
Output Capacitor Stored Energy



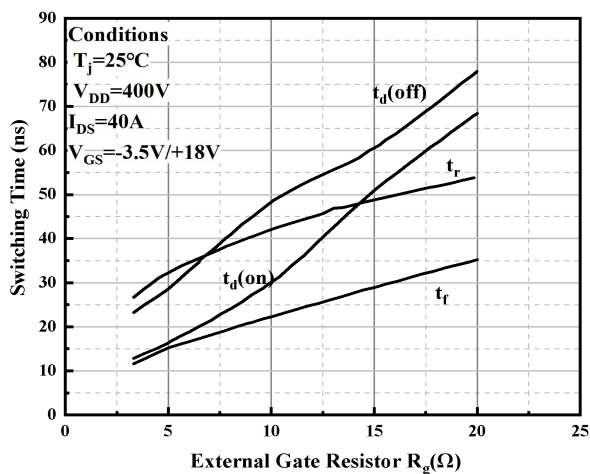
Gate Charge Characteristics



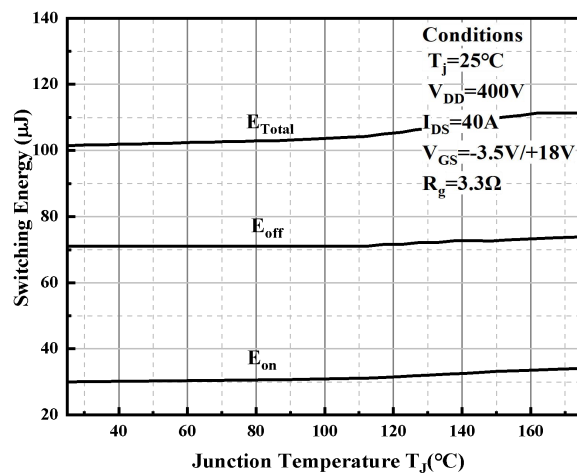
Switching Energy vs. $R_{G(\text{ext})}$



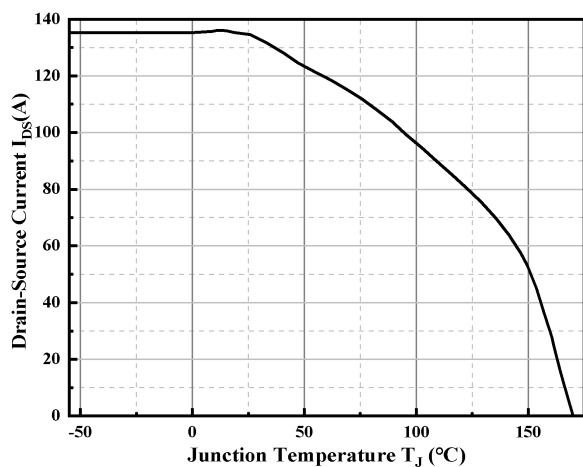
Switching Times vs. $R_{G(\text{ext})}$



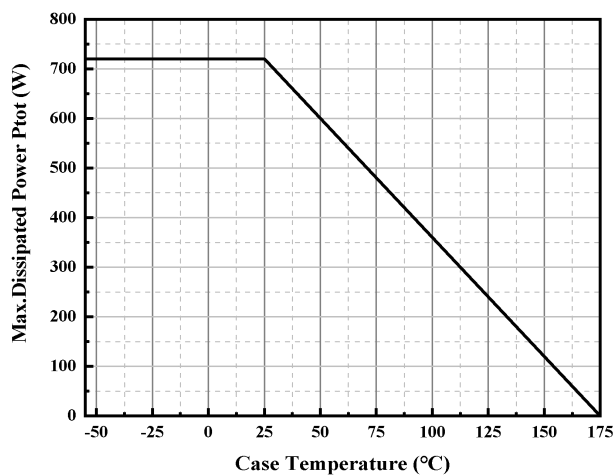
Switching Energy vs. I_{DS}



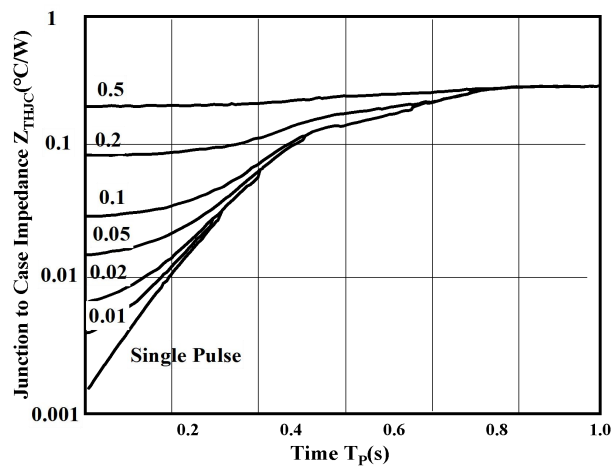
Switching Energy vs. Temperature



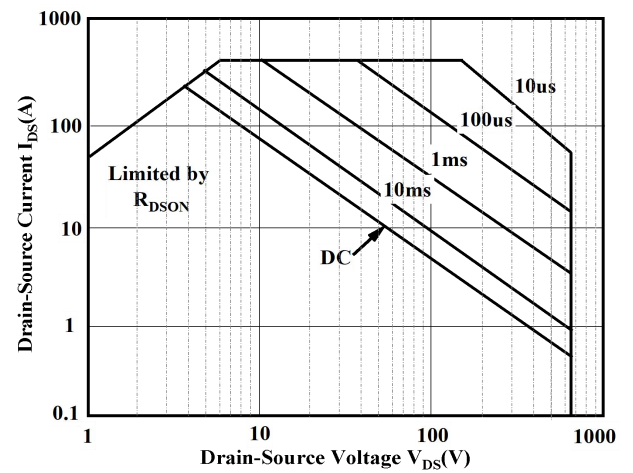
Continuous Drain Current vs. Case Temperature



Power Dissipation Derating vs. Case Temperature

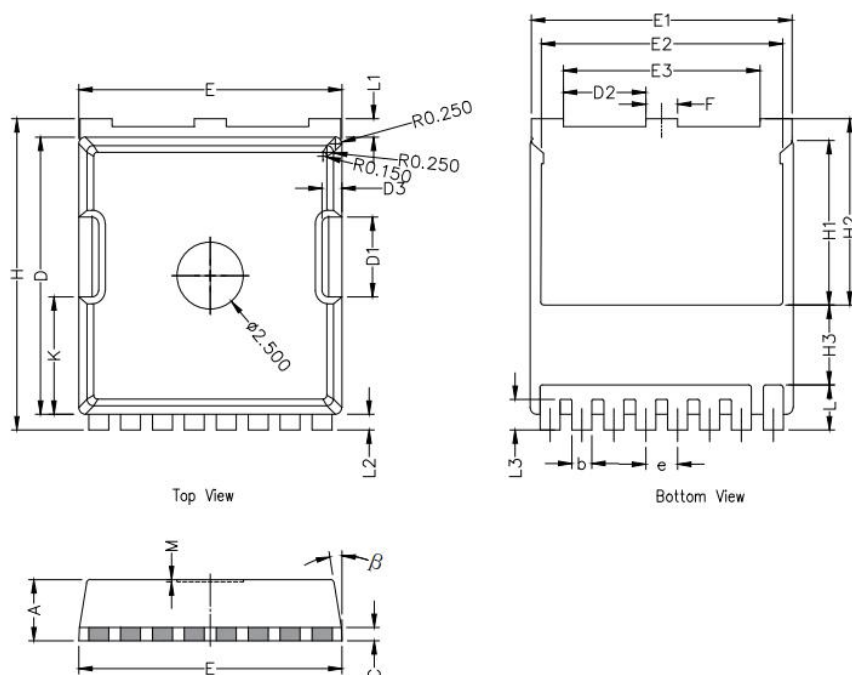


Thermal impedance



Safe Operating Area

TOLL Package Information



Symbol	Dimensions In 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
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	0.7	0.85
L2	0.45	0.6	0.75
M	0.08 REF.		
β	8°	10°	12°
K	4.25	4.40	4.55