

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
650V	25mΩ@18V	75A



合肥矽普半导体

Siliup Semiconductor Technology Co., Ltd

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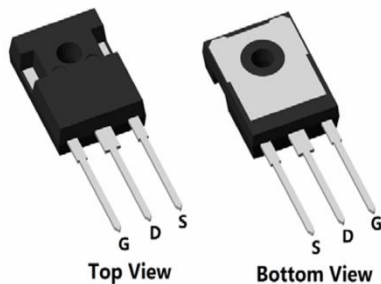
Feature

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

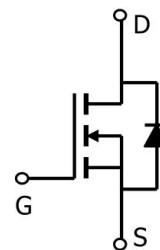
Applications

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

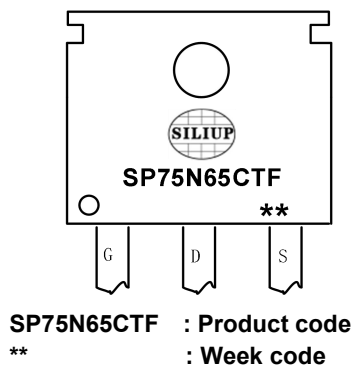
Package



Circuit diagram



Marking



Order Information

Device	Package	Unit/Tube
SP75N65CTF	TO-247	30

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

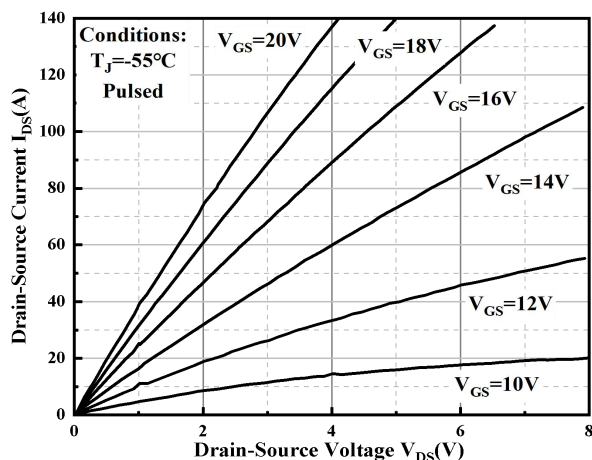
Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GSMAX}	-10/+22	V
Recommend Gate-Source Voltage	V_{GSop}	-5/+18	V
Continuous Drain Current(Tc=25°C)	I_D	112	A
Continuous Drain Current(Tc=100°C)	I_D	75	A
Pulsed Drain Current	I_{DM}	250	A
Total Power Dissipation(Tc=25°C)	P_D	454	W
Total Power Dissipation ² (Tc=100°C)	P_D	232	W
Thermal Resistance Junction-Case	$R_{\theta JC}$	0.33	°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)

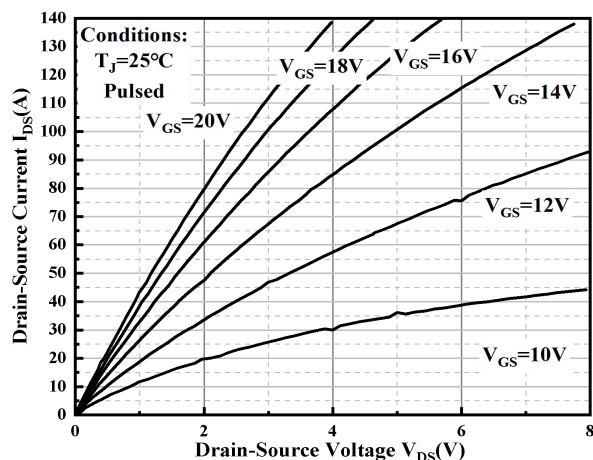
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V , ID=100uA	650	---	---	V
Drain-Source Leakage Current	IDSS	VDS=650, VGS=0V, TJ=25℃	---	3	100	uA
Gate-Source Leakage Current	IGSS	VGS=-5V~+20V , VDS=0V, TJ=25℃	---	---	100	nA
Gate 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℃	---	25	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 (4.5V)	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	---	13	---	ns
Rise Time	Tr		---	26.5	---	
Turn-Off Delay Time	Td(off)		---	23	---	
Fall Time	Tf		---	12	---	
Turn-On Energy	Eon		---	219	---	μJ
Turn-Off Energy	Eoff		---	95	---	
Total Switching Loss	Etot		---	314	---	

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	$V_{GS} = -2V, T_J = 25^\circ C$	---	---	76	A
		$V_{GS} = -2V, T_J = 175^\circ C$	---	---	44	
Reverse Recovery Time	t_{rr}	$V_{GS} = -3.5V/+18V, I_{SD} = 40A,$ $V_R = 400V,$ $di/dt = 3000A/\mu s$	---	32	---	ns
Reverse Recovery Charge	Q_{rr}		---	195	---	nC
Peak Reverse Recovery Current	I_{rrm}		---	20	---	A

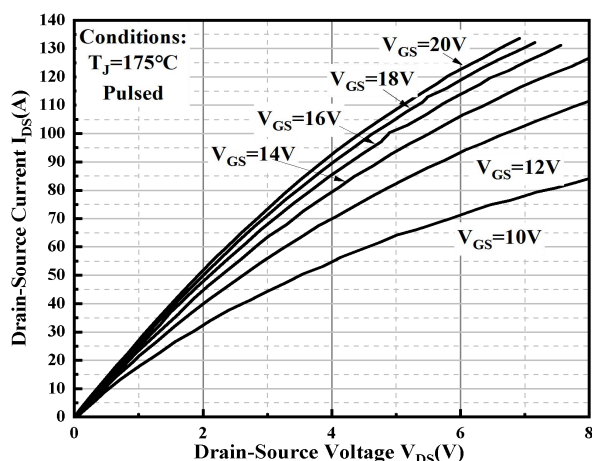
Typical Characteristics



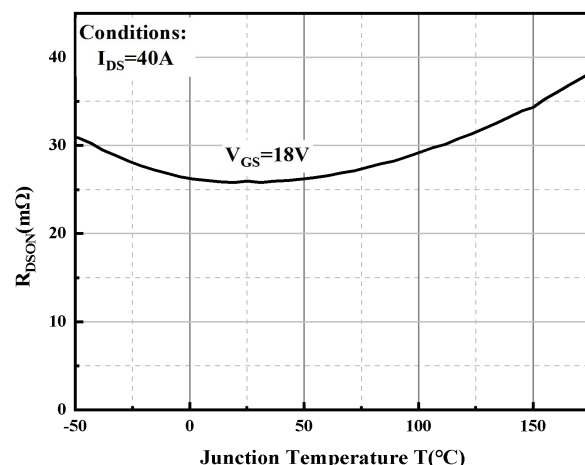
Typical output characteristic(-55°C)



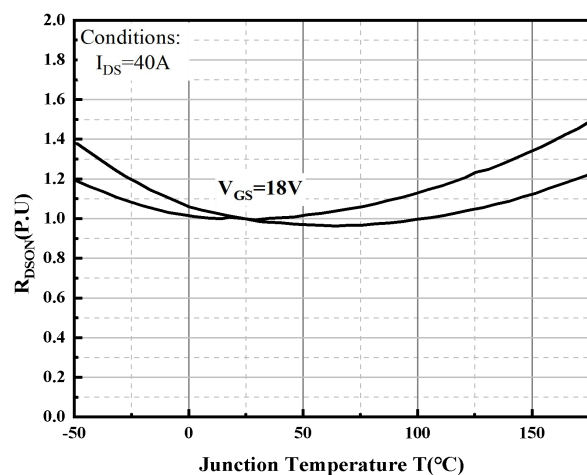
Typical output characteristic(25°C)



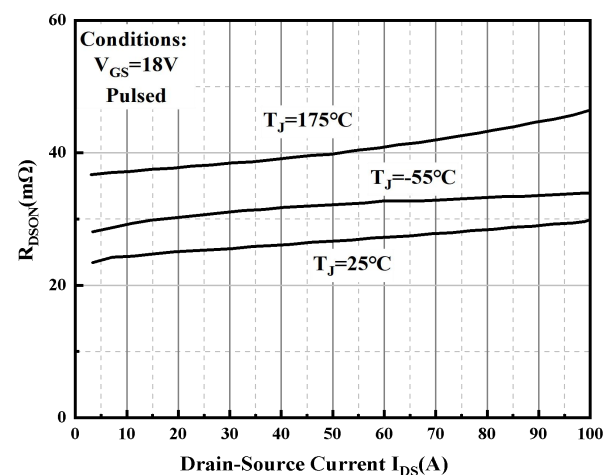
Typical output characteristic(175°C)



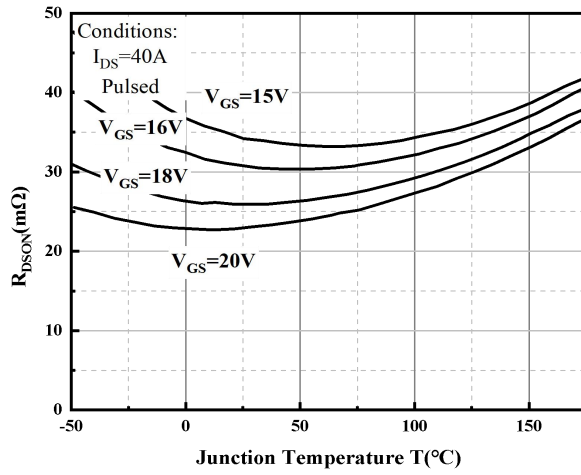
Normalized On-Resistance with Temperature



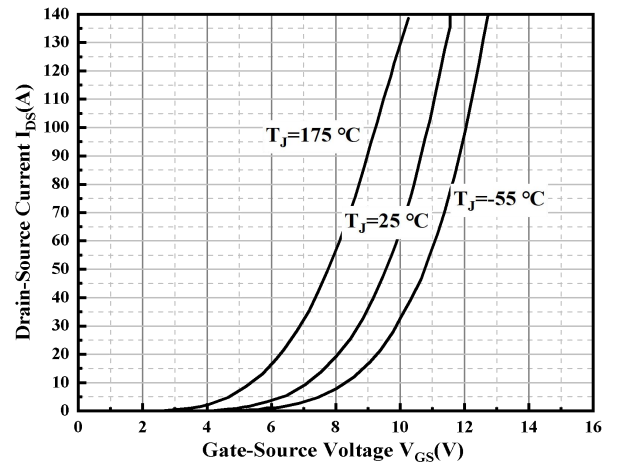
Normalized Ron vs. Temperature



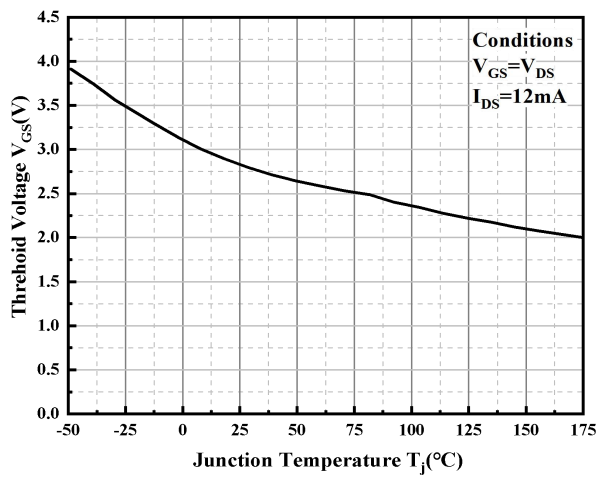
On-Resistance vs. Drain-Source Current



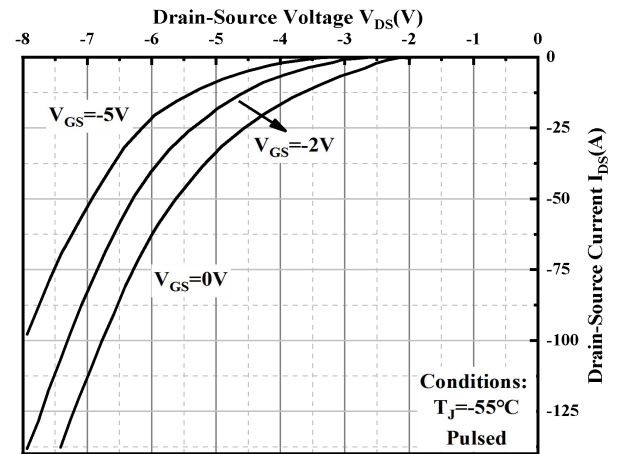
On-Resistance Variation with Temperature



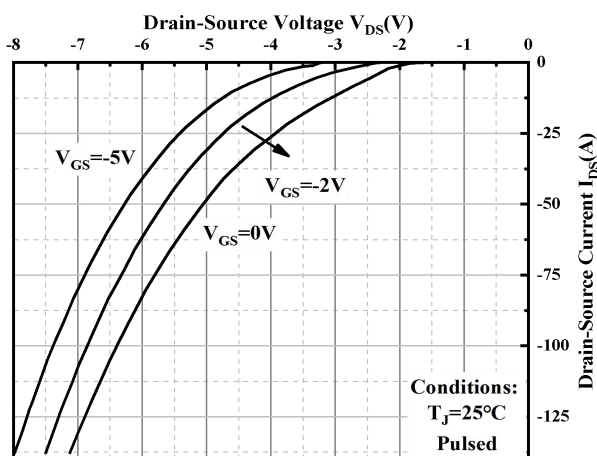
Transfer Curves



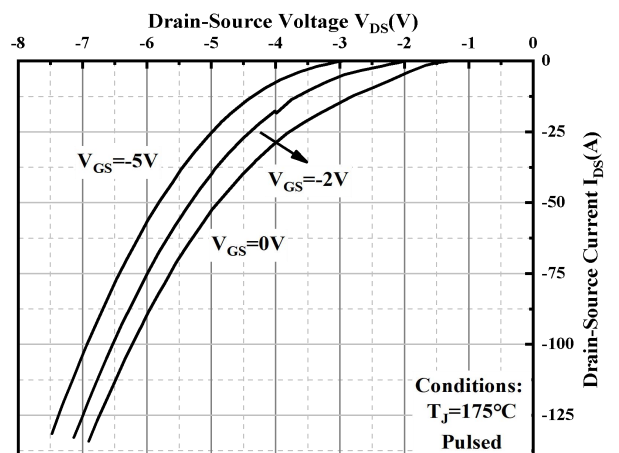
Threshold Voltages. Temperature



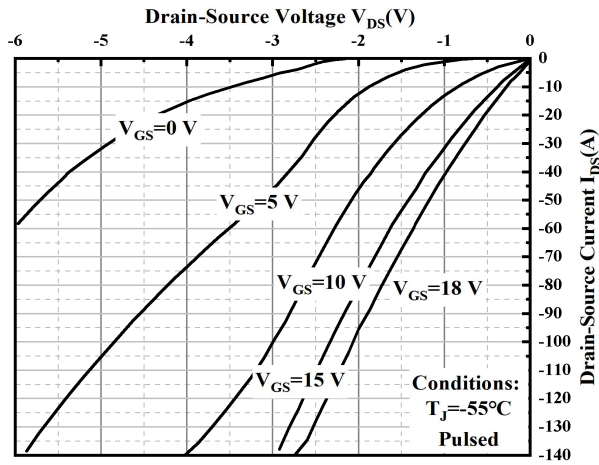
Body Diode curves($-55^{\circ}C$)



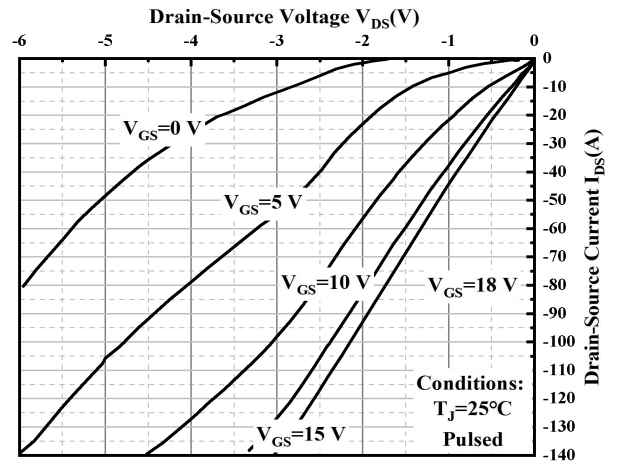
Body Diode curves($25^{\circ}C$)



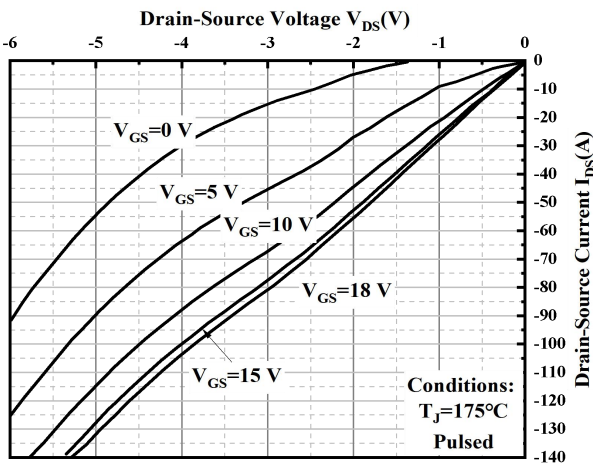
Body Diode curves($175^{\circ}C$)



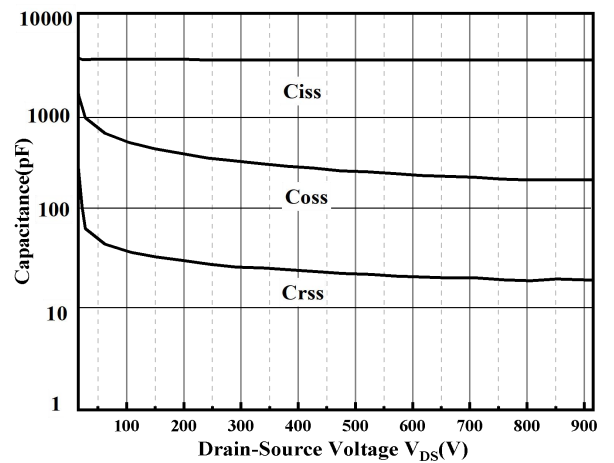
3rd Quadrant curves(-55°C)



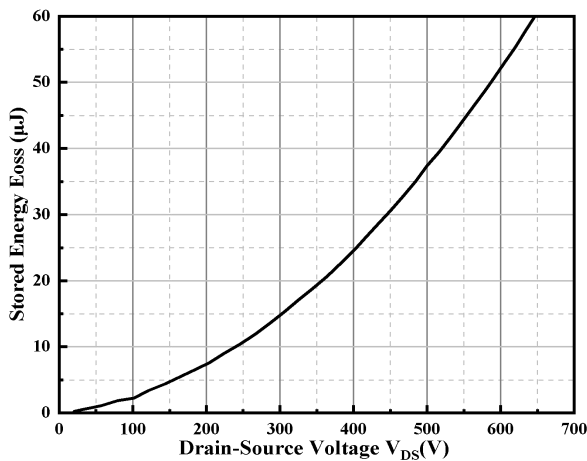
3rd Quadrant curves(175°C)



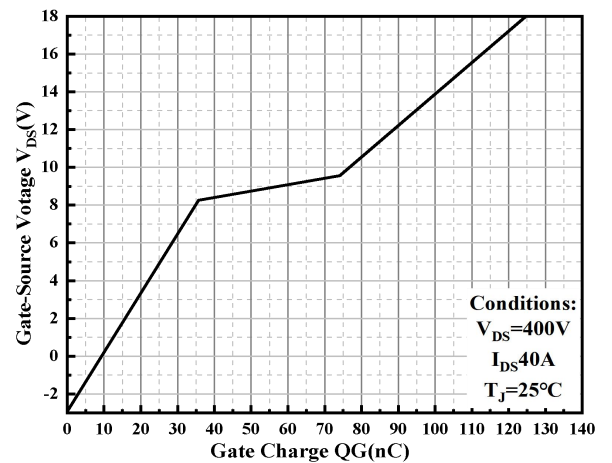
3rd Quadrant curves(175°C)



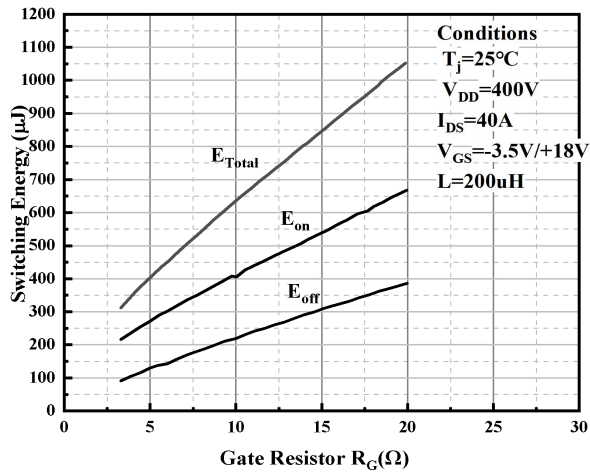
Capacitance vs. V_{DS}



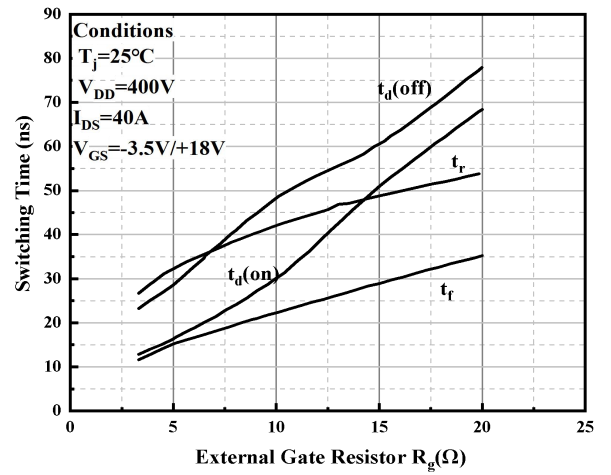
Output Capacitor Stored Energy



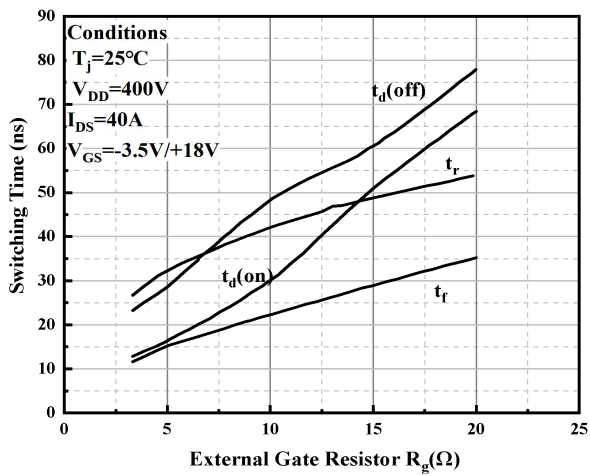
Gate Charge Characteristics



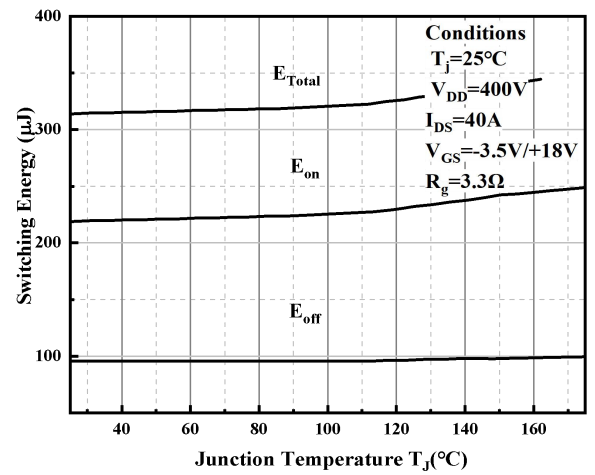
Switching Energy vs. $R_{G(\text{ext})}$



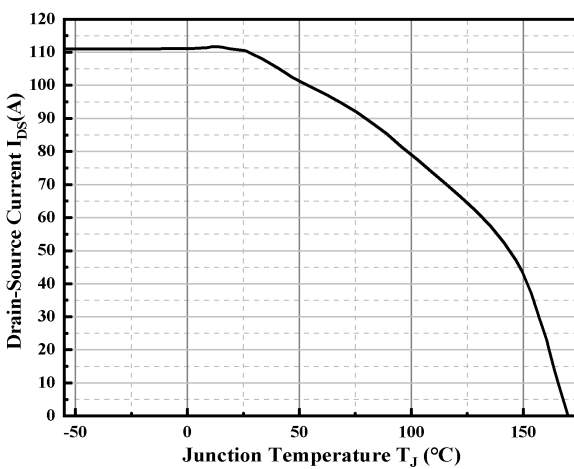
Switching Times vs. $R_{G(\text{ext})}$



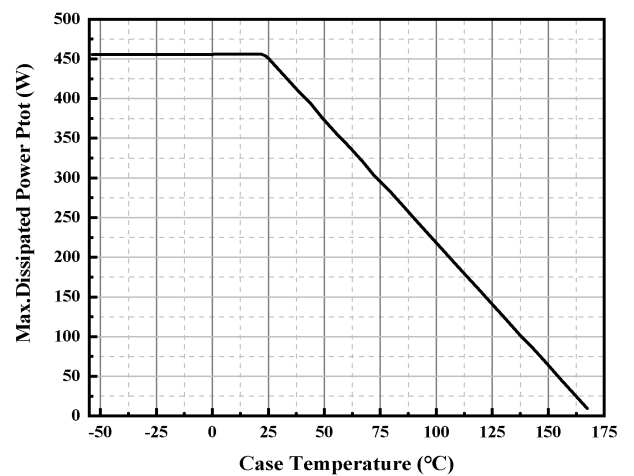
Switching Energy vs. I_{DS}



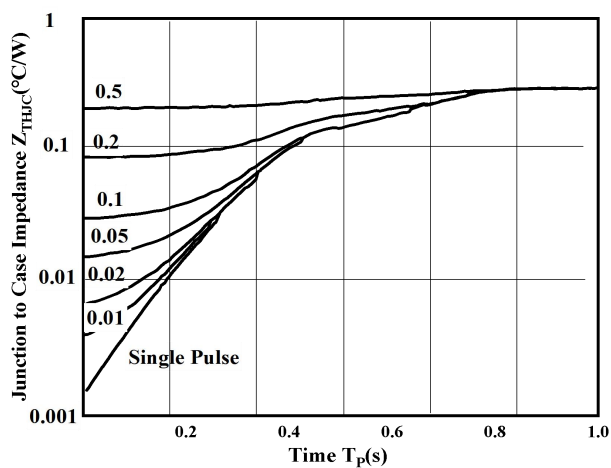
Switching Energy vs. Temperature



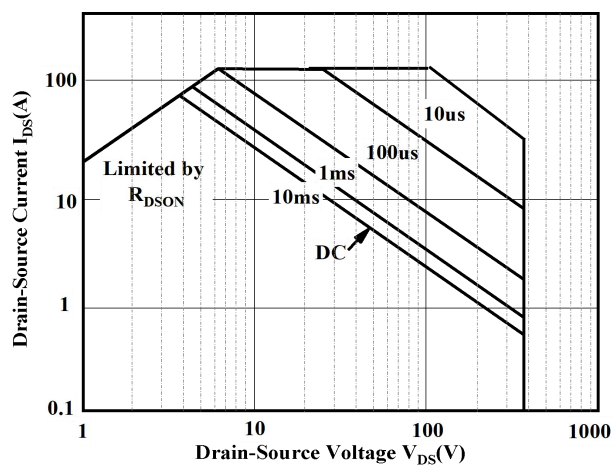
Continuous Drain Current vs. Case Temperature



Power Dissipation Derating vs. Case Temperature



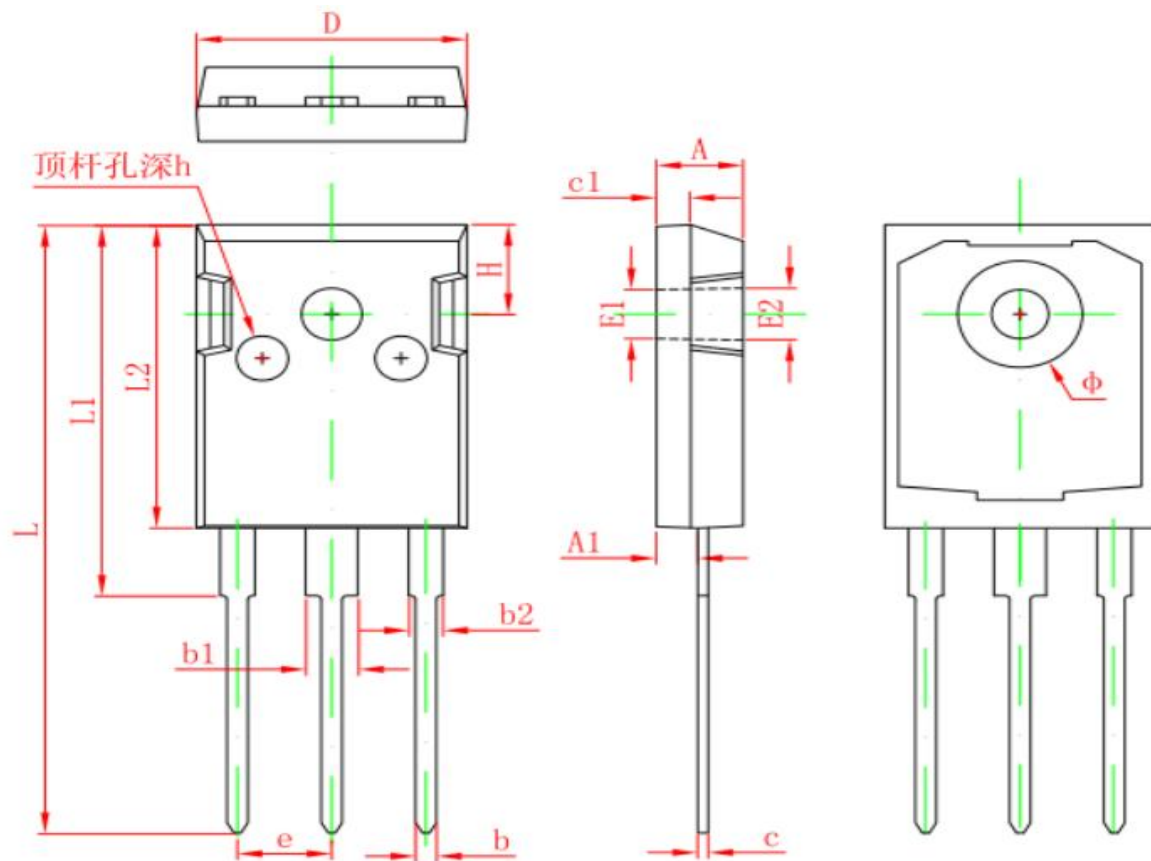
Thermal impedance



Safe Operating Area



TO-247-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.850	5.150	0.191	0.200
A1	2.200	2.600	0.087	0.102
b	1.000	1.400	0.039	0.055
b1	2.800	3.200	0.110	0.126
b2	1.800	2.200	0.071	0.087
c	0.500	0.700	0.020	0.028
c1	1.900	2.100	0.075	0.083
D	15.450	15.750	0.608	0.620
E1	3.500 REF.		0.138 REF.	
E2	3.600 REF.		0.142 REF.	
L	40.900	41.300	1.610	1.626
L1	24.800	25.100	0.976	0.988
L2	20.300	20.600	0.799	0.811
Φ	7.100	7.300	0.280	0.287
e	5.450 TYP.		0.215 TYP.	
H	5.980 REF.		0.235 REF.	
h	0.000	0.300	0.000	0.012