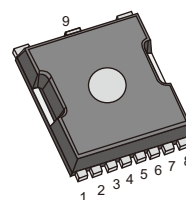


Features

- High blocking voltage with low on-resistance
- High speed switching with low capacitance
- Easy to Parallel
- Simple to Drive

Product Summary			
V _{DS}	R _{DS(on)} (mΩ)Typ	I _D (A)	Q _g (Typ)
650V	30 @ 18V 25A	55	88nc

TOLL



Mechanical Data

- Case:TOLL Package

Application

- EV Charging
- Renewable Energy
- Automotive DC/DC converters
- Server Power Supplies

Block Diagram

Pin Definition:

1. Gate
2. Kelvin Source
9. Drain
- 3/4/5/6/7/8. Power Source

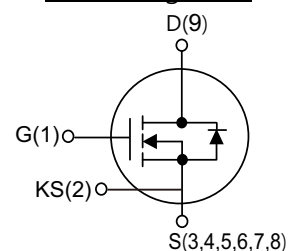


Table1 Absolute Maximum Ratings (T_C=25°C, unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	650	V
Gate-Source Voltage(Max)	V _{GS(max)}	-8/+22	V
Recommend Gate-Source Voltage	V _{GSop}	-4/+18	V
Continuous Drain Current	I _D	T _C =25°C	55
		T _C =100°C	39
Pulsed Drain Current (Note 1)	I _{DM}	197	A
Power Dissipation T _C =25°C	P _D	258	W
Operating Junction and Storage Temperature	T _J /T _{STG}	-55 ~ +175	°C

Table 2.Thermal Characteristics

Parameter	Symbol	SC30N65T	Unit
Thermal resistance Junction to Case	R _{θJC}	0.58	°C/W
Thermal resistance Junction to Ambient	R _{θJA}	40	°C/W

Table 3. Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V,I _D =1mA	650	-	-	V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =650V,V _{GS} =0V	-	1	50	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =22V,V _{DS} =0V	-	-	250	nA
	Reverse		V _{GS} = -10V,V _{DS} =0V	-	-	-250	nA
On Characteristics							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} ,I _D =10mA	1.8	2.8	4.3	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =18V,I _D =25A,T _J =25℃	-	30	50	mΩ
			V _{GS} =18V,I _D =25A,T _J =175℃	-	36	-	
Gate Resisitance		R _G	f=1MHz	-	4.7	-	Ω
Dynamic Characteristics							
Input Capacitance		C _{ISS}	V _{DS} =400V,V _{GS} =0V, f=1MHz,V _{AC} =25mV	-	1980	-	pF
Output Capacitance		C _{OSS}		-	180	-	pF
Reverse Transfer Capacitance		C _{RSS}		-	15	-	pF
Turn-on switching energy		E _{ON}	V _{DS} =400V,I _D =25A V _{GS} = -4/18V,R _G =2.5Ω, L=100μH,R _L =16Ω, T _J =25℃	-	128	-	μJ
Turn-off switching energy		E _{OFF}		-	27	-	μJ
Turn-On Delay Time		td(on)		-	13	-	ns
Turn-On Rise Time		t _R		-	14	-	ns
Turn-Off Delay Time		td(off)		-	29	-	ns
Turn-Off Fall Time		t _f		-	10	-	ns
Total Gate Charge		Q _G		V _{DD} =400V,I _D =25A, V _{GS} = -4/18V	-	88	-
Gate-Source Charge		Q _{GS}	-		24	-	nC
Gate-Drain Charge		Q _{GD}	-		33	-	nC
Drain-Source Diode Characteristics and Maximum Ratings(Note 2)							
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} = -4V,I _S =12.5A	-	3.6	-	V
Continuous Diode Forward Current		I _S		-	55	-	A
Reverse Recovery Time		trr	V _R =400V, I _{SD} =25A	-	14	-	ns
Recovered charge		Q _{rr}		-	96	-	nC
Peak reverse recovery current		I _{rrm}		-	12	-	A

Notes: 1 Repetitive Rating Pulse width limited by maximum junction temperature

2 Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

Typical Characteristics Diagrams

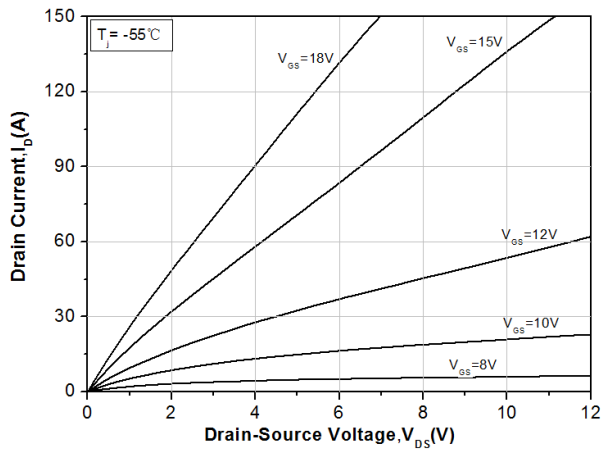


Figure 1. Output Characteristics $T_j = -55\text{ }^{\circ}\text{C}$

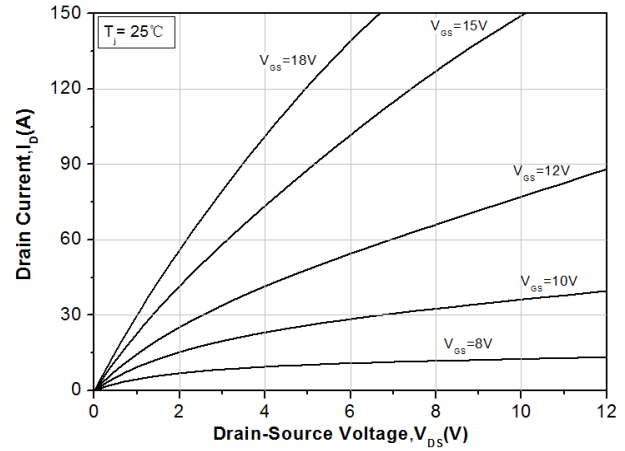


Figure 2. Output Characteristics $T_j = 25\text{ }^{\circ}\text{C}$

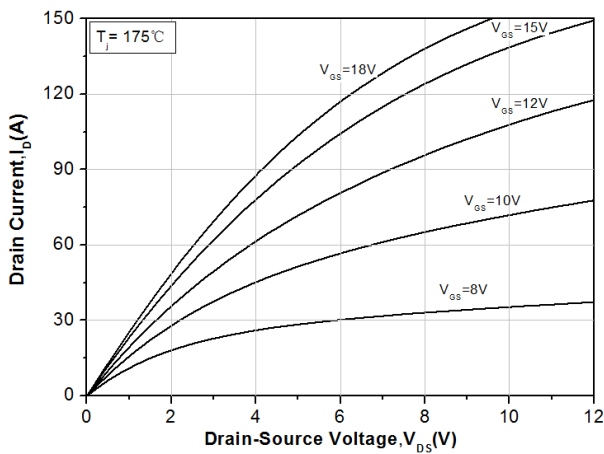


Figure 3. Output Characteristics $T_j = 175\text{ }^{\circ}\text{C}$

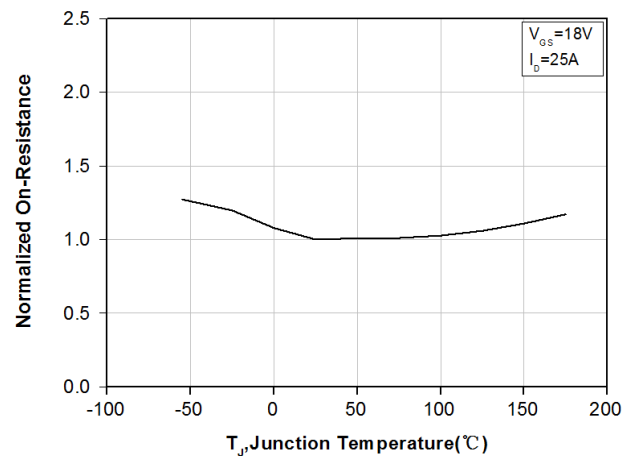


Figure 4. Normalized On-Resistance vs. Temperature

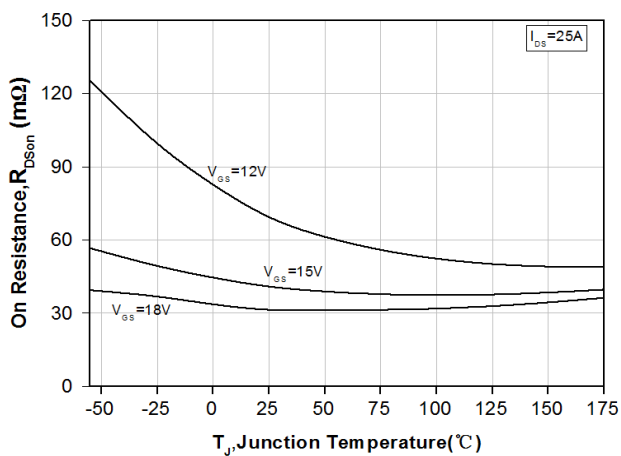


Figure 5. On-Resistance vs. Temperature for Various Gate Voltages

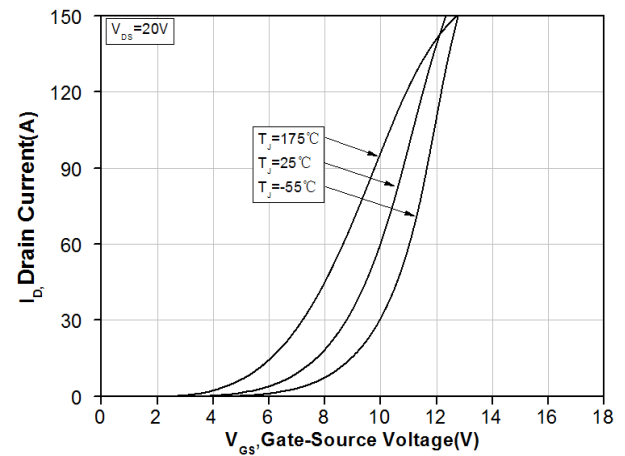


Figure 6. Transfer Characteristics for Various Junction Temperatures

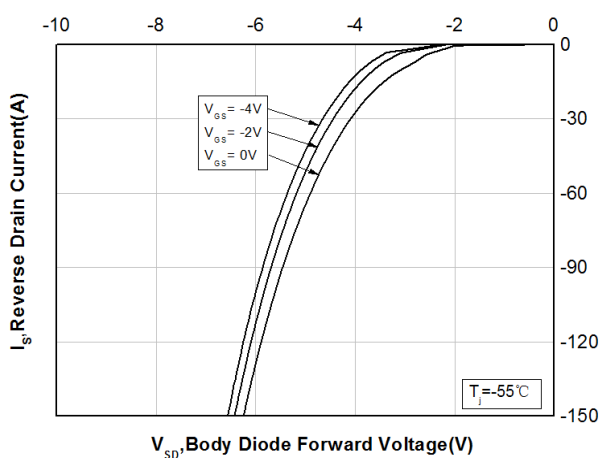


Figure 7. Body Diode Characteristics at -55 °C

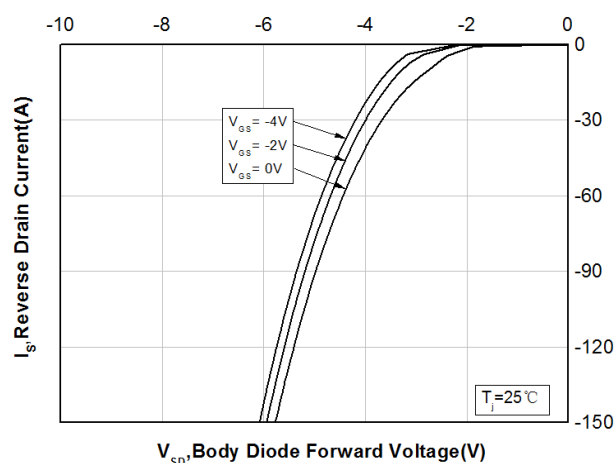


Figure 8. Body Diode Characteristics at 25 °C

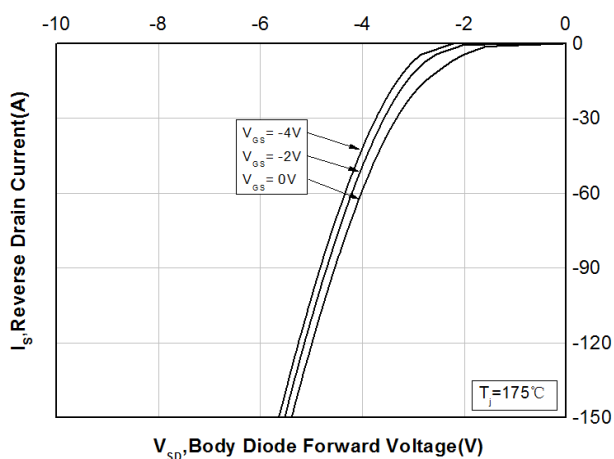


Figure 9. Body Diode Characteristics at 175 °C

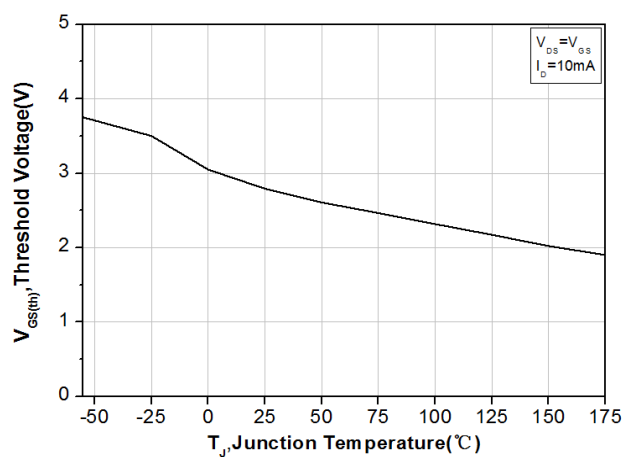


Figure 10. Threshold Voltage vs. Temperature

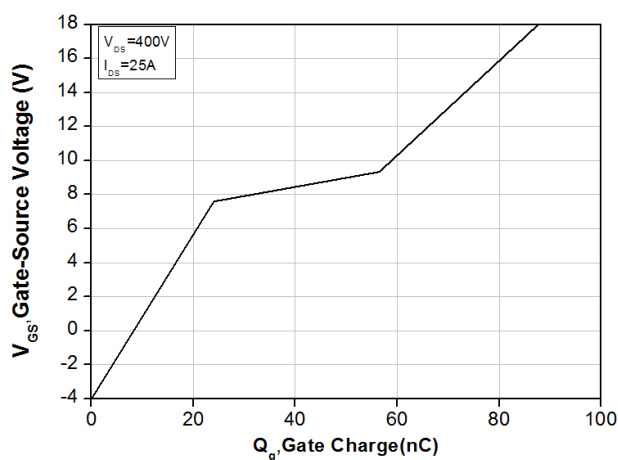


Figure 11. Gate Charge Characteristics

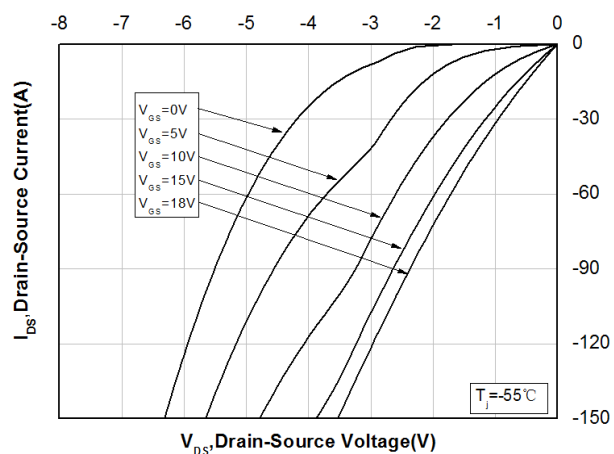


Figure 12. 3rd Quadrant Characteristics at -55 °C

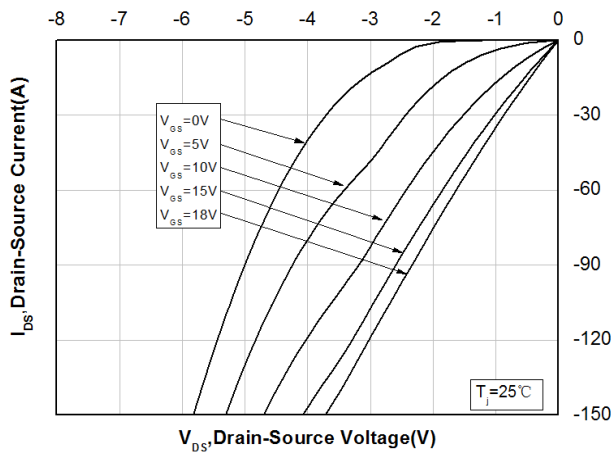


Figure 13. 3rd Quadrant Characteristics at 25 °C

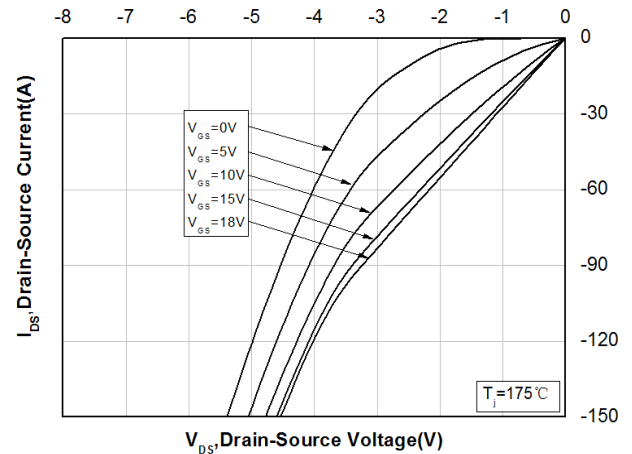


Figure 14. 3rd Quadrant Characteristics at 175 °C

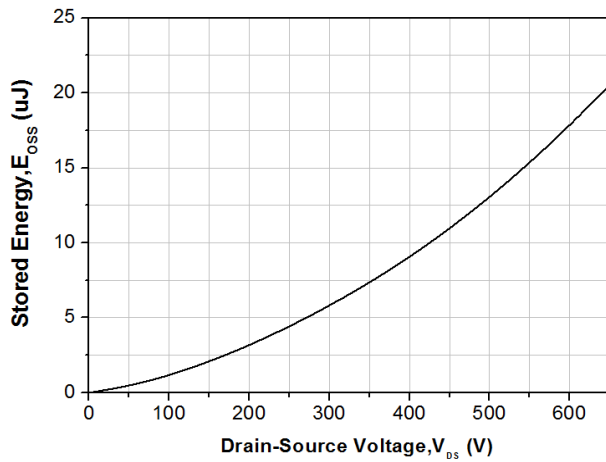


Figure 15. Output Capacitor Stored Energy

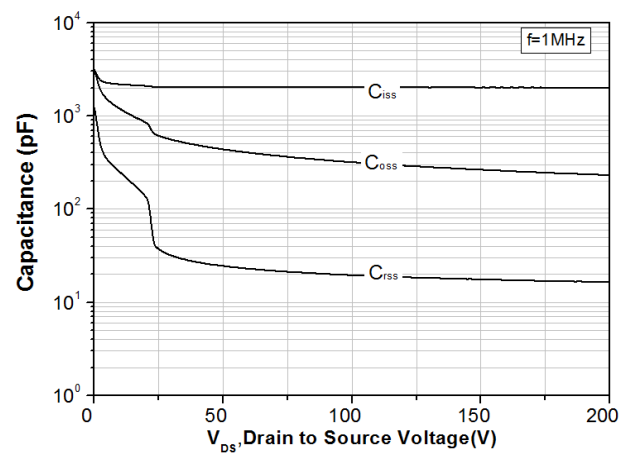


Figure 16. Capacitances vs. Drain-Source Voltage (0 - 200V)

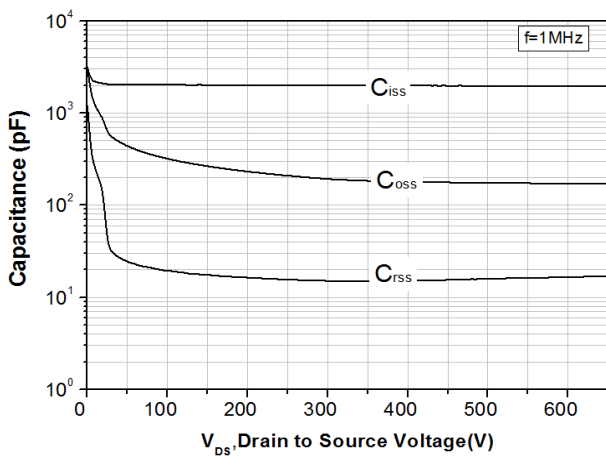


Figure 17. Capacitances vs. Drain-Source Voltage (0 - 650V)

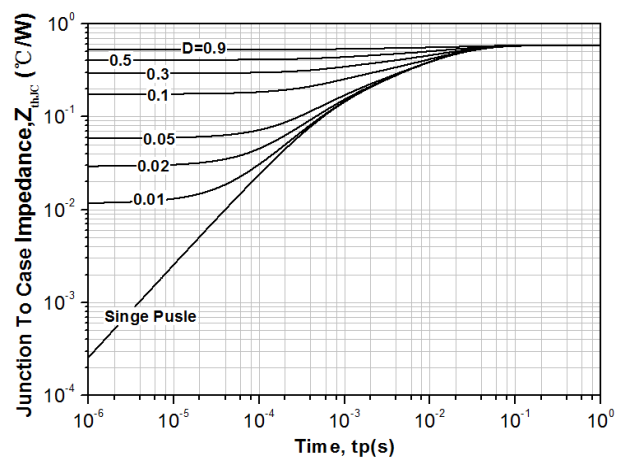


Figure 18. Transient Thermal Impedance (Junction-Case)

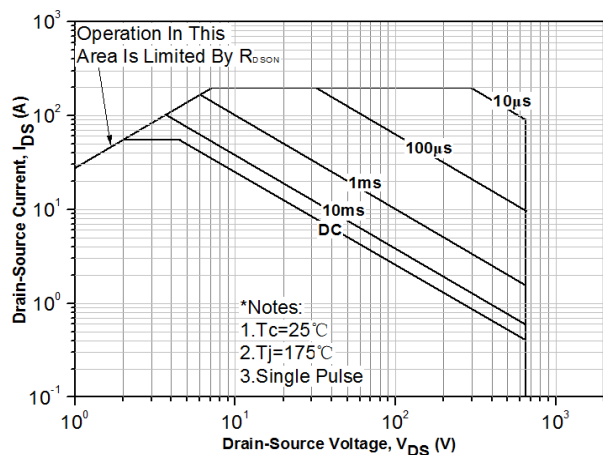


Figure 19. Safe Operating Area

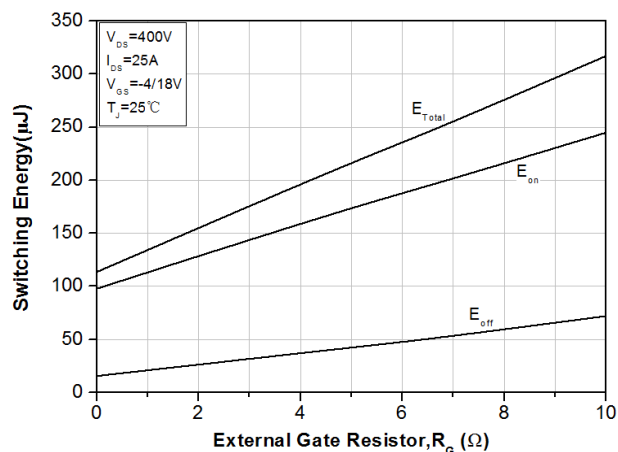


Figure 20. Switching Losses vs. $R_G(\text{ext})$

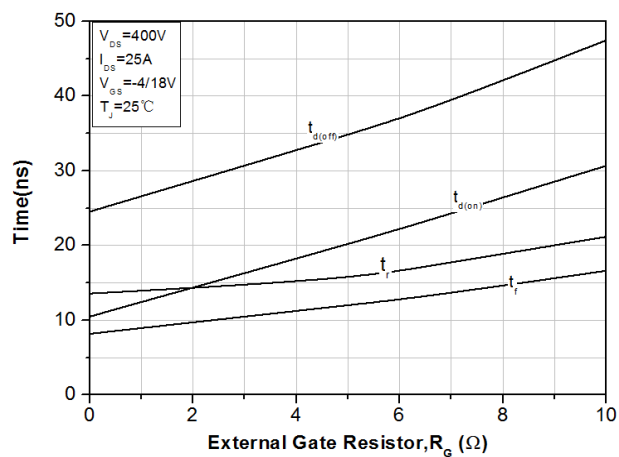


Figure 21. Switching Times vs. $R_G(\text{ext})$

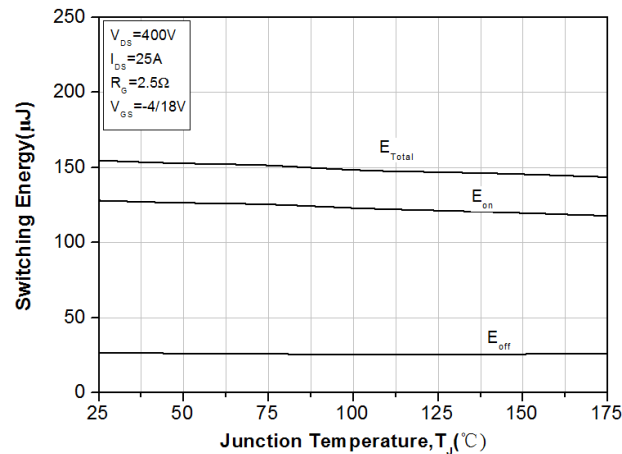


Figure 22. Switching Losses vs. Temperature

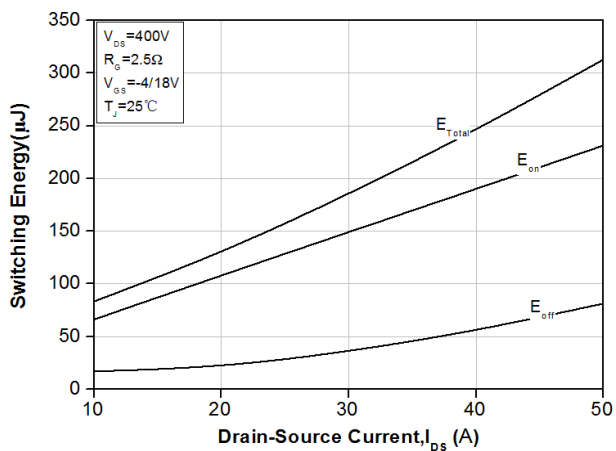


Figure 23. Switching Losses vs. Drain Current

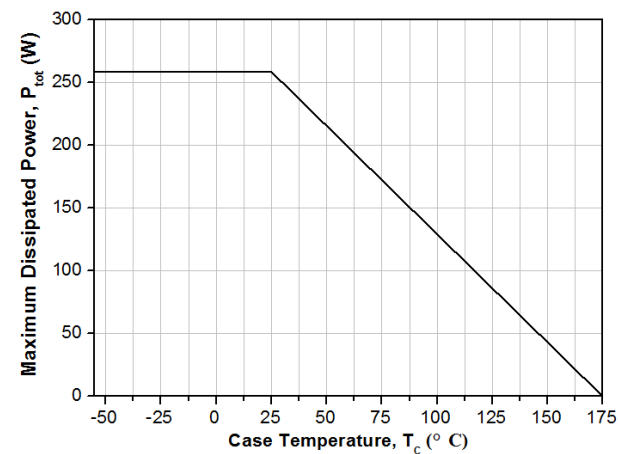
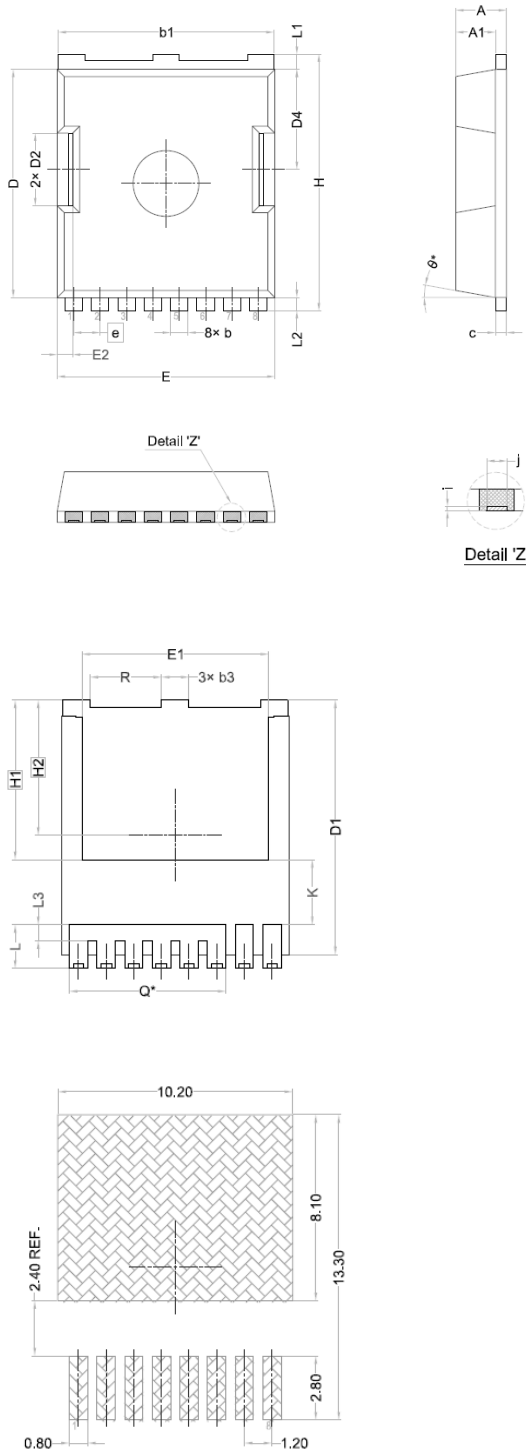


Figure 24. Maximum Power Dissipation Derating vs. Case Temperature

Dimensions

TOLL package



SYMBOL	DIMENSIONS		
	MIN.	NOM.	MAX.
A	2.20	2.30	2.40
A1	1.70	1.80	1.90
b	0.70	0.80	0.90
b1	9.70	9.80	9.90
b3	1.10	1.20	1.30
c	0.40	0.50	0.60
D	10.28	10.38	10.48
D1	10.98	11.08	11.18
D2	3.20	3.30	3.40
D4	4.45	4.55	4.65
E	9.80	9.90	10.00
E1	8.00	8.10	8.20
E2	0.60	0.70	0.80
e	1.20 BSC		
H	11.58	11.68	11.78
H1	6.95 BSC		
H2	5.89 BSC		
I	0.10 REF.		
j	0.46 REF.		
K	2.80 REF.		
L	1.40	1.90	2.10
L1	0.60	0.70	0.80
L2	0.50	0.60	0.70
L3	0.30	0.70	0.80
N	8		
Q	6.80 REF.		
R	3.00	3.10	3.20
θ	10° REF.		

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