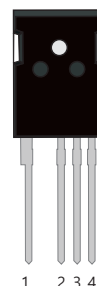


Features

- High blocking voltage with low on-resistance
- High speed switching with low capacitance
- High operating junction temperature capability
- Very fast and robust intrinsic body diode
- Kelvin gate input easing driver circuit design

Product Summary			
V _{DS}	R _{DS(on)} (mΩ)Typ	I _D (A)	Q _g (Typ)
1200V	7 @ 18V 100A	310	515nc

TO-247-4L



Mechanical Data

- Case:TO-247-4L Package

Application

- Motor drivers
- Solar inverters
- Automotive DC/DC converters
- Automotive compressor inverters
- Switch mode power supplies

Block Diagram

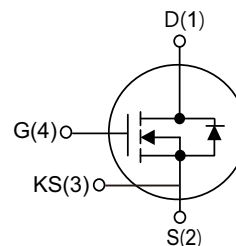


Table1 Absolute Maximum Ratings (T_c=25°C, unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	1200	V
Gate-Source Voltage(Max)	V _{GS(DC)}	-8/+22	V
Gate-Source Voltage	V _{GS(OP)}	-4/+18	V
Continuous Drain Current	I _D	T _C =25°C	310
		T _C =100°C	219
Pulsed Drain Current (Note 1)	I _{DM}	1400	A
Power Dissipation	P _D	1250	W
Operating Junction and Storage Temperature	T _J /T _{STG}	-55 ~ +175	°C

Table 2.Thermal Characteristics

Parameter	Symbol	SC07N120P4	Unit
Thermal resistance Junction to Case	R _{θJC}	0.12	°C/W

Table 3. Electrical Characteristics (T_J=25°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 =100μA	1200	-	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =1200V, V _{GS} =0V	-	-	100	μA
Gate- Source Leakage Current	Forward	I _{GSS} V _{GS} =22V, V _{DS} =0V	-	-	250	nA
	Reverse	V _{GS} =-8V, V _{DS} =0V	-	-	-250	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =45mA	2.0	2.4	3.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =18V, I _D =100A, T _J =25°C	-	7	10	mΩ
		V _{GS} =18V, I _D =100A, T _J =175°C	-	12	-	
Gate Resitance	R _G	f=1MHz	-	1.6	-	Ω
Dynamic Characteristics						
Input Capacitance	C _{ISS}	V _{DS} =1000V, V _{GS} =0V, f=1MHz, V _{AC} =25mV	-	11500	-	pF
Output Capacitance	C _{OSS}		-	563	-	pF
Reverse Transfer Capacitance	C _{RSS}		-	37	-	pF
Coss stored energy	E _{OSS}		-	315	-	μJ
Turn-on switching energy	E _{ON}	V _{DS} =800V, I _D =100A V _{GS} =-4/18V, R _G =3Ω, L=100μH, T _J =25°C	-	2059	-	μJ
Turn-off switching energy	E _{OFF}		-	1185	-	μJ
Turn-On Delay Time	t _{d(on)}		-	33	-	ns
Turn-On Rise Time	t _r		-	41	-	ns
Turn-Off Delay Time	t _{d(off)}		-	96	-	ns
Turn-Off Fall Time	t _f	V _{DD} =800V, I _D =100A, V _{GS} =-4/18V	-	23	-	ns
Total Gate Charge	Q _G		-	515	-	nC
Gate-Source Charge	Q _{GS}		-	207	-	nC
Gate-Drain Charge	Q _{GD}		-	30	-	nC
Drain-Source Diode Characteristics and Maximum Ratings(Note 2)						
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =100A	-	4.1	-	V
Reverse Recovery Time	t _{rr}	V _{GS} =-4V, V _R =800V, I _{SD} =100A, diF/dt=3000A/μs	-	29	-	ns
Recovered charge	Q _{rr}		-	839	-	nC
Peak reverse recovery current	I _{rrm}		-	51	-	A

Notes: 1 RepetitiveRating Pulse width limited by maximum junction temperature

2 Pulse Test: Pulse width ≤300μs, Duty cycle≤2%

Typical Characteristics Diagrams

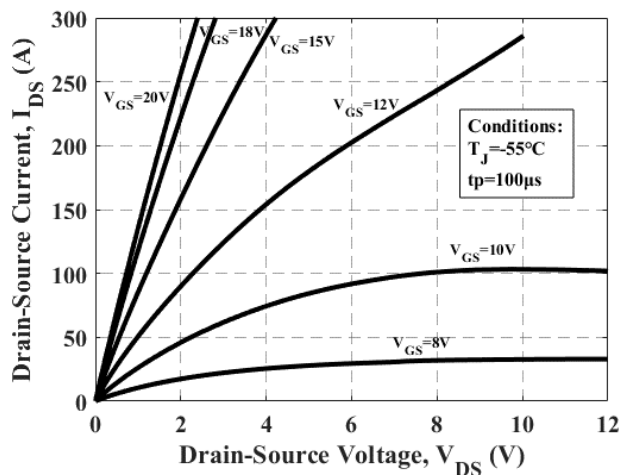


Figure 1. Output Characteristics $T_J = -55\text{ }^{\circ}\text{C}$

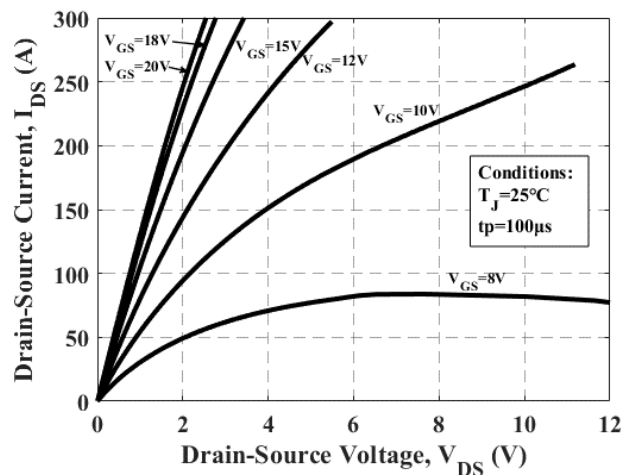


Figure 2. Output Characteristics $T_J = 25\text{ }^{\circ}\text{C}$

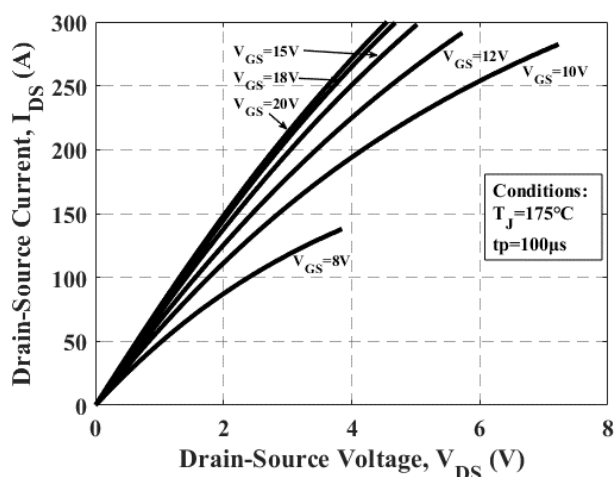


Figure 3. Output Characteristics $T_J = 175\text{ }^{\circ}\text{C}$

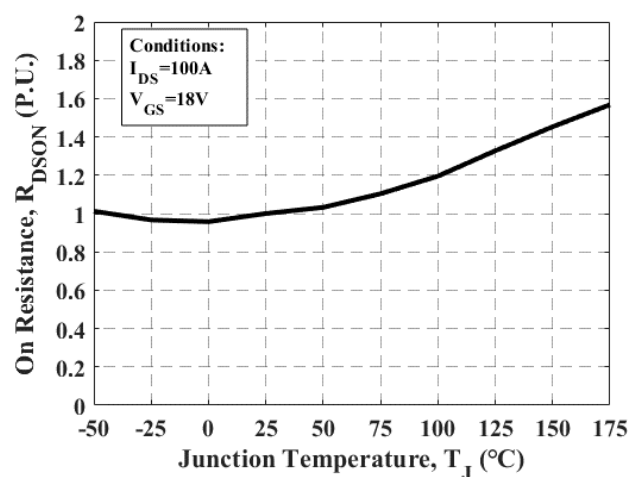


Figure 4. Normalized On-Resistance vs. Temperature

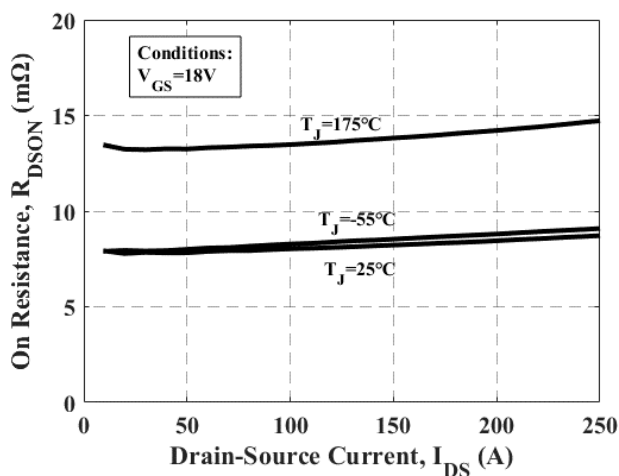


Figure 5. On-Resistance vs. Drain Current for Various Temperatures

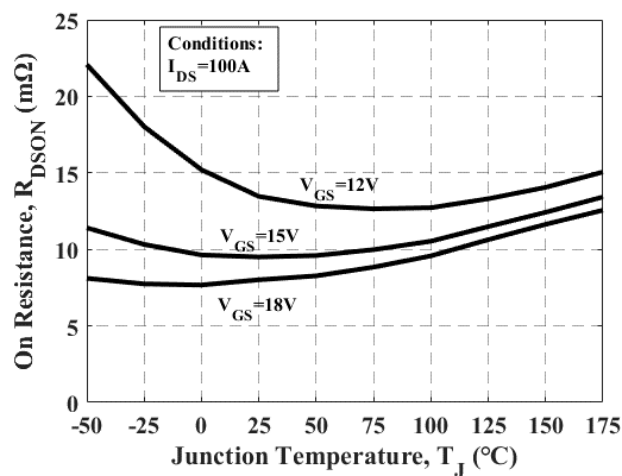


Figure 6. On-Resistance vs. Temperature for Various Gate Voltages

Typical Characteristics Diagrams

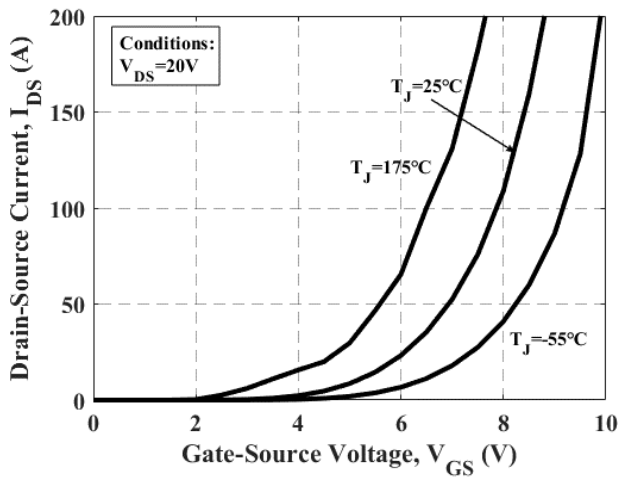


Figure 7. Transfer Characteristics for Various Junction Temperatures

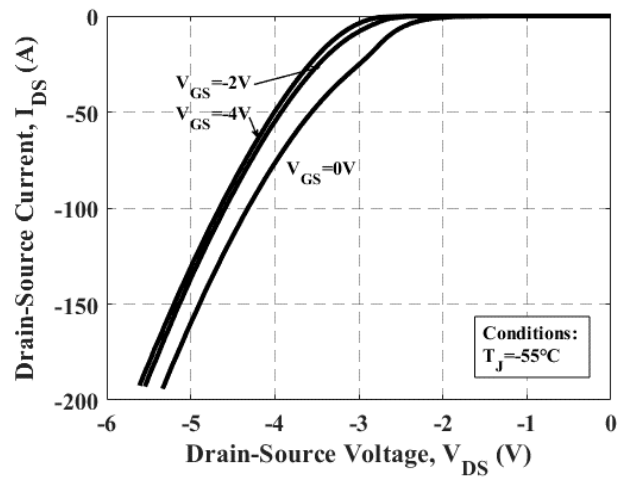


Figure 8. Body Diode Characteristics at -55°C

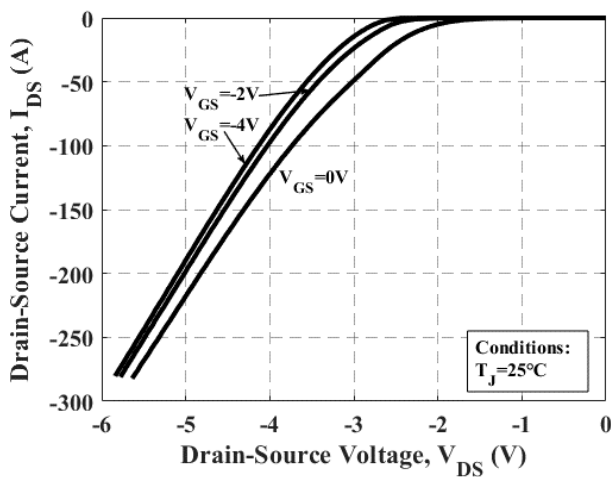


Figure 9. Body Diode Characteristics at 25°C

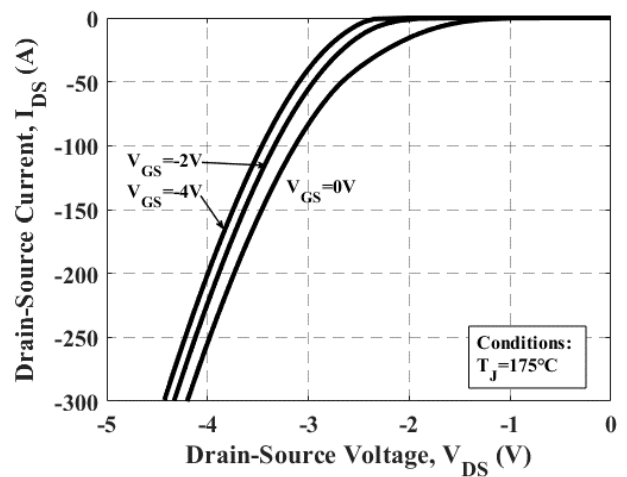


Figure 10. Body Diode Characteristics at 175°C

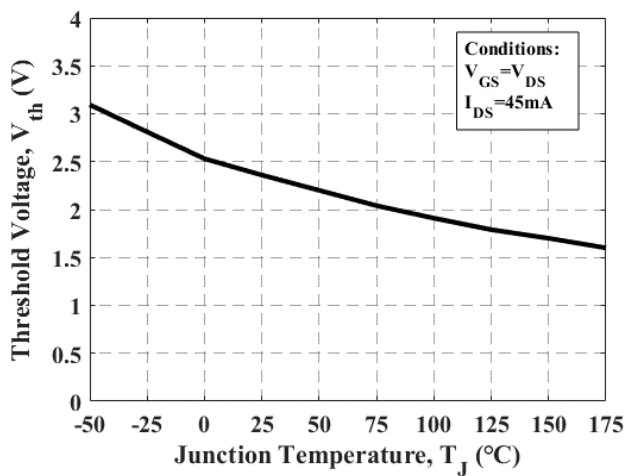


Figure 11. Threshold Voltage vs. Temperature

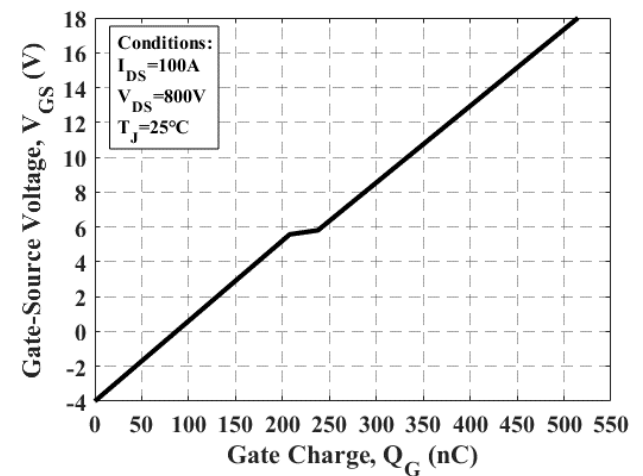


Figure 12. Gate Charge Characteristics

Typical Characteristics Diagrams

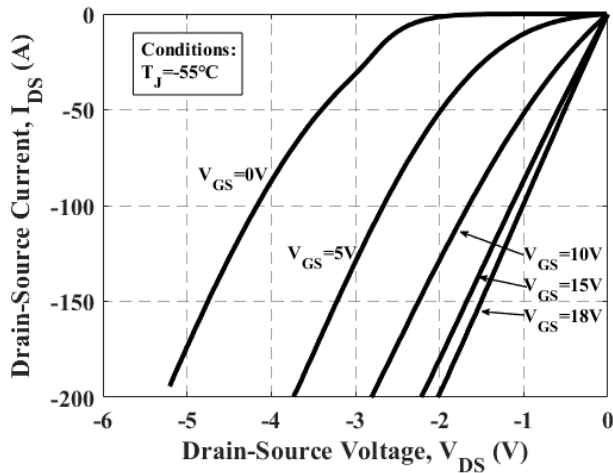


Figure 13. 3rd Quadrant Characteristics at -55 °C

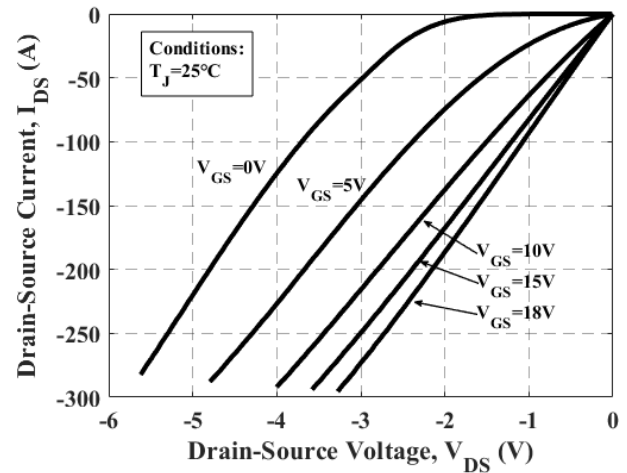


Figure 14. 3rd Quadrant Characteristics at 25 °C

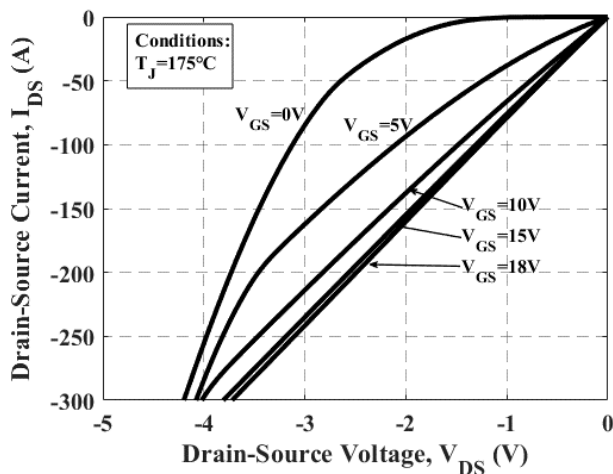


Figure 15. 3rd Quadrant Characteristics at 175 °C

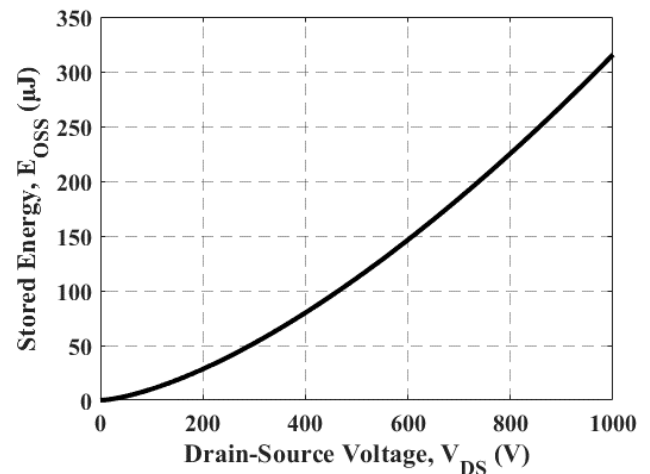


Figure 16. Output Capacitor Stored Energy

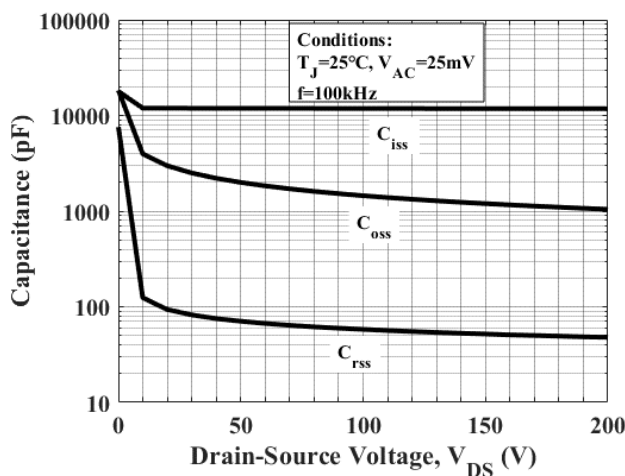


Figure 17. Capacitances vs. Drain-Source Voltage (0 - 200V)

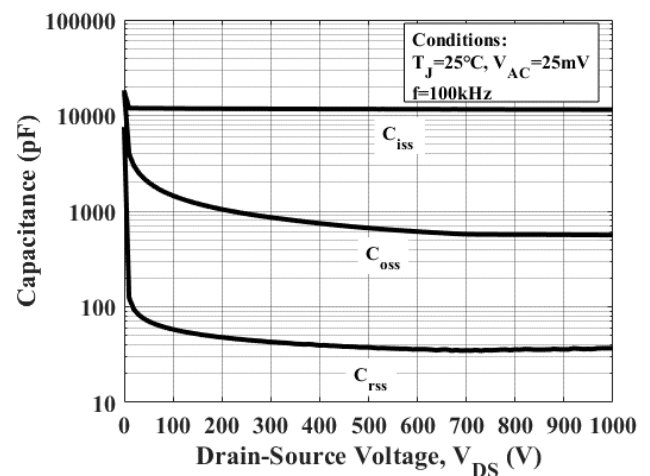


Figure 18. Capacitances vs. Drain-Source Voltage (0 - 1000V)

Typical Characteristics Diagrams

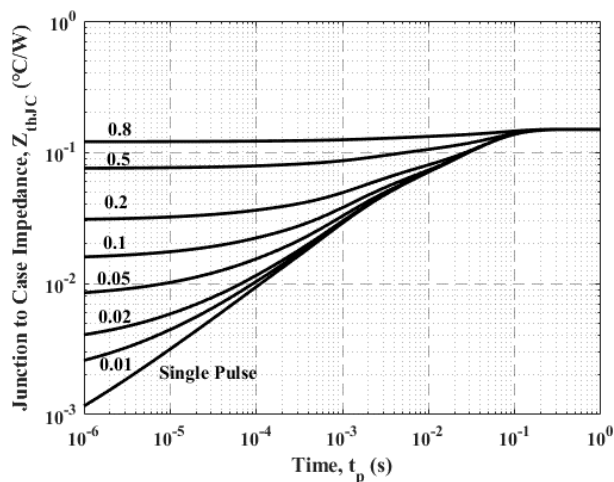


Figure 19. Transient Thermal Impedance (Junction - Case)

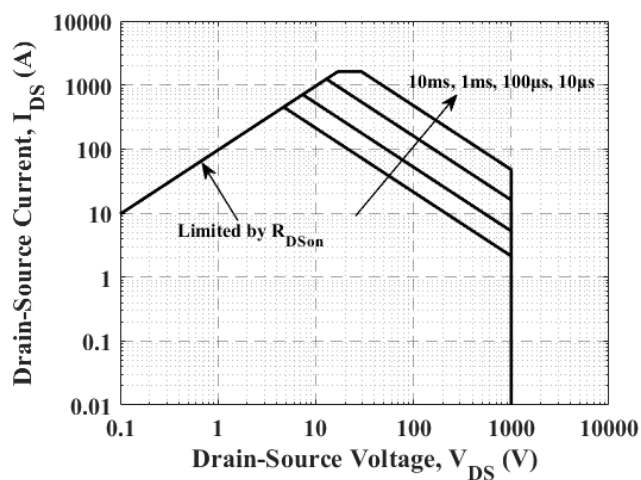


Figure 20. Safe Operating Area

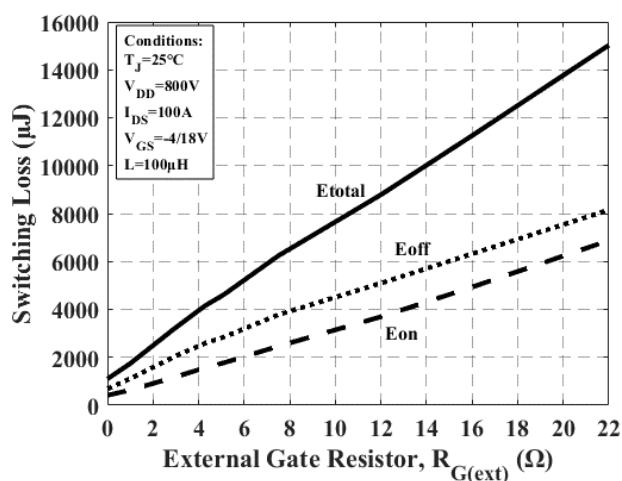


Figure 21. Switching Losses vs. $R_{G(ext)}$

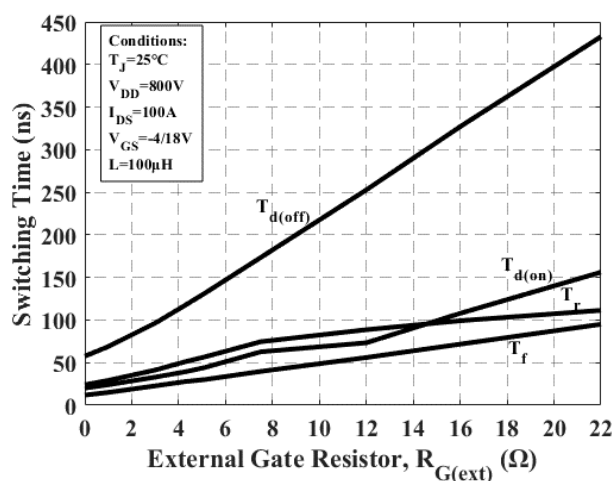


Figure 22. Switching Times vs. $R_{G(ext)}$

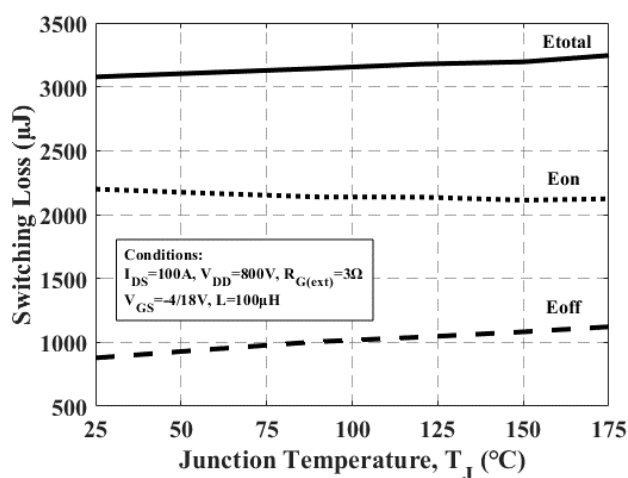


Figure 23. Switching Losses vs. Temperature

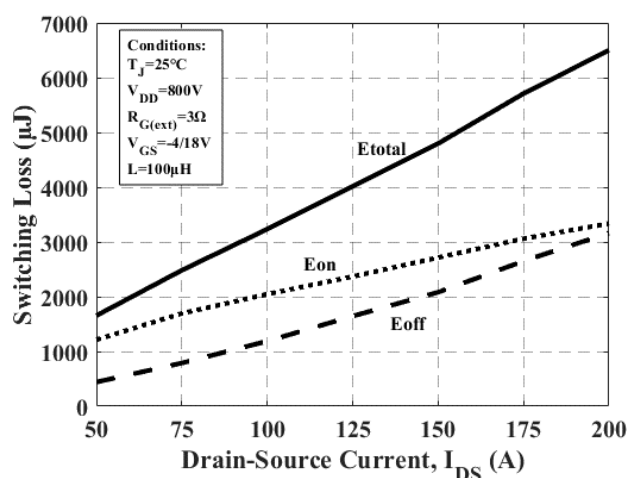


Figure 24. Switching Losses vs. Drain Current

Typical Characteristics Diagrams

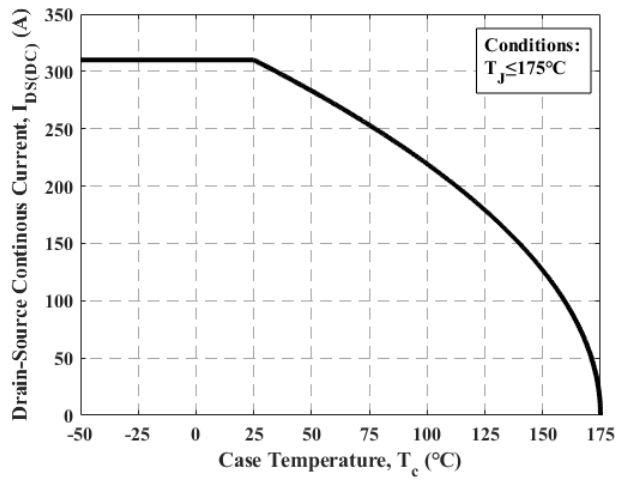


Figure 25. Continuous Drain Current Derating vs. Case Temperature

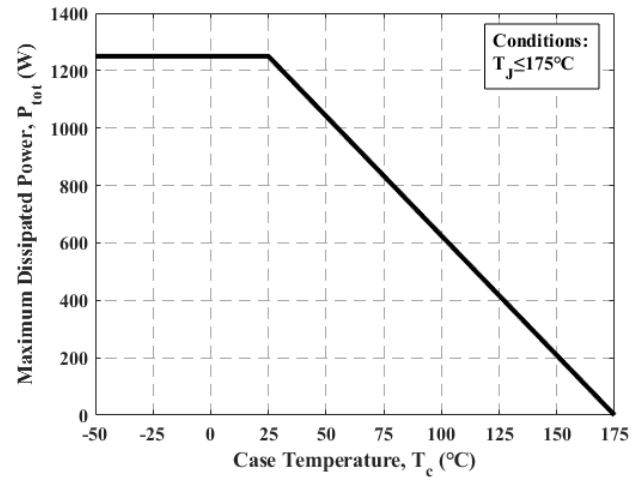
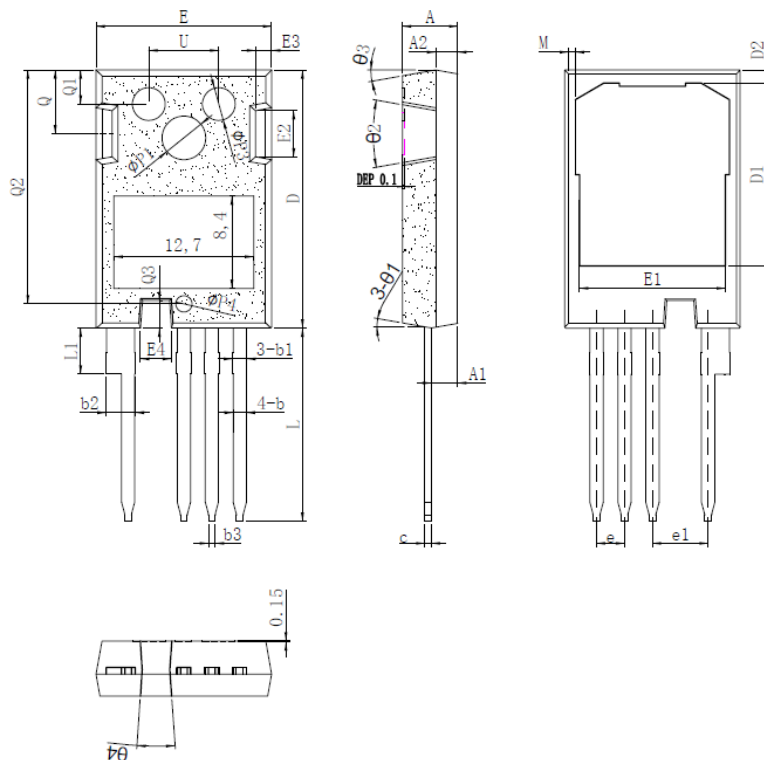


Figure 26. Maximum Power Dissipation Derating vs. Case Temperature

Dimensions

TO-247-4L package



	mm		
	MIN	NOM	MAX
A	4.83	5.02	5.21
A1	2.29	2.42	2.54
A2	1.91	2.00	2.16
b	1.07	1.20	1.33
b1	1.15	1.30	1.45
b2	2.39	2.67	2.94
b3	0.45	0.60	0.75
c	0.55	0.60	0.68
D	23.30	23.45	23.60
D1	16.35	16.65	16.95
D2	0.95	1.19	1.25
E	15.75	15.94	16.13
E1	13.05	13.25	13.45
E2	4.00	4.40	4.80
E3	1.00	1.45	1.90
E4	2.40	2.80	3.20
e	2.50	2.54	2.58
e1	5.03	5.08	5.13
L	17.31	17.57	17.82
L1	/	/	4.37
M	0.40	0.60	0.80
φP1	3.80	4.00	4.20
φP3	2.80	3.00	3.20
φP4	1.30	1.50	1.70
Q	5.49	5.79	6.00
Q1	2.80	3.10	3.40
Q2	19.95	21.25	21.55
Q3	2.35	2.50	2.65
U	6.05	6.35	6.55
θ1	6°	10°	13°
θ2	16°	20°	24°
θ3	6°	10°	13°
θ4	5°	8°	11°

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