SEMICONDUCTOR

SC26N65P

650V 94A N-Channel SIC Power MOSFET

Features

- High blocking voltage with low on-resistance
- High speed switching with low capacitance
- High operating junction temperature capability
- Wide bandgap SiC MOSFET technology
- Halogen free, RoHs compliant

Product Summary			
V_{DS}	$R_{DS(on)}$(mΩ)Typ	I_D(A)	Qg(Typ)
650V	26@ 18V 30A	94	68nc

TO-247



Mechanical Data

- Case:TO-247 Package

Application

- Motor drivers
- Renewable energy
- Automotive DC/DC converters
- Switch mode power supplies

Pin Definition:

1. Gate
2. Drain
3. Source

Block Diagram

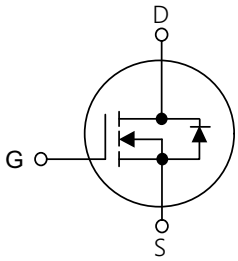


Table1 Absolute Maximum Ratings (T_C=25°C, unless otherwise specified)

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	T_C=25°C	I_D	94	A
	T_C=100°C		66	
Pulsed Drain Current (Note 1)		I_{DM}	190	A
Power Dissipation	T_C=25°C	P_D	343	W
Operating Junction and Storage Temperature		T_J/T_{STG}	-55 ~ +175	°C

Table 2.Thermal Characteristics

Parameter	Symbol	SC26N65P	Unit
Thermal resistance Junction to Case	$R_{\theta JC}$	0.437	°C/W
Thermal resistance Junction to Ambient	$R_{\theta JA}$	40	°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	650	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=650V,V_{GS}=0V,T_J=25°C	-	1	100	μA
		V_{DS}=650V,V_{GS}=0V,T_J=175°C	-	-	3.5	mA
Gate- Source Leakage Current	I_{GSS}	V_{GS}=18V,V_{DS}=0V	-	-	±250	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=10mA	2.0	-	4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=15V,I_D=30A,T_J=25°C	-	32	43	mΩ
		V_{GS}=18V,I_D=30A,T_J=25°C	-	26	35	
		V_{GS}=18V,I_D=30A,T_J=175°C	-	34	-	
Gate Resisitance	R_G	f=1MHz	-	1.3	-	Ω
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=600V,V_{GS}=0V, f=1MHz	-	1845	-	pF
Output Capacitance	C_{OSS}		-	140	-	pF
Reverse Transfer Capacitance	C_{RSS}		-	11	-	pF
Turn-on switching energy	E_{ON}	V_{DS}=400V,I_D=30A, V_{GS}=-4/18V,R_G=2.5Ω	-	62	-	μJ
Turn-off switching energy	E_{OFF}		-	26	-	μJ
Turn-On Delay Time	td(on)	V_{DS}=400V,V_{GS}=-4/18V, I_D=30A, R_G=2.5Ω	-	15	-	ns
Turn-On Rise Time	t_R		-	14	-	ns
Turn-Off Delay Time	td(off)		-	29	-	ns
Turn-Off Fall Time	tf		-	6	-	ns
Total Gate Charge	Q_G	V_{DD}=400V,I_D=30A, V_{GS}=-4/18V	-	68	-	nC
Gate-Source Charge	Q_{GS}		-	21	-	nC
Gate-Drain Charge	Q_{GD}		-	12	-	nC
Drain-Source Diode Characteristics and Maximum Ratings(Note 2)						
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=30A	-	4.2	-	V
Continuous Diode Forward Current	I_S		-	-	94	A
Reverse Recovery Time	trr	V_{GS}=-4 V, I_F=30 A, V_R=400 V, di/dt=2560A/μs,	-	14	-	ns
Recovered charge	Qrr		-	135	-	nC
Peak reverse recovery current	Irrm		-	16	-	A

Notes: 1 RepetitiveRating Pulse width limited by maximum junction temperature

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

Typical Characteristics Diagrams

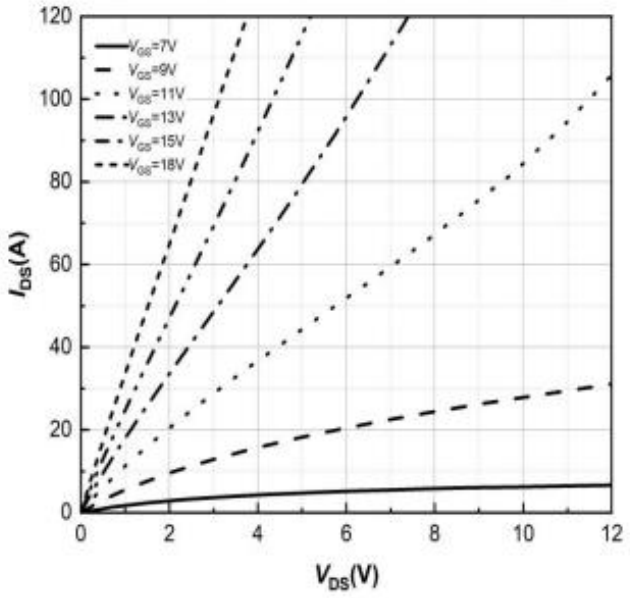


Figure 1. **Output Characteristics T_j=-40°C**

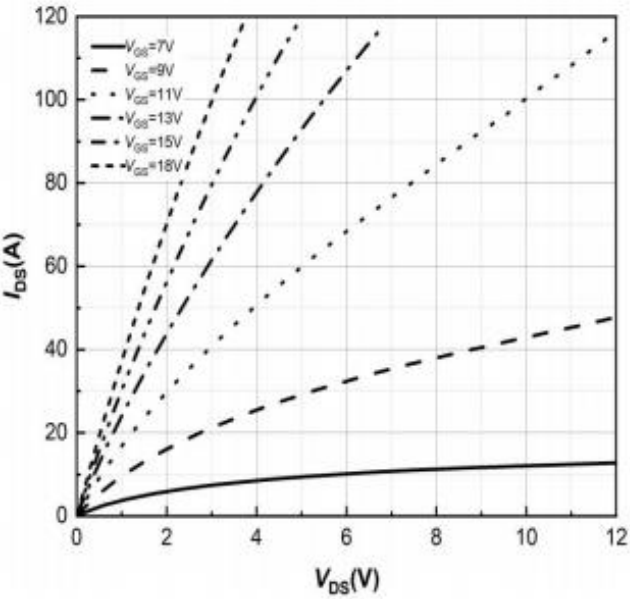


Figure 2. **Output Characteristics T_j=25°C**

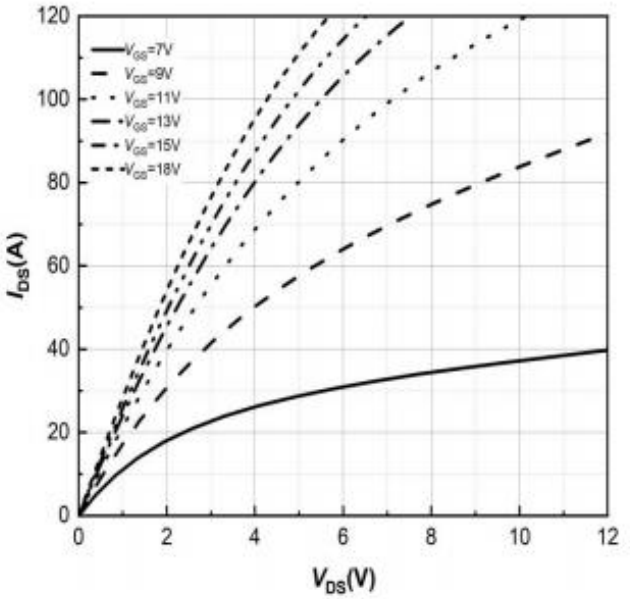


Figure 3. **Output Characteristics T_j=175°C**

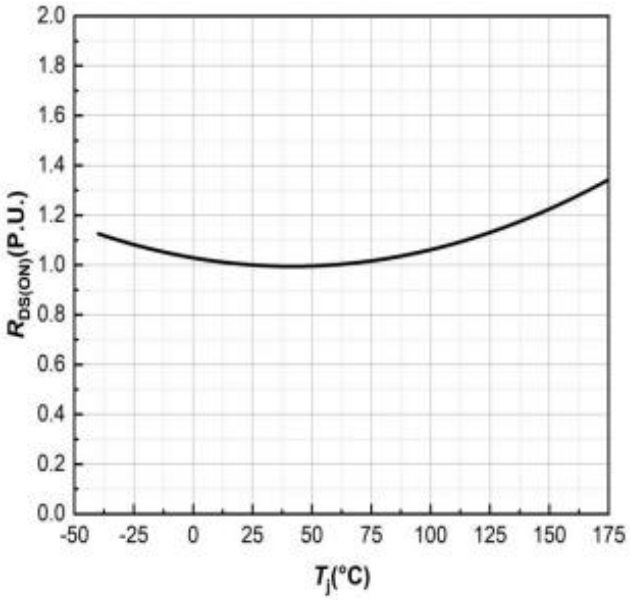


Figure 4. **Normalized On-Resistance vs. Temperature**

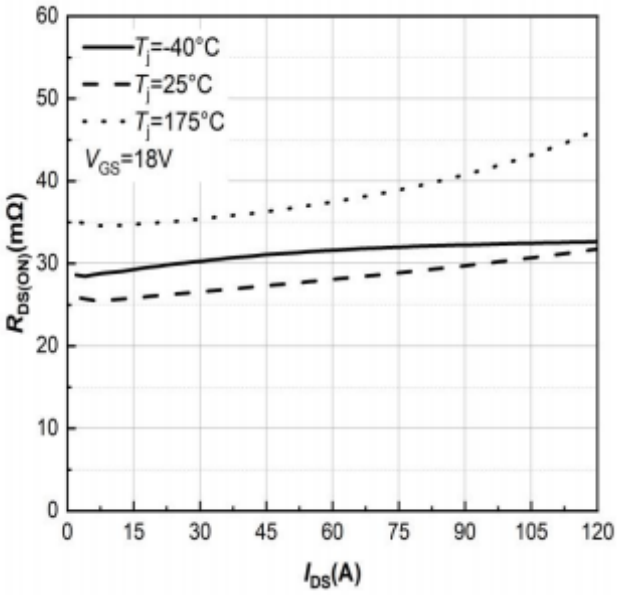


Figure 5. **On-Resistance vs. Drain Current For Various Temperatures**

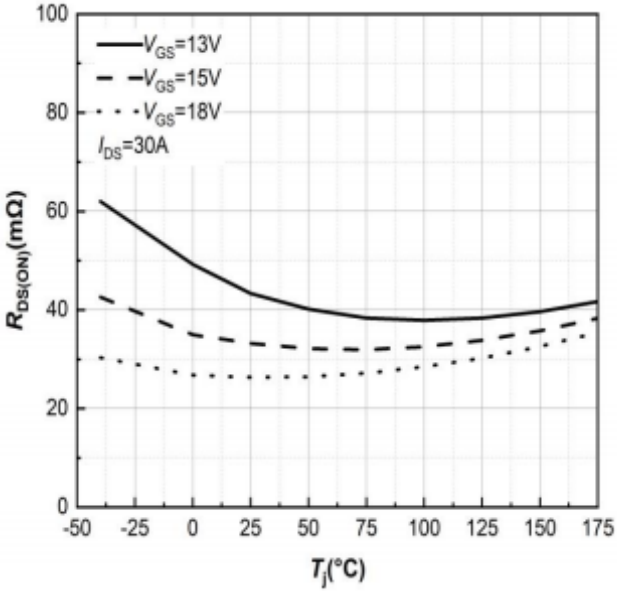


Figure 6. **On-Resistance vs. Temperature For Various Gate Voltage**

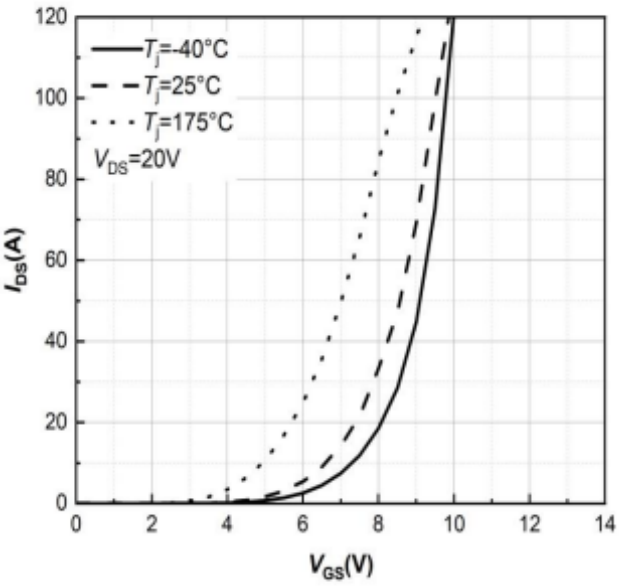


Figure 7. **Transfer Characteristic for Various Junction Temperatures**

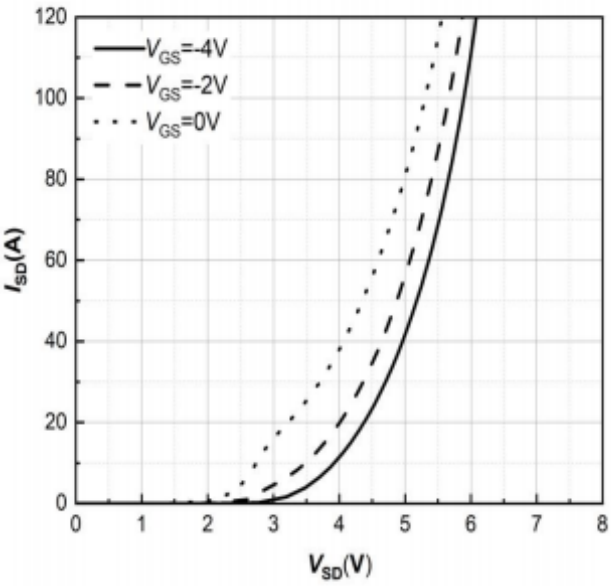


Figure 8. **Body Diode Characteristic T_j=-40°C**

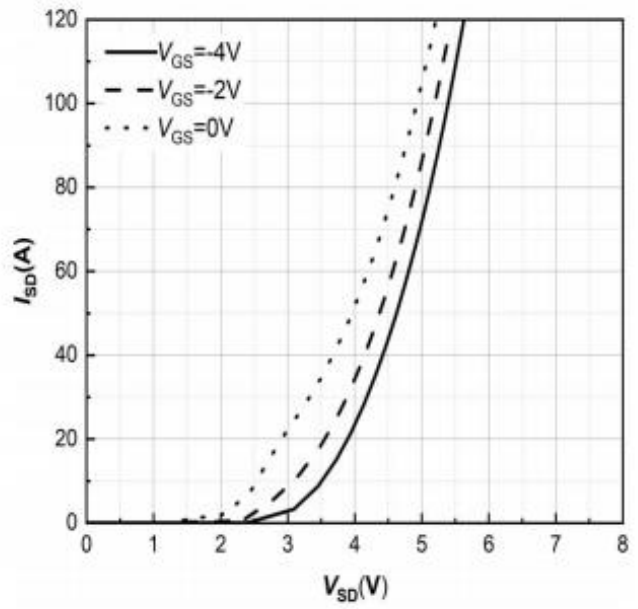


Figure 9. **Body Diode Characteristic T_j=25°C**

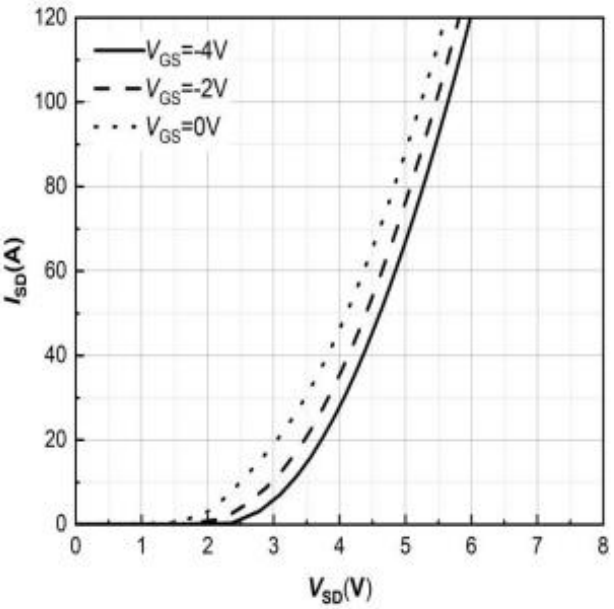


Figure 10. **Body Diode Characteristic T_j=175°C**

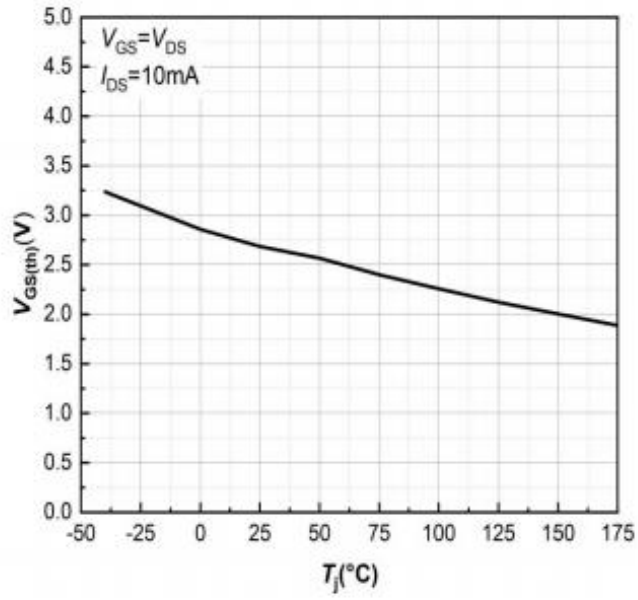


Figure 11. **Threshold Voltage vs. Temperature**

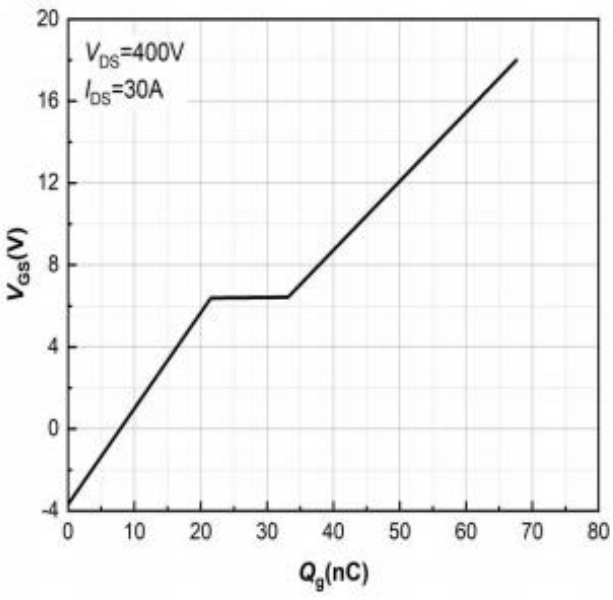


Figure 12. **Gate Charge Characteristics**

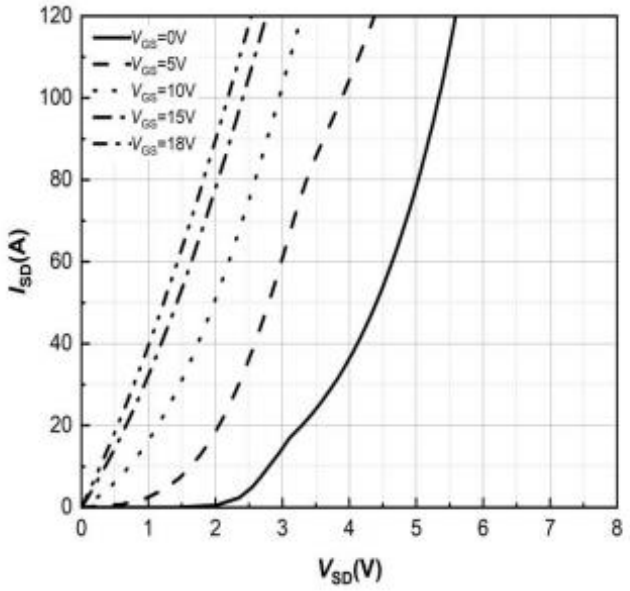


Figure 13. **3rd Quadrant Characteristic T_j=-40°C**

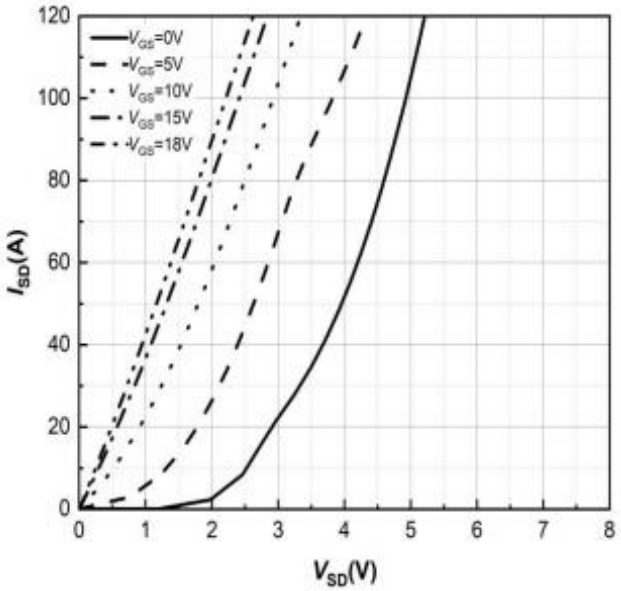


Figure 14. **3rd Quadrant Characteristic T_j=25°C**

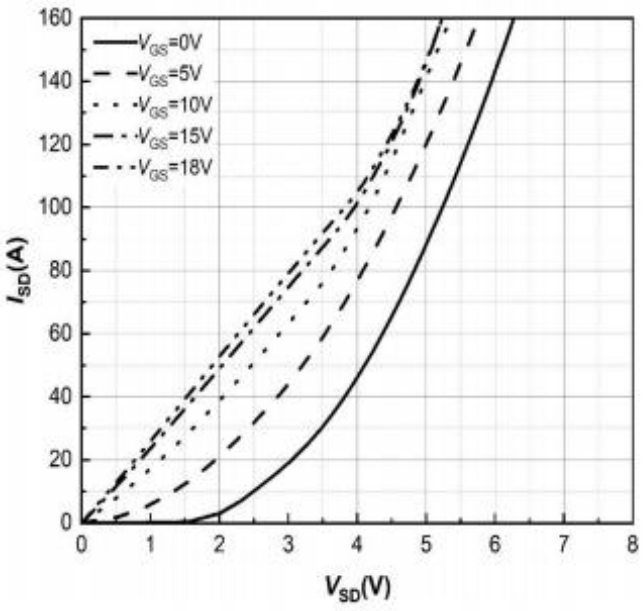


Figure 15. **3rd Quadrant Characteristic T_j=175°C**

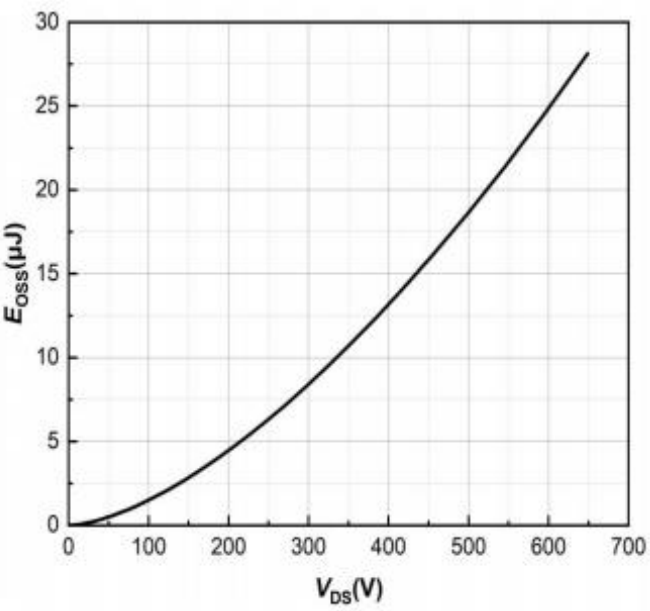


Figure 16. **Output Capacitor Stored Energy**

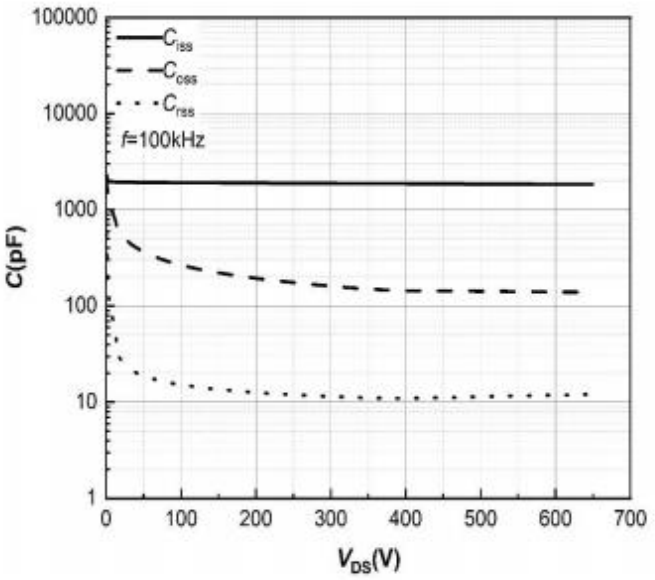


Figure 17. **Capacitances vs. Drain-Source**

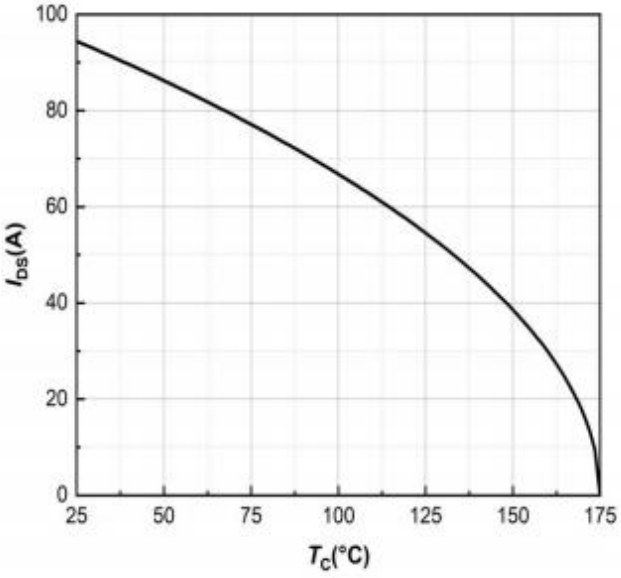


Figure 18. **Continuous Drain Current Derating vs. Case Temperature**

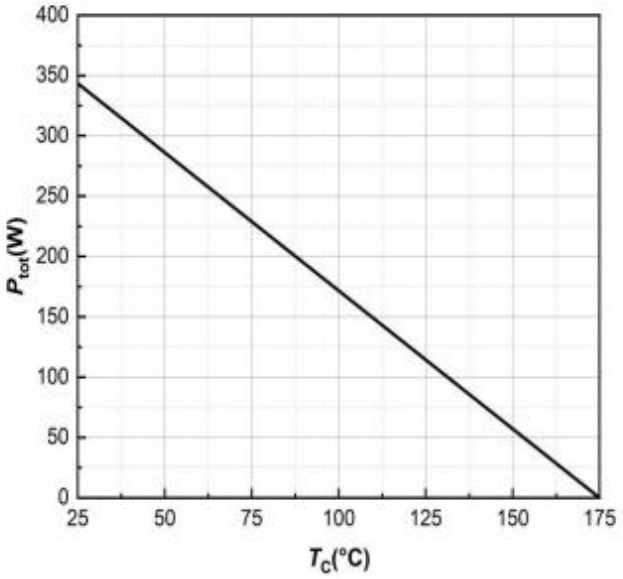


Figure 19. **Maximum Power Dissipation Derating vs. Case Temperature**

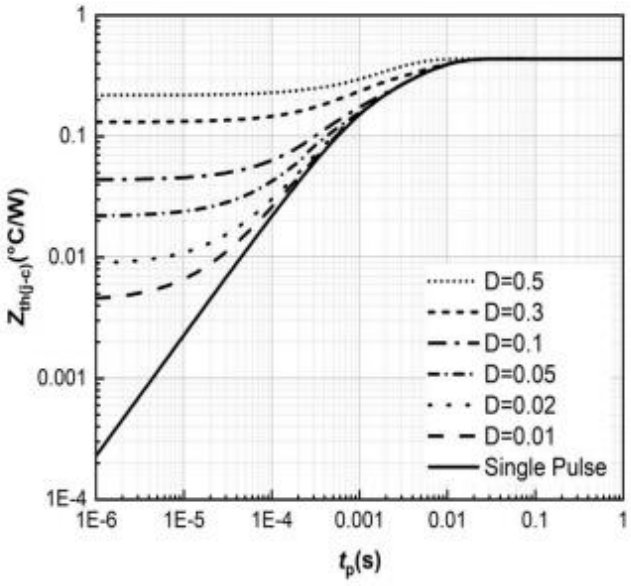


Figure 20. **Transient Thermal Impedance**

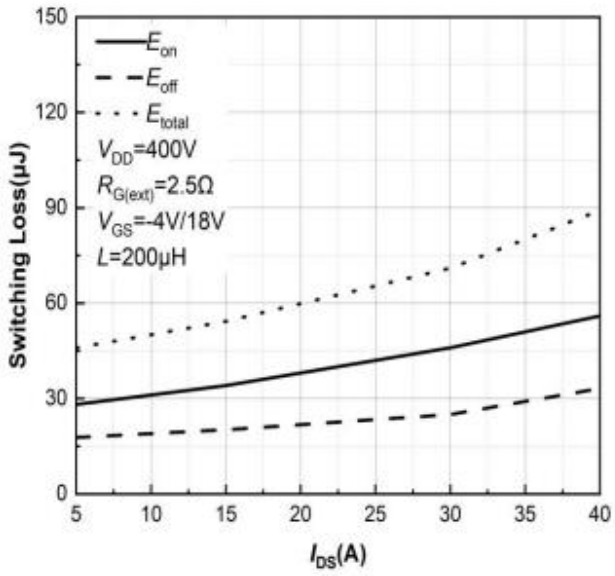


Figure 21. **Clamped Inductive Switching Energy vs. Drain Current T_j=25°C**

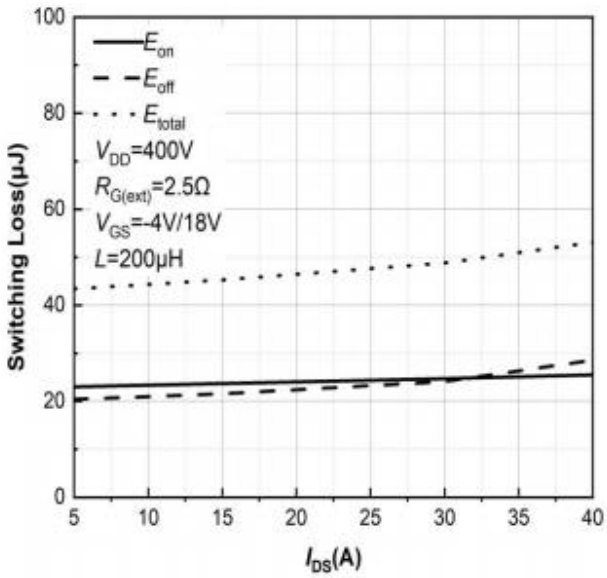


Figure 22. **Clamped Inductive Switching Energy vs. Drain Current T_j=175°C**

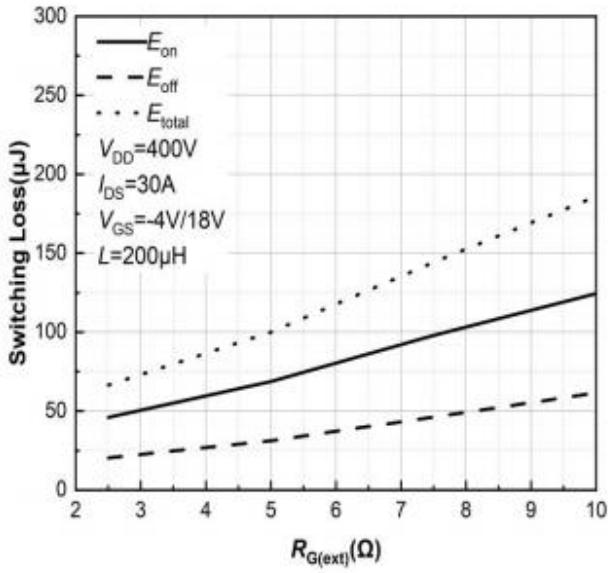


Figure 23. **Clamped Inductive Switching Energy vs. $R_{G(ext)}$ T_j=25°C**

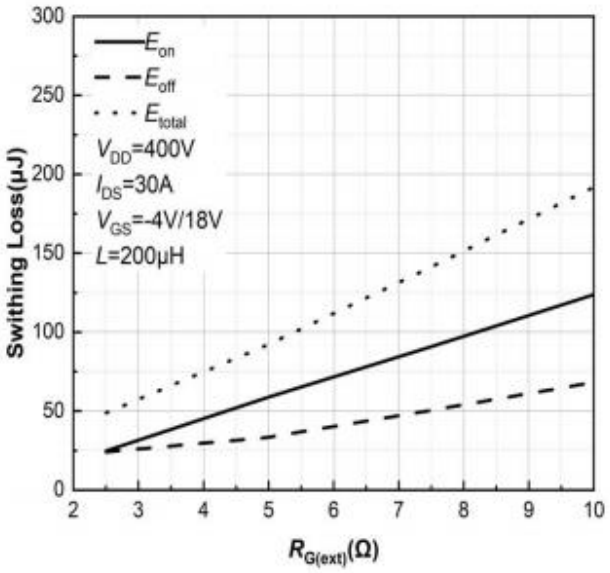


Figure 24. **Clamped Inductive Switching Energy vs. $R_{G(ext)}$ T_j=175°C**

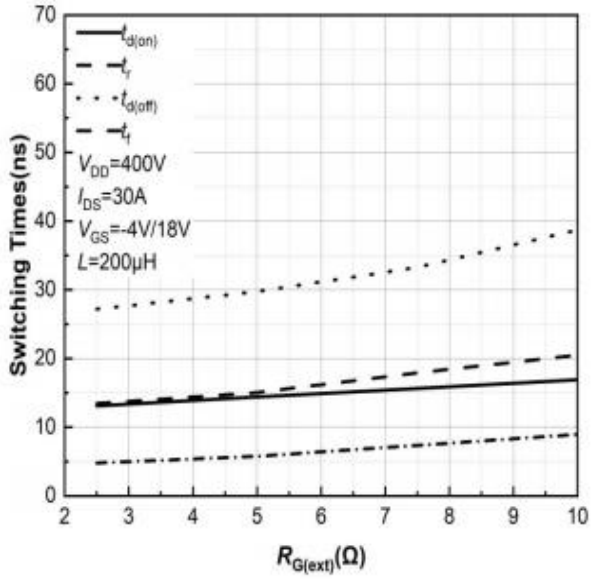


Figure 25. **Switching Times vs. $R_{G(ext)}$ T_j=25°C**

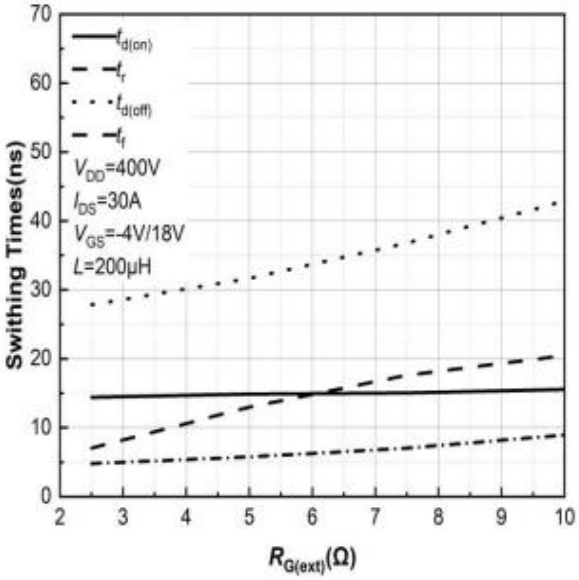


Figure 26. **Switching Times vs. $R_{G(ext)}$ T_j=175°C**

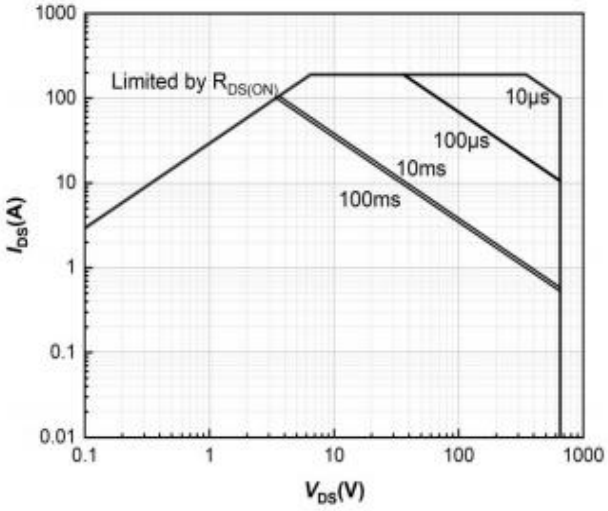
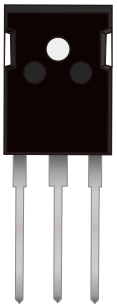
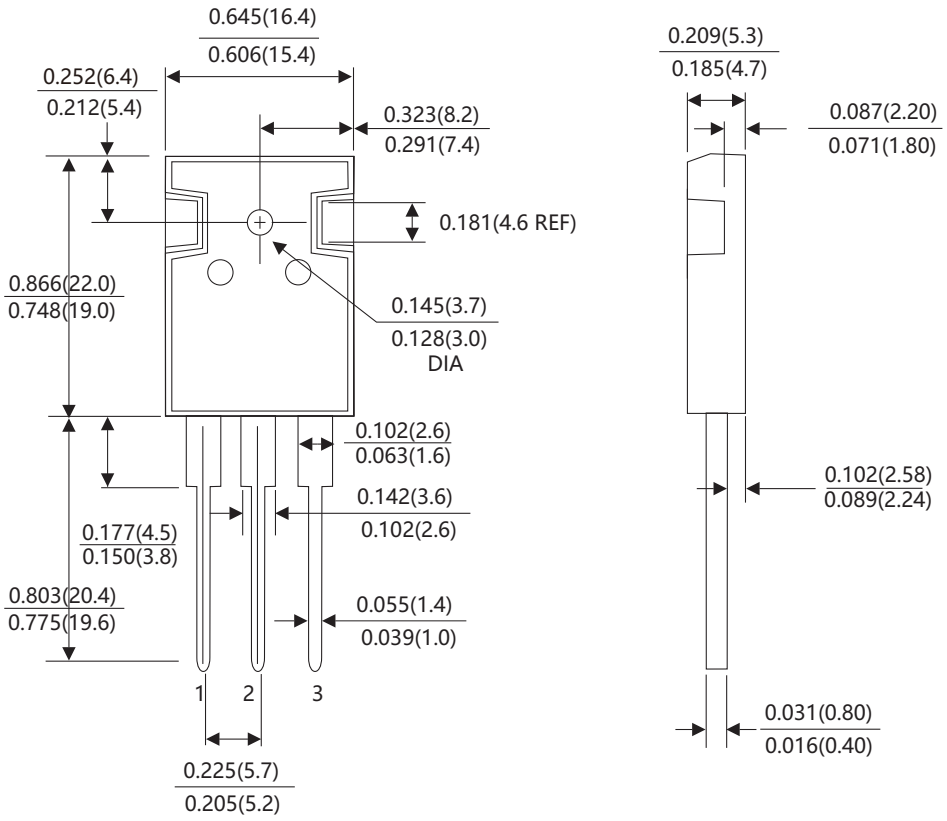


Figure 27. **Safe Operating Area**

Dimensions

TO-247 package





Friendship Reminder

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