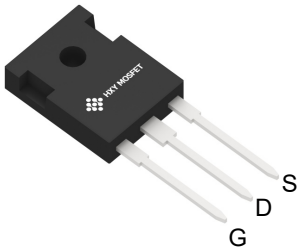
Features

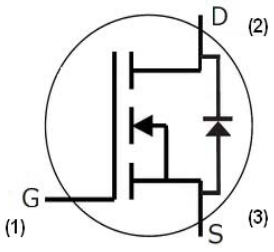
- High Blocking Voltage with Low On-Resistance
- Temperature-Independent switching behavior
- Highoperatingjunctiontemperaturecapability



TO-247

Applications

- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC/DC converters
- Online UPS/Industrial UPS



Part Number	Package	Qty(PCS)
UF3C065040K3S	TO-247	30

Maximum Ratings (T_C = 25 ˚C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{DSmax}	Drain - Source Voltage	650	V	V_{GS} = 0 V, I_D=1mA	
V_{GSmax}	Gate - Source Voltage	-8/+22	V	Absolute Maximum Values	
V_{GSop}	Gate - Source Voltage	-4/+15	V	Recommended operational values	
I_D	Continuous Drain Current	85	A	V_{GS} =15 V, T_C = 25˚C	Fig. 19
		60		V_{GS} =15 V, T_C = 100˚C	
$I_{D(pulse)}$	Pulsed Drain Current	160	A	Pulse width t_P limited by T_{jmax}	Fig. 22
P_D	Power Dissipation	312	W	T_C=25˚C, T_J =15 ˚C	Fig. 20
T_J , T_{stg}	Operating Junction and Storage Temperature	-55 to +175	˚C		
T_L	Solder Temperature	260	˚C	1.6mm (0.063”) from case for 10s	

Electrical Characteristics (T_C = 25˚C unless otherwise specified)

Symbol	Parameter	Conditions	Value			Unit	Note
			Min	Typ	Max		
$V_{(BR)DSS}$	Drain Source Breakdown Voltage	V_{GS}=0V,I_D=1mA	650	-	-	V	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=10mA	1.8	2.9	4.3	V	Fig.11
		V_{DS}=V_{GS},I_D=10mA,T_j=175°C	-	2.1	-	V	
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=650V,V_{GS}=0V		0.02	10	μA	
I_{GSS}	Gate Source Leakage Current	V_{GS}=15V,V_{DS}=0V	-	-	100	nA	
$R_{DS(on)}$	Current Drain-Source On-State Resistance	V_{GS}=15V,I_D=30A	-	38	51	mΩ	Fig.4,5,6
		V_{GS}=15V,I_D=30A,T_j=175°C	-	44	-		
		V_{GS}=18V,I_D=30A	-	28	41		
		V_{GS}=18V,I_D=30A,T_j=175°C	-	40	-		
g_{fs}	Transconductance	V_{DS}=20V,I_D=30A	-	18	-	S	Fig.7
		V_{DS}=20V,I_D=30A,T_j=175°C	-	17	-		
$R_{g,int}$	Internal Gate Resistance	V_{AC}=25mV,f=1MHz	-	8.3	-	Ω	
V_{SD}	Diode Forward Voltage	V_{GS}= -4V,I_{SD}=15A	-	3.2	-	V	Fig.8,9,10
		V_{GS}= -4V,I_{SD}=15A,T_j=175°C	-	2.8	-		

Reverse Diode Characteristics

Symbol	Parameter	Conditions	Value			Unit	Note
			Min	Typ	Max		
C_{iss}	Input Capacitance	V_{DS}=600V,V_{GS}=0V,T_j=25°C,V_{AC}=25mV,f=100KHz	-	2682	-	pF	Fig.17, 18
C_{oss}	Output Capacitance		-	246	-		
C_{rss}	Reverse Capacitance		-	12	-		
E_{oss}	Coss Stored Energy		-	46	-	μJ	Fig.16
Q_{gs}	Gate Source Charge	V_{DS}=400V,V_{GS}=-4/15V,I_D=30A	-	22	-	nC	Fig.12
Q_{gd}	Gate Drain Charge		-	32	-		
Q_g	Gate Charge		-	103	-		

Switching Characteristics (T_C = 25˚C unless otherwise specified)

Symbol	Parameter	Conditions	Value			Unit	Note
			Min	Typ	Max		
E_{on}	Turn on Switching Energy	V_{DS}=400V,V_{GS}=-4/+15V,I_D=30A, R_g=2.5Ω,L=120μH	-	341	-	μJ	Fig.23
E_{off}	Turn off Switching Energy		-	62	-		
$t_{d(on)}$	Turn on Delay Time		-	54	-	nS	Fig.27
t_r	Rise Time		-	25	-		
$t_{d(off)}$	Turn off Delay Time		-	35	-		
t_f	Fall Time		-	13	-		

Body Diode Characteristics

Symbol	Parameter	Conditions	Value			Unit	Note
			Min	Typ	Max		
V_{SD}	Diode Forward Voltage	V_{GS}= -4V,I_{SD}=15A	-	3.2	-	V	Fig.8,9,10
		V_{GS}= -4V,I_{SD}=15A,T_j=175°C	-	2.8	-		
t_{rr}	Reverse Recovery Time	VR=400V,V_{GS}= -4V,I_D=30A, di/dt=1000A/μS	-	18	-	nS	
Q_{rr}	Reverse Recovery Charge		-	108	-	nC	
I_{rm}	Peak Reverse Recovery Current		-	10	-	A	

Thermal Characteristics

Symbol	Parameter	Conditions	Value	Unit	Note
$R_{th(j-c)}$	Thermal Resistance from Junction to Case		0.48	℃/W	Fig.21

Typical Performance

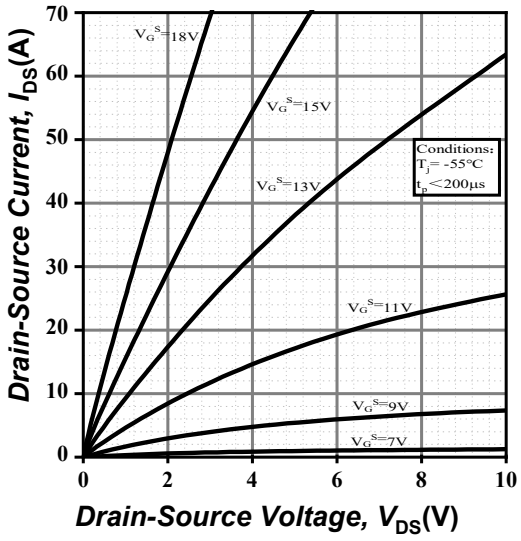


Figure 1. Output Characteristic T_j= -55°C

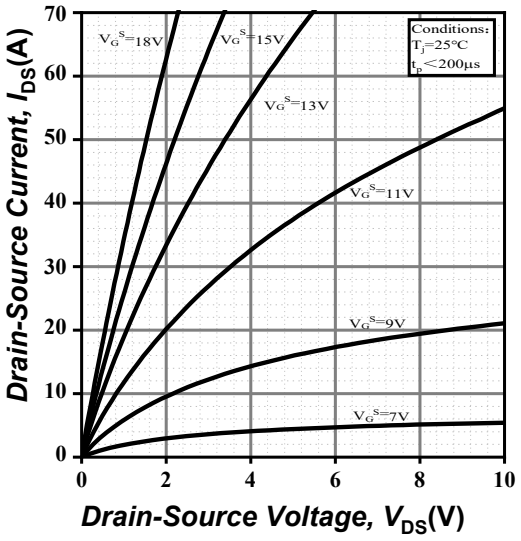


Figure 2. Output Characteristic T_j= 25°C

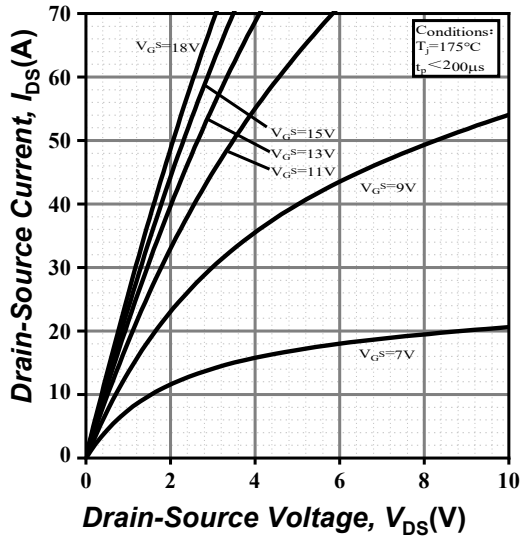


Figure 3. Output Characteristic T_j= 175°C

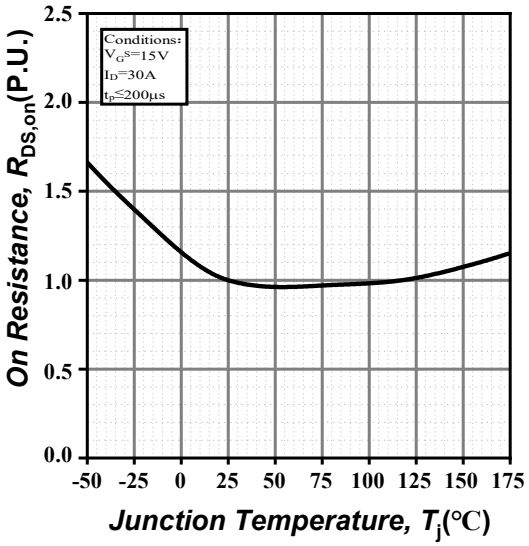


Figure 4. Normalized On-Resistance vs. Temperature

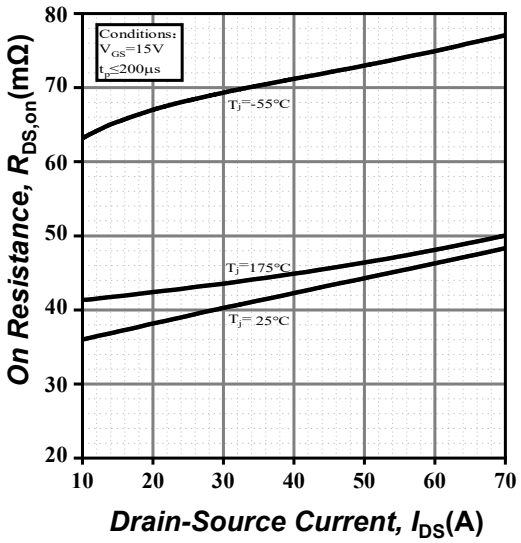


Figure 5. On-Resistance vs. Drain Current for Various Temperature

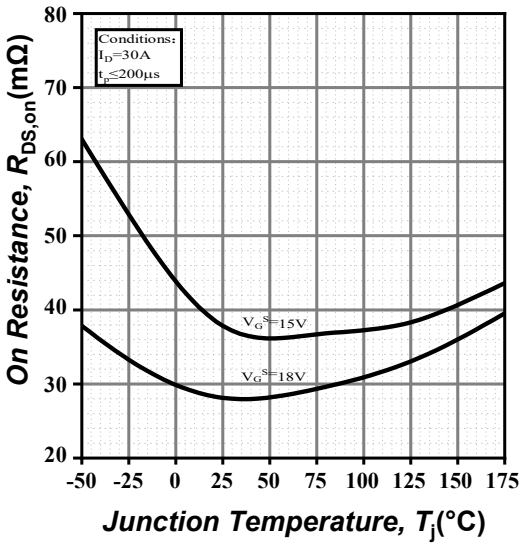


Figure 6. On-Resistance vs. Temperature for Various Gate Voltage

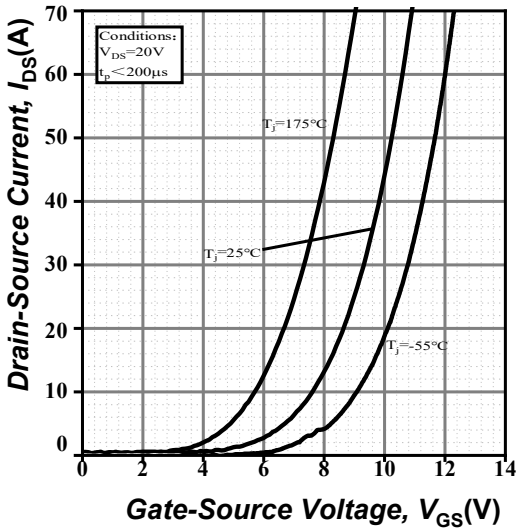


Figure 7. Transfer Characteristic for Various Junction Temperature

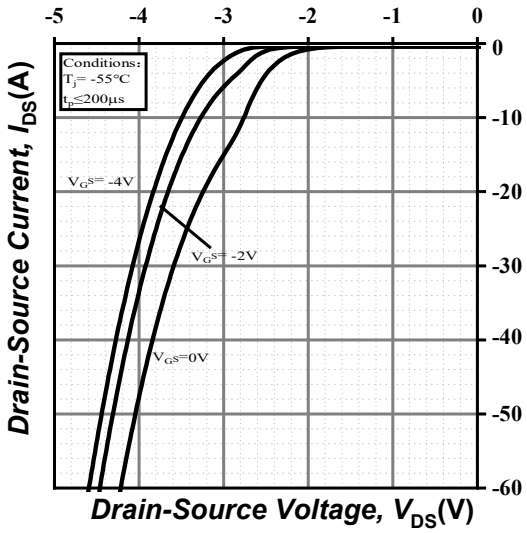


Figure 8. Body Diode Characteristic T_j= -55°C

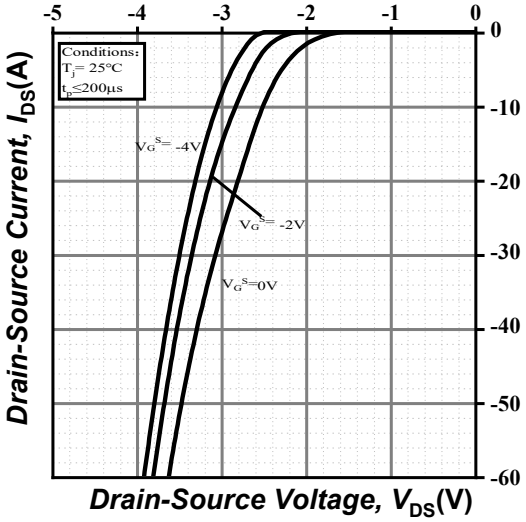


Figure 9. Body Diode Characteristic T_j= 25°C

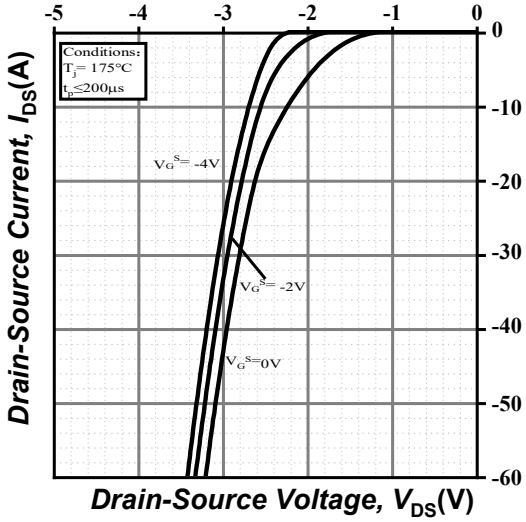


Figure 10. Body Diode Characteristic T_j= 175°C

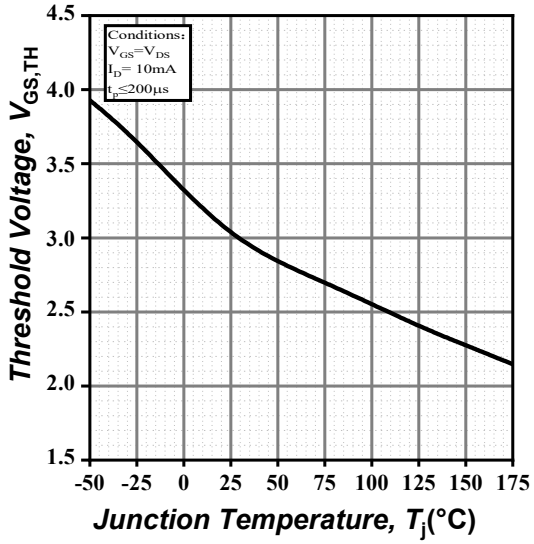


Figure 11. Threshold Voltage vs. Temperature

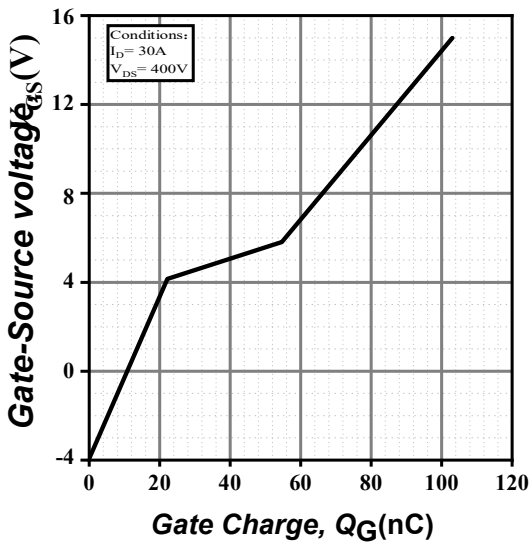


Figure 12. Gate Charge Characteristic

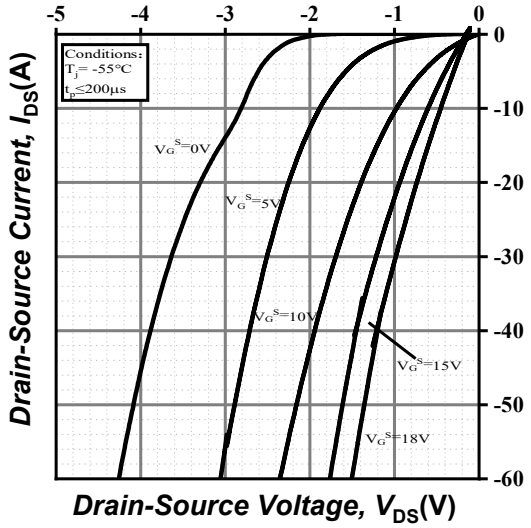


Figure 13. 3rd Quadrant Characteristic T_j= -55°C

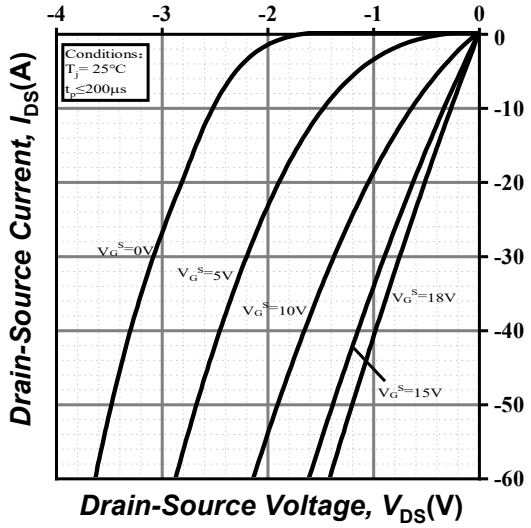


Figure 14. 3rd Quadrant Characteristic T_j= 25°C

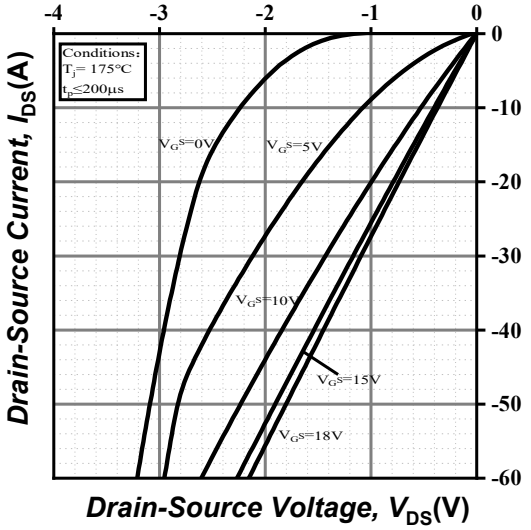


Figure 15. 3rd Quadrant Characteristic T_j= 175°C

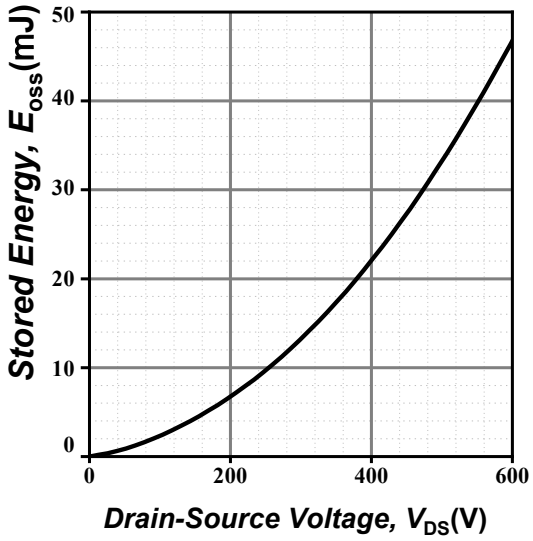


Figure 16. Output Capacitor Stored Energy

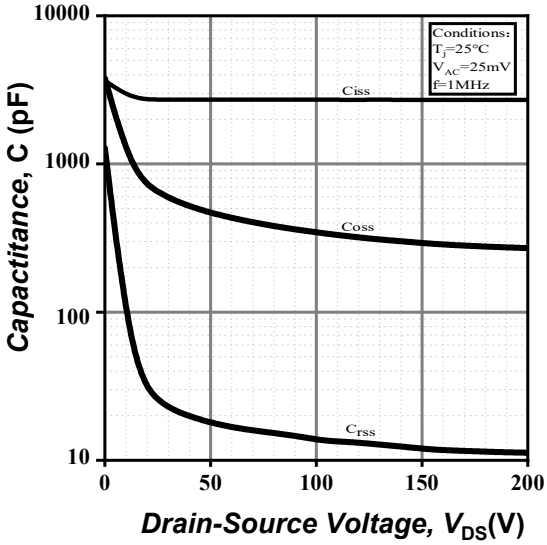


Figure 17. Capacitance vs. Drain-Source Voltage(0 - 200V)

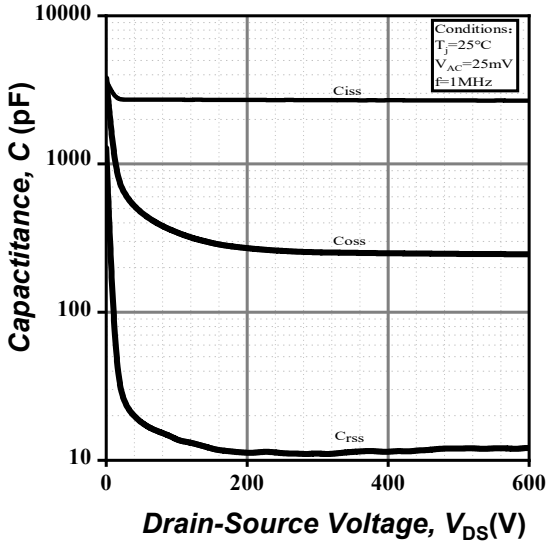


Figure 18. Capacitance vs. Drain-Source Voltage(0 - 600V)

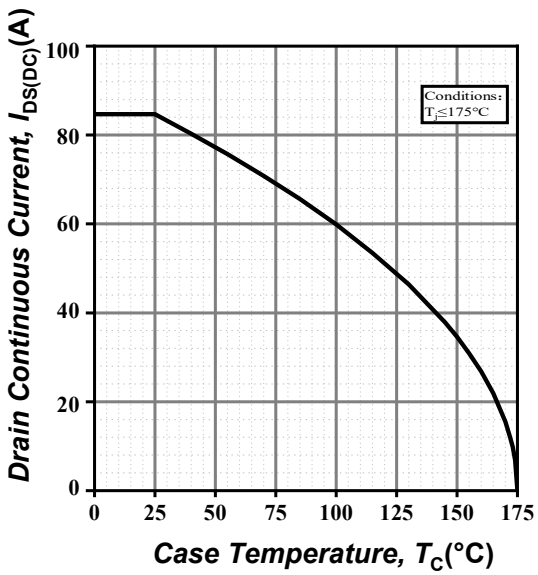


Figure 19. Continuous Drain Current Derating vs. Case Temperature

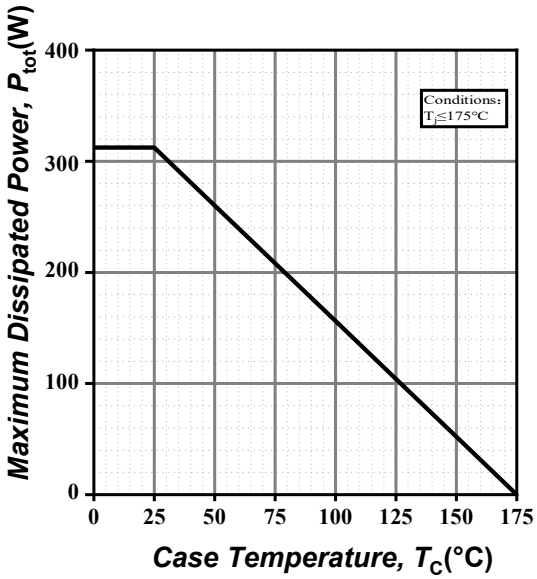


Figure 20. Maximum Power Dissipation Derating vs. Case Temperature

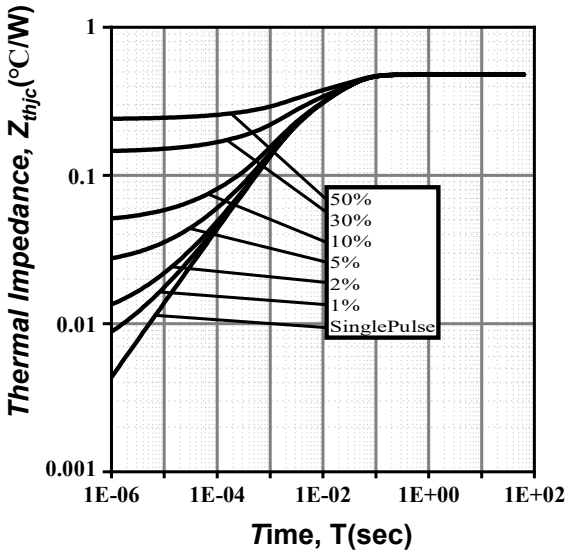


Figure 21. Transient Thermal Impedance (Junction - Case)

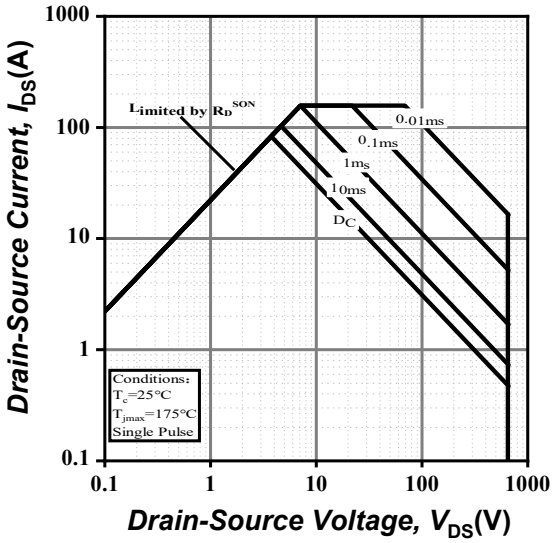


Figure 22. Safe Operation Area

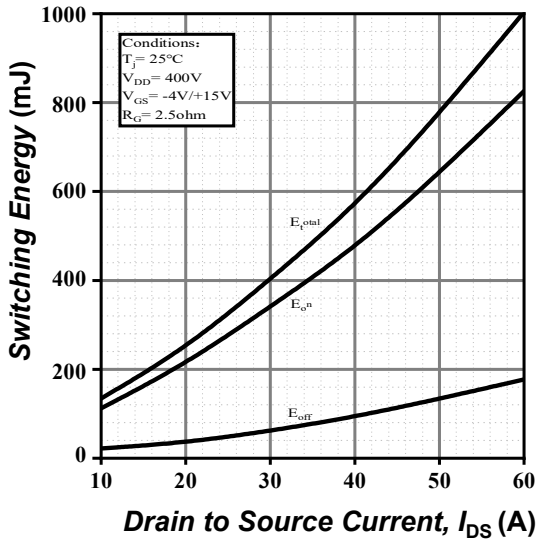


Figure 23. Clamped Inductive Switching Energy vs. Drain Current(V_{DD}=400V)

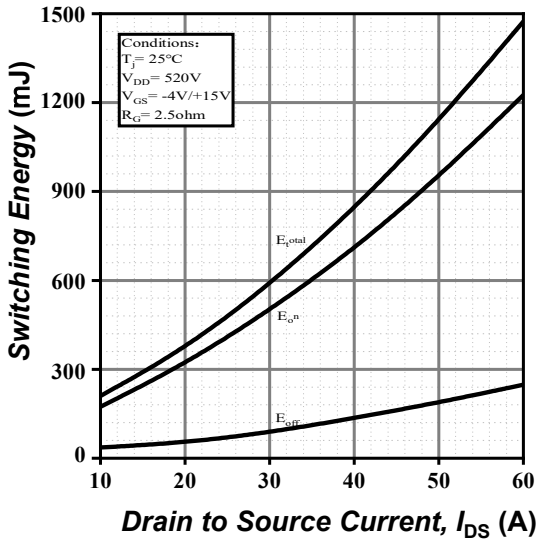


Figure 24. Clamped Inductive Switching Energy vs. Drain Current(V_{DD}=520V)

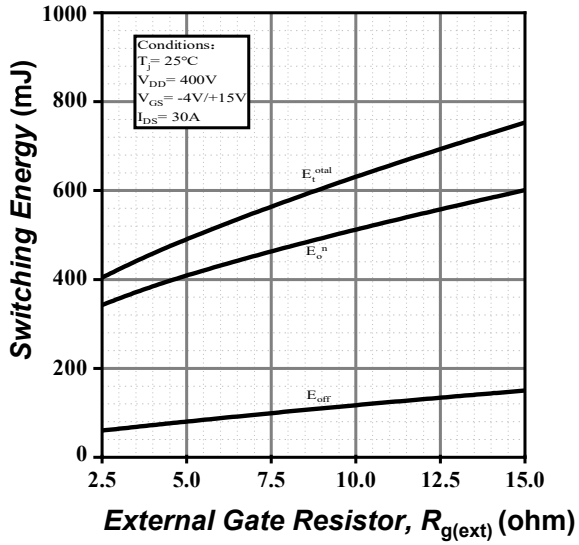


Figure 25. Clamped Inductive Switching Energy vs. $R_{g(ext)}$

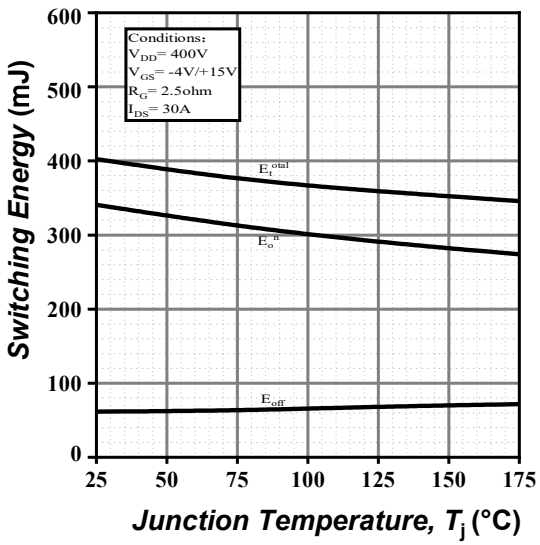


Figure 26. Clamped Inductive Switching Energy vs. Temperature

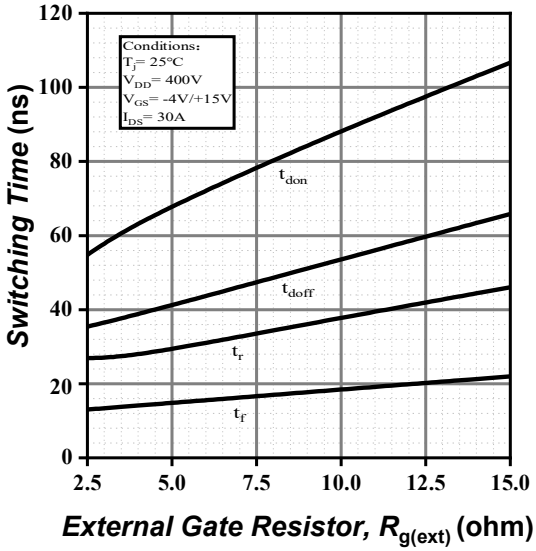
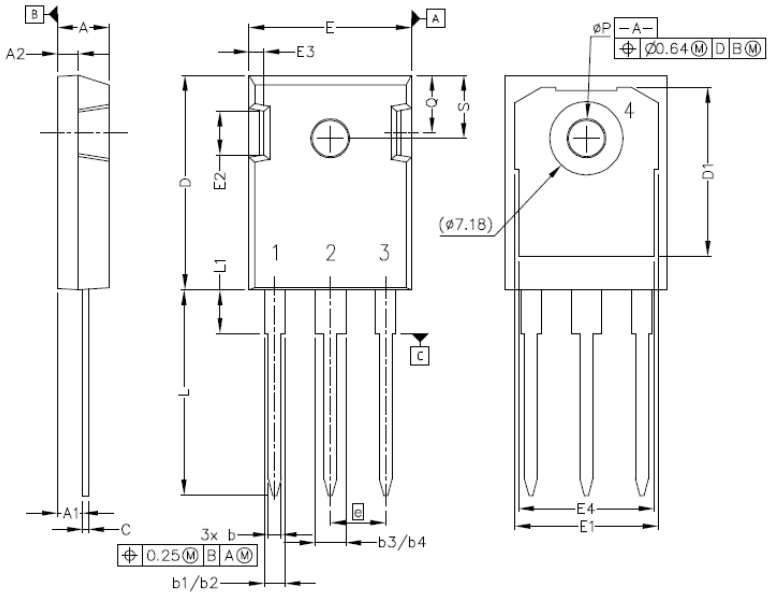
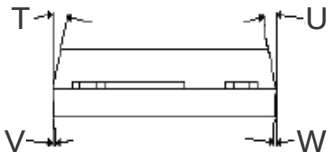


Figure 27. Switching Times vs. $R_{g(ext)}$

Package Dimensions

Package TO-247



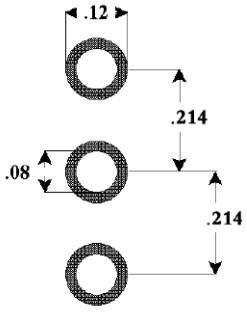


Pinout Information:

- Pin 1 = Gate
- Pin 2, 4 = Drain
- Pin 3 = Source

POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.042	.052	1.07	1.33
b1	.075	.095	1.91	2.41
b2	.075	.085	1.91	2.16
b3	.113	.133	2.87	3.38
b4	.113	.123	2.87	3.13
c	.022	.027	0.55	0.68
D	.819	.831	20.80	21.10
D1	.640	.695	16.25	17.65
D2	.037	.049	0.95	1.25
E	.620	.635	15.75	16.13
E1	.516	.557	13.10	14.15
E2	.145	.201	3.68	5.10
E3	.039	.075	1.00	1.90
E4	.487	.529	12.38	13.43
e	.214 BSC		5.44 BSC	
N	3		3	
L	.780	.800	19.81	20.32
L1	.161	.173	4.10	4.40
ØP	.138	.144	3.51	3.65
Q	.216	.236	5.49	6.00
S	.238	.248	6.04	6.30
T	9°	11°	9°	11°
U	9°	11°	9°	11°
V	2°	8°	2°	8°
W	2°	8°	2°	8°

Recommended Solder Pad Layout



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