N Channel MOSFET

multicomp PRO

Features

RoHS Compliant

- $V_{DS(V)}$ = 150V
- ID = 65A
- $R_{DS(on)}$ (at V_{GS} = 10V) <9.9mΩ
- SGT MOSFET
- Superior UIS performance
- 100% UIS tested
- Very low on-resistance

Absolute Maximum Ratings (TA = 25°C unless otherwise noted)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	150	V
Gate-Source Voltage		V_{GS}	+20	
Continuous Drain Current[A]	T_C = 25°C	I_D	65	A
	T_C = 100°C		41	
Pulsed Drain Current[B]		I_{DM}	260	
Single Pulse Avalanche Energy[C]		E_{AS}	324	mJ
Power Dissipation		P_D	104	W
Thermal Resistance, Junction- to-Ambient[D]		$R_{\theta JA}$	45	mJ
Thermal Resistance, Junction- to-Case		$R_{\theta JC}$	1.2	°C/W
Storage Temperature Range		T_{stg}	-55 to 150	°C

Notes:
A. The max drain current rating is silicon limited
B. Repetitive Rating: Pulse width limited by maximum junction temperature
C. L = 0.5 mH, V_{DD} = 50 V, I_{AS} = 36 A, R_G = 25 Ω, Starting T_J = 25°C
D. Mount on minimum PCB layout

Electrical Characteristics (T_J = 25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=-250μA, V_{GS}=0V	150			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-150V, V_{GS}=0V			1	μA
Gate to Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±100	nA
Gate to Source Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	2	3	4	V
Static Drain-Source On-Resistance	$R_{DS(On)}$	V_{GS}=-10V, I_D=20A		8	9.9	mΩ
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=75V, F=1MHz		3690		pF
Output Capacitance	C_{oss}			320		
Reverse Transfer Capacitance	C_{RSS}			15		
Gate Resistance	R_G	F = 1 MHz		1.2		Ω

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Switching Characteristics						
Total Gate Charge	Q_g	V_{DD}=75V, I_D=20A V_{GS}=10V,		51		nC
Gate Source Charge	Q_{gs}			18		
Gate Drain Charge	Q_{gd}			10		
Turn-On DelayTime	$t_{d(on)}$	V_{DD} = 75V, R_L = 3.8Ω, V_{GS} = 10V, R_G = 6.8Ω		23		nS
Turn-On Rise Time	t_r			40		
Turn-Off DelayTime	$t_{d(off)}$			48		
Turn-Off Fall Time	t_f			22		
Drain-Source Diode Characteristics and Maximum Ratings						
Body Diode Reverse Recovery Time	t_{rr}	V_{DD} = 75V, I_F = 20A dI/dt = 100 A/μs,		86		nS
Body Diode Reverse Recovery Charge	Q_{rr}			265		nC
Peak Reverse Recovery Current	I_{RRM}			5		
Maximum Body-Diode Continuous Current	I_S				65	
Maximum Body-Diode Current (Pulsed)	I_{SM}				260	
Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 1A		0.68		V

Notes:
1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

Typical Characterisitics

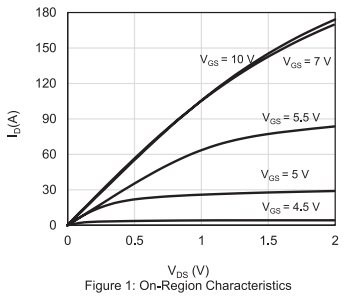


Figure 1: On-Region Characteristics

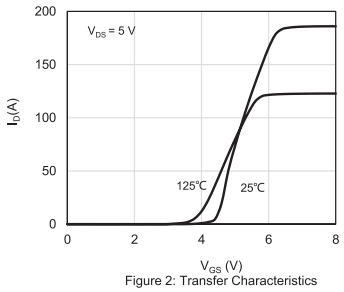


Figure 2: Transfer Characteristics

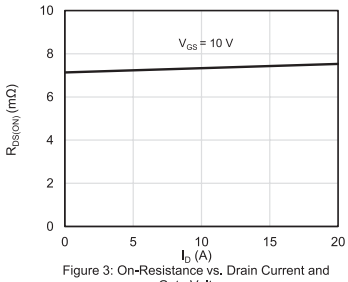


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

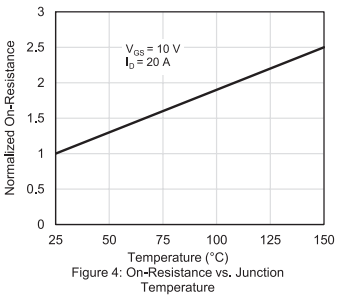


Figure 4: On-Resistance vs. Junction Temperature

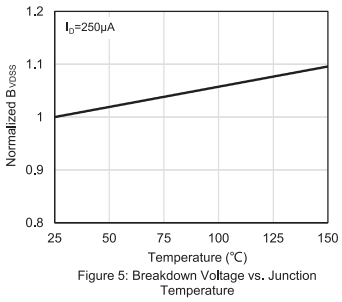


Figure 5: Breakdown Voltage vs. Junction Temperature

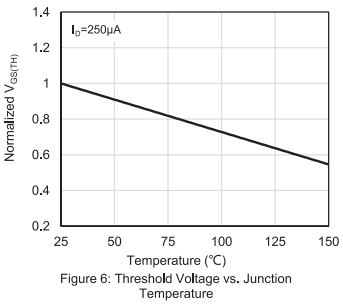


Figure 6: Threshold Voltage vs. Junction Temperature

Typical Characterisitics

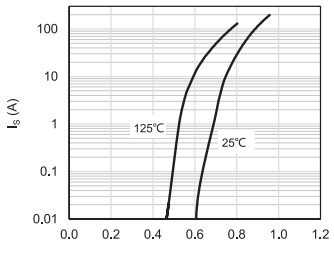


Figure 7: Body-Diode Characteristics

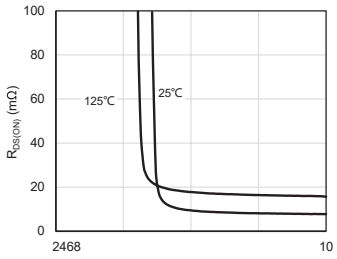


Figure 8: On-Resistance vs. Gate-Source Voltage

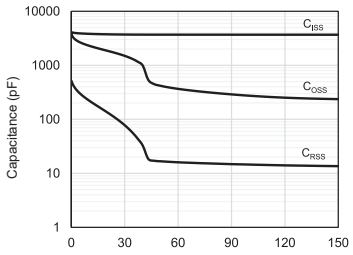


Figure 9: Capacitance Characteristics

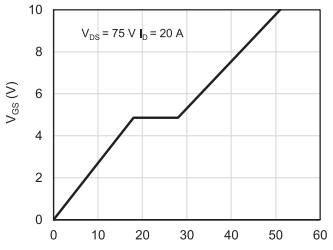


Figure 10: Gate-Charge Characteristics

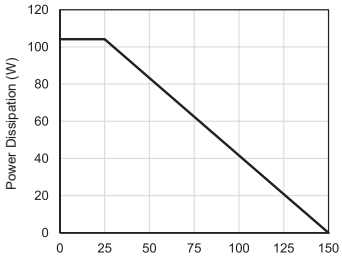


Figure 11: Power De-rating

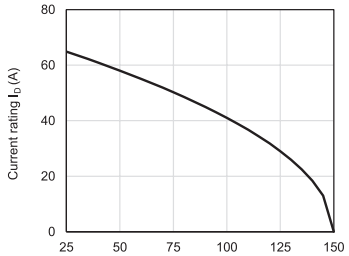


Figure 12: Current De-rating

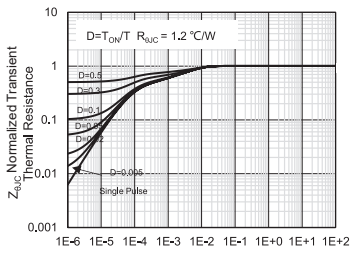


Figure 13: Normalized Maximum Transient Thermal Impedance

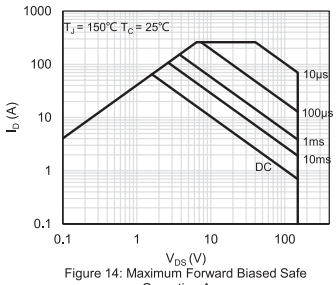
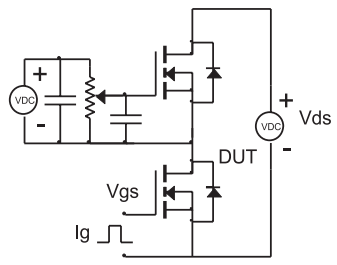
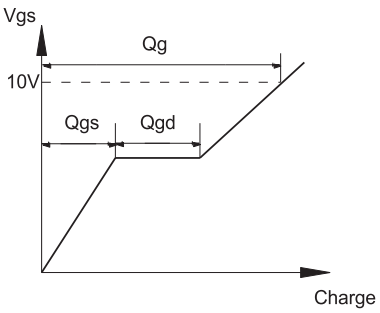


Figure 14: Maximum Forward Biased Safe Operating Area

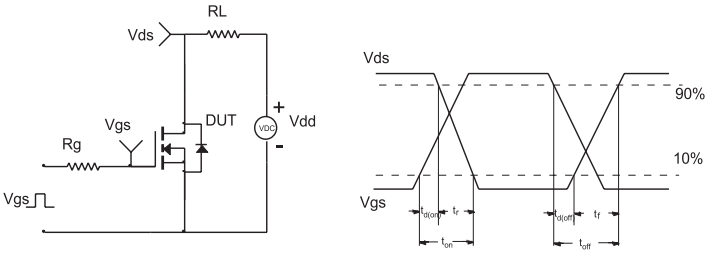
Test Circuit and Waveform

Gate Charge Test Circuit & Waveform

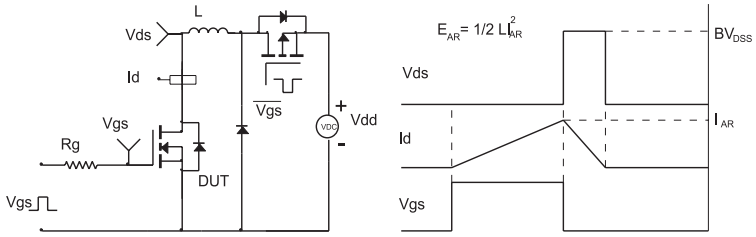




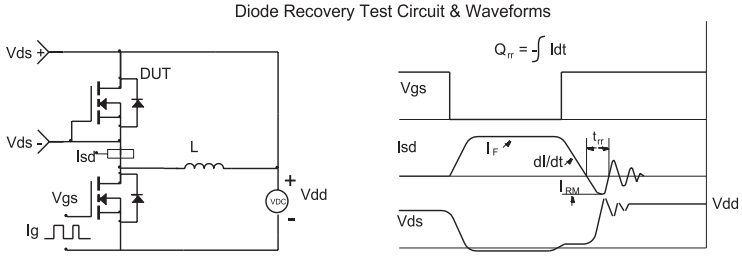
Resistive Switching Test Circuit & Waveforms



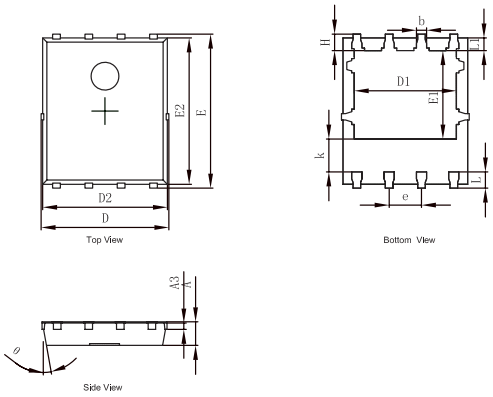
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

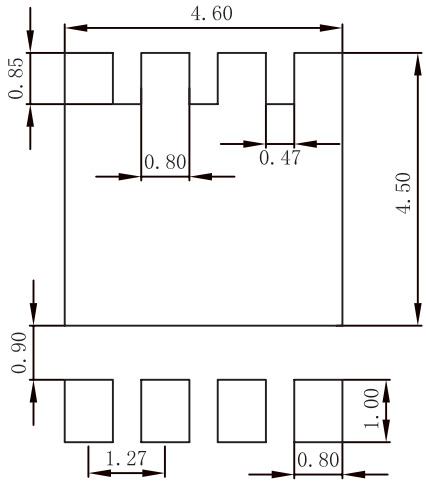


Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°

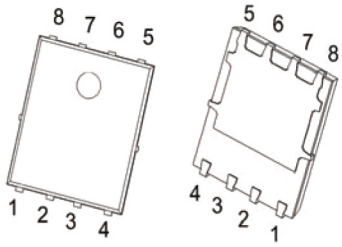
Suggested Pad Layou

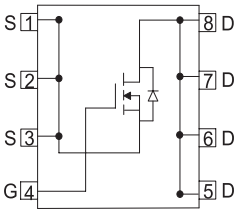


Notes

1. Controlling dimension: in millimeters.
2. General tolerance: ±0.05mm
3. The pad layout is for reference purposes only.

Diagram





Part Number Table

Description	Part Number
N Channel MOSFET, 65A, 150V	2KK6040DFN

Dimensions : Millimetres