

RoHS Compliant Product
A suffix of "-C" specifies halogen & lead-free

DESCRIPTION

The SPRD2440-C is the highest performance trench Dual N-ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The SPRD2440-C meet the RoHS and Green Product requirement with full function reliability approved.

FEATURES

- Advanced High Cell Density Trench Technology
- Super Low Gate Charge
- Green Device Available

MARKING



PACKAGE INFORMATION

Package	MPQ	Leader Size
DFN5x6-8D	3K	13 inch

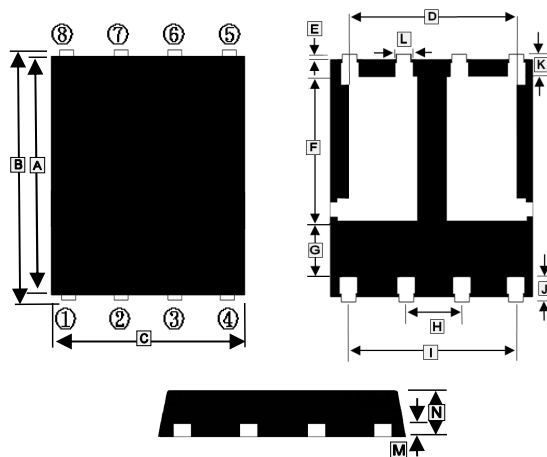
ORDER INFORMATION

Part Number	Type
SPRD2440-C	Lead (Pb)-free and Halogen-free

ABSOLUTE MAXIMUM RATINGS

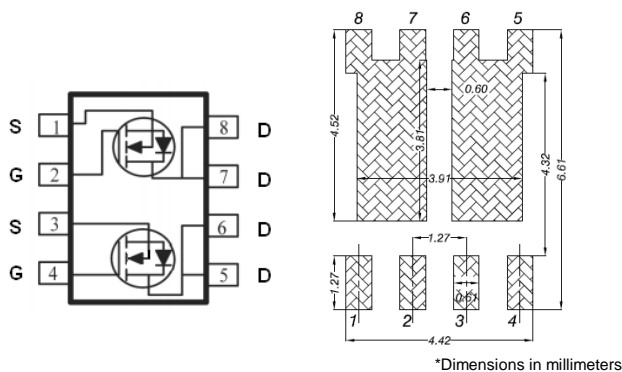
Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ¹ @ $V_{GS}=10V$	I_D	$T_C=25^\circ C$	24
		$T_C=100^\circ C$	24
Pulsed Drain Current ³	I_{DM}	80	A
Total Power Dissipation	P_D	35.7	W
Operating Junction & Storage Temperature Range	T_J, T_{STG}	-55~150	$^\circ C$
Thermal Data			
Thermal Resistance Junction-Ambient ¹	$R_{\theta JA}$	62.5	$^\circ C/W$
Thermal Resistance Junction-Ambient ²		110	
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	3.5	

DFN5x6-8D



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	5.70	5.80	H	1.27 BSC.	
B	5.90	6.10	I	3.61	3.96
C	4.80	5.00	J	0.51	0.71
D	3.61	3.96	K	0.41	0.61
E	0.06	0.20	L	0.33	0.51
F	3.38	3.78	M	0.20	0.30
G	1.10	-	N	0.90	1.10

Mounting Pad Layout



ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions	
Drain-Source Breakdown Voltage	BV_{DSS}	40	-	-	V	$V_{GS}=0, I_D=250\mu\text{A}$	
Gate Threshold Voltage	$V_{GS(th)}$	1	-	2.5	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	
Forward Transfer Conductance	g_{fs}	-	36	-	S	$V_{DS}=5\text{V}, I_D=20\text{A}$	
Gate-Source Leakage Current	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 20\text{V}$	
Drain-Source Leakage Current	I_{DSS}	$T_J=25^\circ\text{C}$	-	-	1	μA	$V_{DS}=24\text{V}, V_{GS}=0$
		$T_J=55^\circ\text{C}$	-	-	5		
Static Drain-Source On-Resistance ⁴	$R_{DS(ON)}$	-	9	12	m Ω	$V_{GS}=10\text{V}, I_D=12\text{A}$	
		-	11	15		$V_{GS}=4.5\text{V}, I_D=10\text{A}$	
Total Gate Charge	Q_g	-	18.8	-	nC	$I_D=12\text{A}$ $V_{DS}=20\text{V}$ $V_{GS}=10\text{V}$	
Gate-Source Charge	Q_{gs}	-	6.4	-			
Gate-Drain Charge	Q_{gd}	-	7	-			
Turn-on Delay Time	$T_{d(on)}$	-	8.3	-	nS	$V_{DD}=12\text{V}$ $I_D=1\text{A}$ $V_{GS}=10\text{V}$ $R_G=3.3\Omega$	
Rise Time	T_r	-	2.3	-			
Turn-off Delay Time	$T_{d(off)}$	-	35	-			
Fall Time	T_f	-	10.2	-			
Input Capacitance	C_{iss}	-	1980	-	pF	$V_{GS}=0$ $V_{DS}=15\text{V}$ $f=1\text{MHz}$	
Output Capacitance	C_{oss}	-	187	-			
Reverse Transfer Capacitance	C_{rss}	-	141	-			
Source-Drain Diode							
Continuous Source Current ¹	I_S	-	-	24	A		
Pulsed Source Current ³	I_{SM}	-	-	80			
Forward on Voltage ⁴	V_{SD}	-	-	1.2	V	$I_S=1\text{A}, V_{GS}=0$	
Reverse recovery time ⁵	T_{rr}	-	24	-	nS	$V_R=30\text{V}, I_F=2\text{A},$ $dI_F/dt = 100\text{A}/\mu\text{s}$	
Reverse recovery charge ⁵	Q_{rr}	-	17	-	nC		

Notes:

- Surface mounted on a 1 inch² FR-4 board with 2oz copper.
- When mounted on Min. copper pad.
- Pulse width limited by maximum junction temperature, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
- Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
- Per Channel.

CHARACTERISTIC CURVES

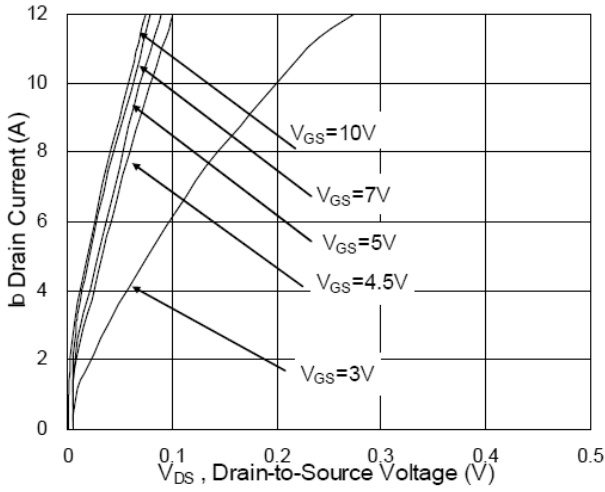


Fig.1 Typical Output Characteristics

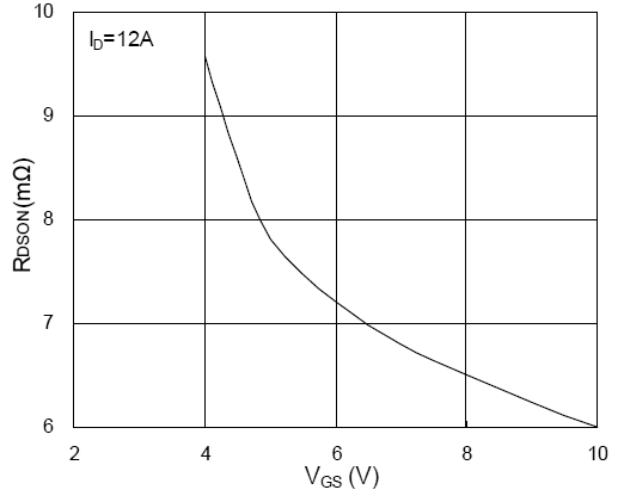


Fig.2 On-Resistance vs. G-S Voltage

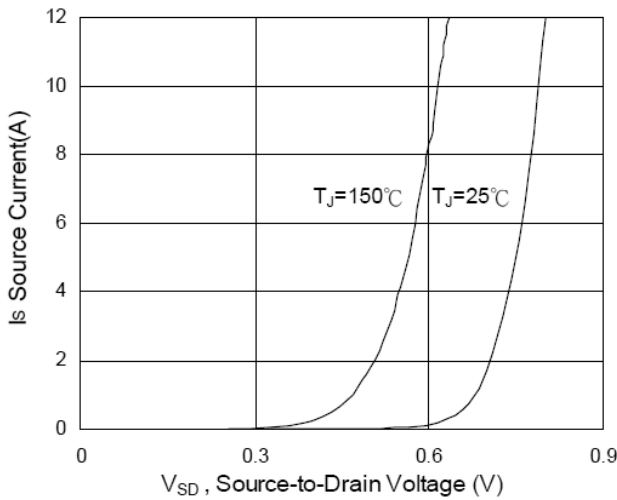


Fig.3 Forward Characteristics of Reverse

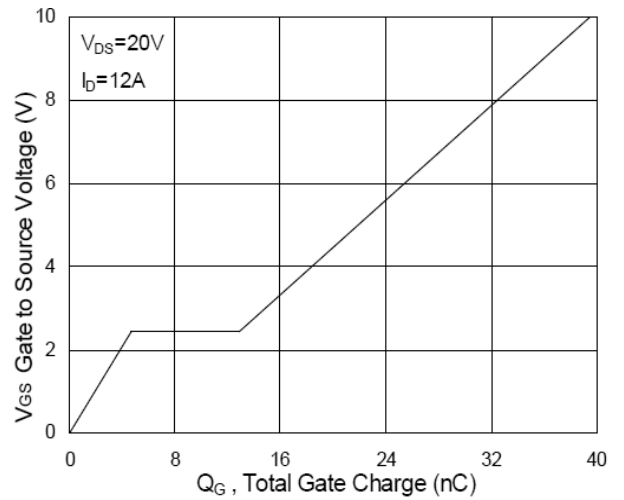


Fig.4 Gate-Charge Characteristics

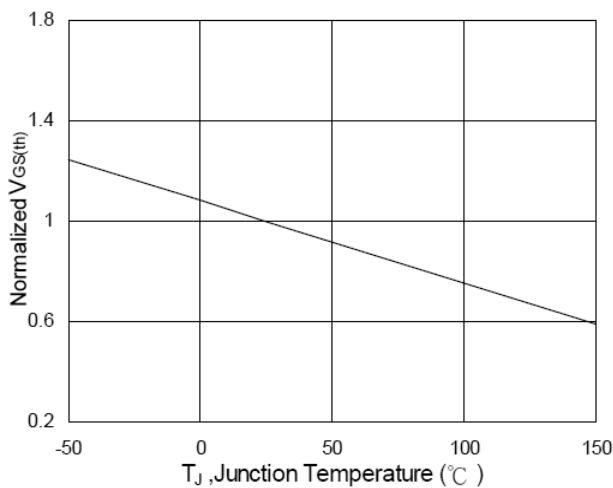


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

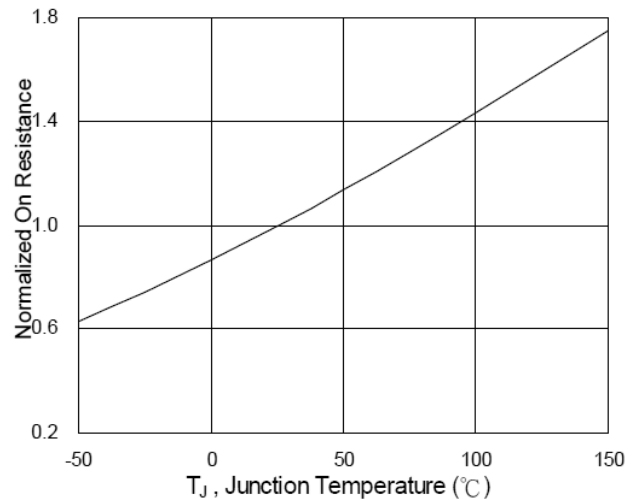


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

CHARACTERISTIC CURVES

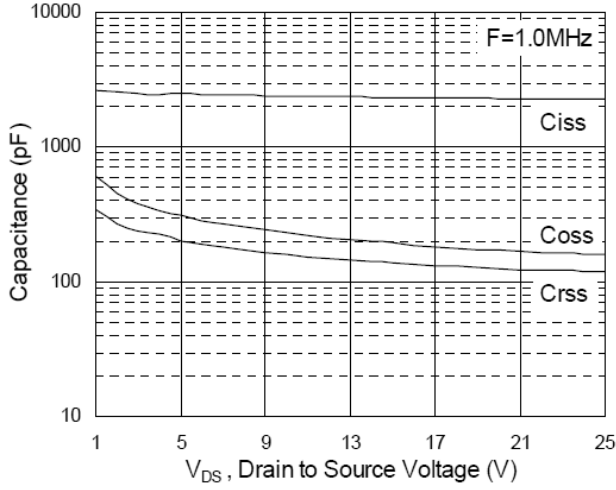


Fig.7 Capacitance

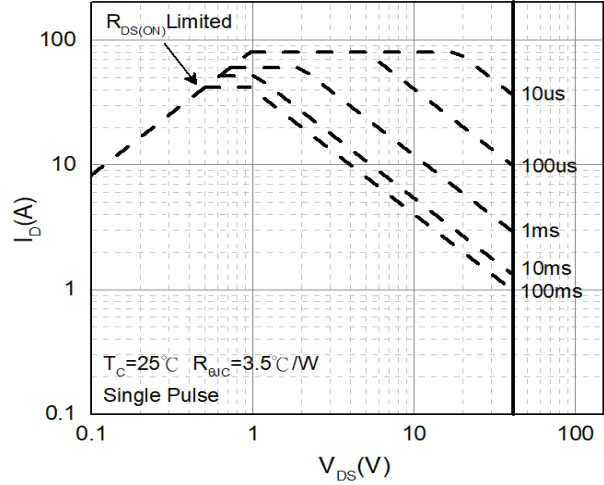


Fig.8 Safe Operating Area

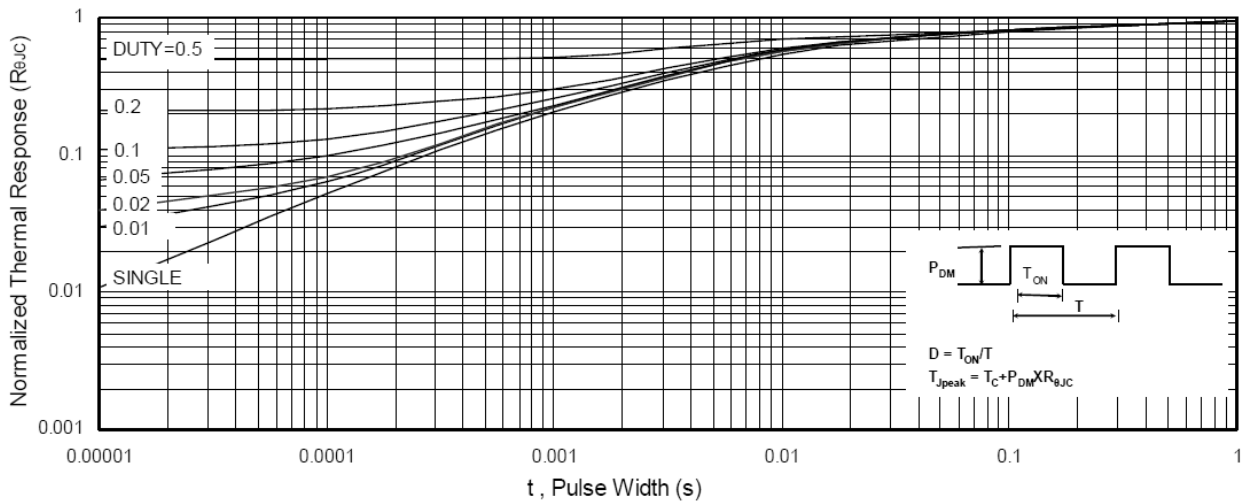


Fig.9 Normalized Maximum Transient Thermal Impedance

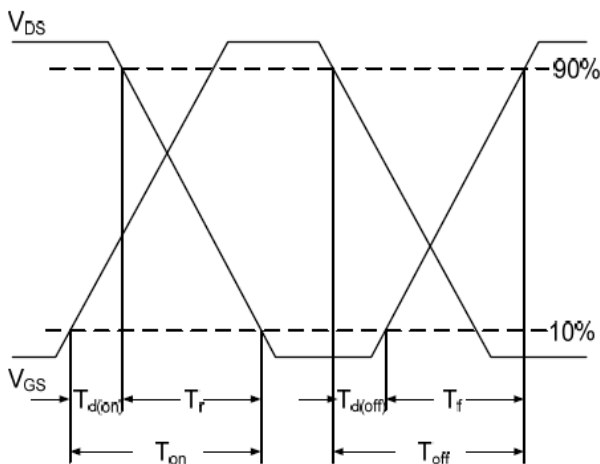


Fig.10 Switching Time Waveform

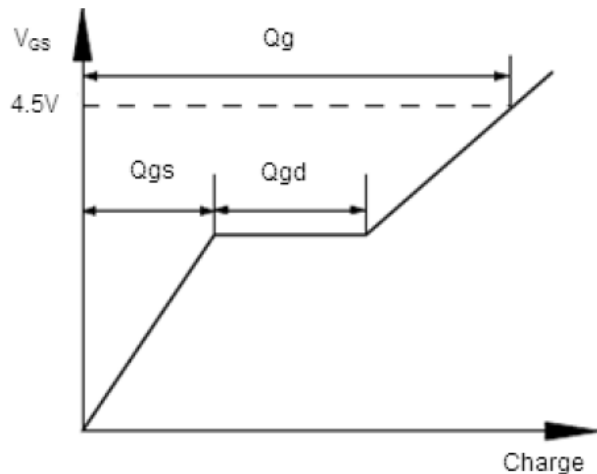


Fig.11 Gate Charge Waveform