



YOUSHANG SEMICONDUCTOR

设计研发新型功率器件

各类小信号开关

中低压及高压大电流等场效应管

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Features

- $BV_{CEO} > 100V$
- $I_C = 3A$ Continuous Collector Current
- $I_{CM} = 6A$ Peak Pulse Current
- $R_{CE(SAT)} < 150m\Omega$
- Rated to $+175^\circ C$ —Ideal for High Ambient Temperature Environments
- Wettable Flank for Improved Optical Inspection
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **The NK-DXTN3C100PSQ is suitable for automotive applications requiring specific change control and is AEC-Q101 qualified, is PPAP capable, and is manufactured in IATF16949:2016 certified facilities.**

Mechanical Data

- Case: PowerDI[®] 5060-8
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Finish—Matte Tin Annealed Over Copper Leadframe; Solderable per MIL-STD-202, Method 208 ③
- Weight: 0.097 grams (Approximate)

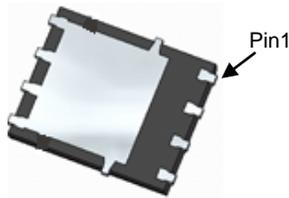
Applications

- Power Management
- Load Switch
- Linear Mode Voltage Regulator
- Backlighting Applications

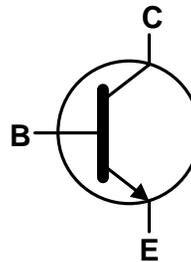
PowerDI5060-8 (SWP) (Type Q)



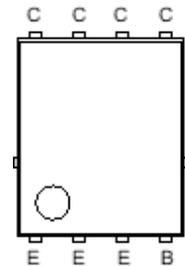
Top View



Bottom View



Internal Schematic



Top View
Pin Configuration

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	100	V
Collector-Emitter Voltage	V _{CEO}	100	V
Emitter-Base Voltage	V _{EBO}	7	V
Base Current	I _B	500	mA
Continuous Collector Current	I _C	3	A
Peak Pulse Collector Current	I _{CM}	6	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

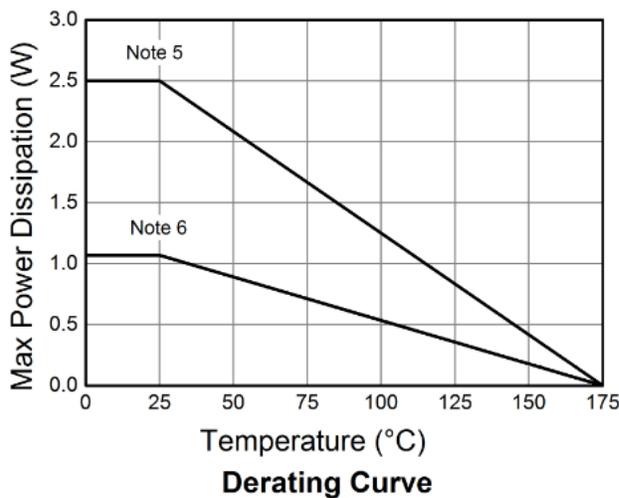
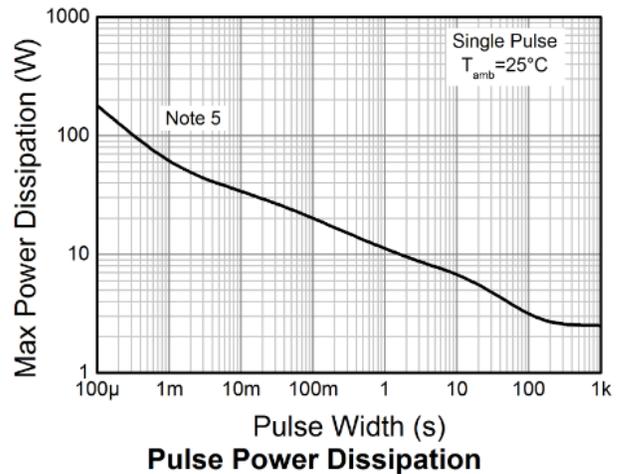
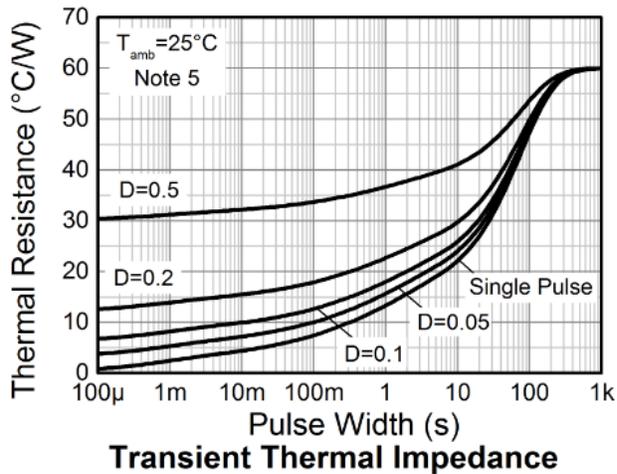
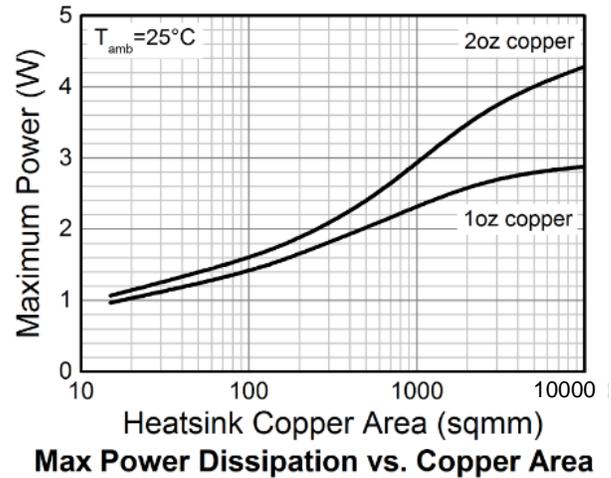
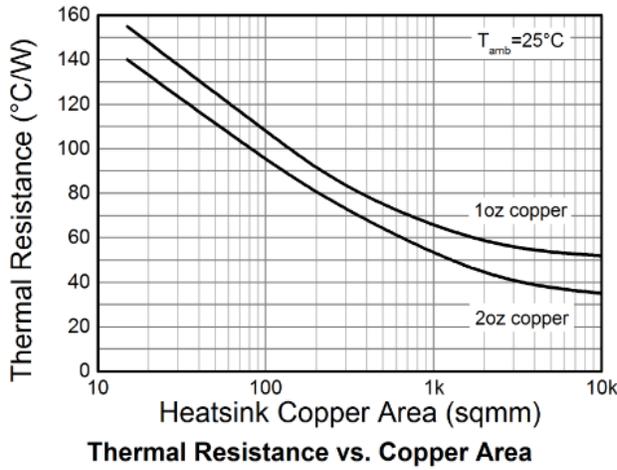
Characteristic	Symbol	Value	Unit
Power Dissipation	P _D	2.5	W
Thermal Resistance, Junction to Ambient	R _{θJA}	60	°C/W
		140	
Thermal Resistance, Junction to Lead	R _{θJL}	5.7	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +175	°C

ESD Ratings (Note 8)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted with the collector lead on 25mm x 25mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 6. Same as note (5), except mounted on minimum recommended pad layout.
 7. Thermal resistance from junction to solder point (at the collector tab).
 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Typical Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

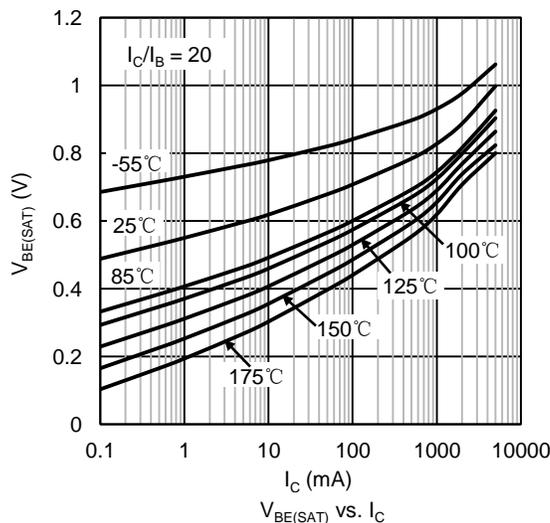
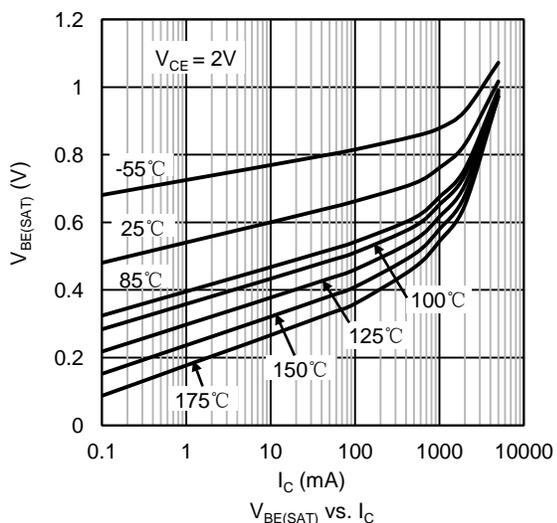
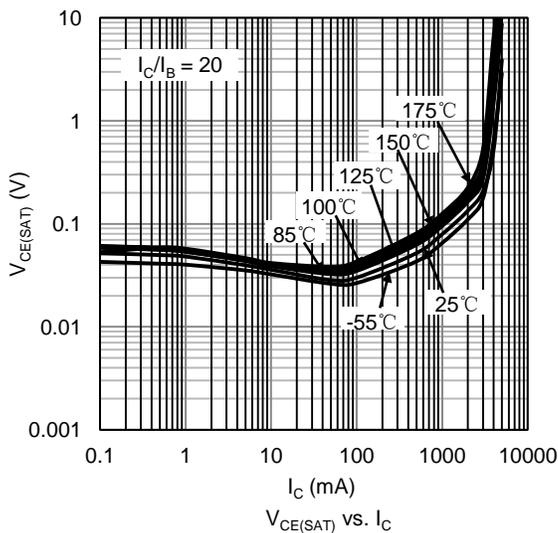
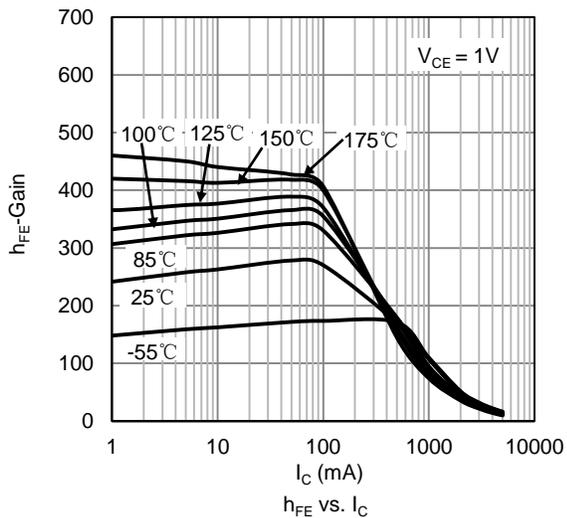
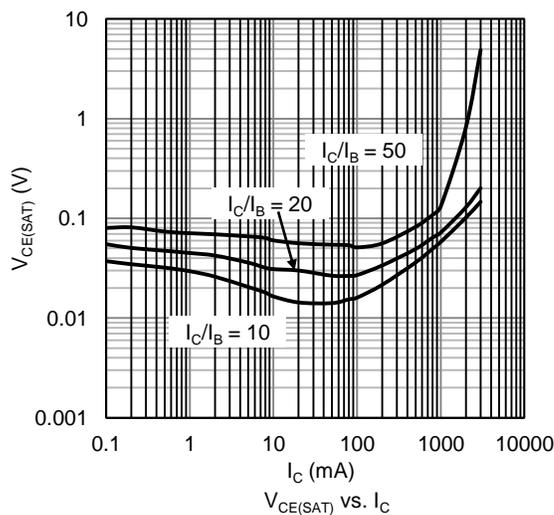
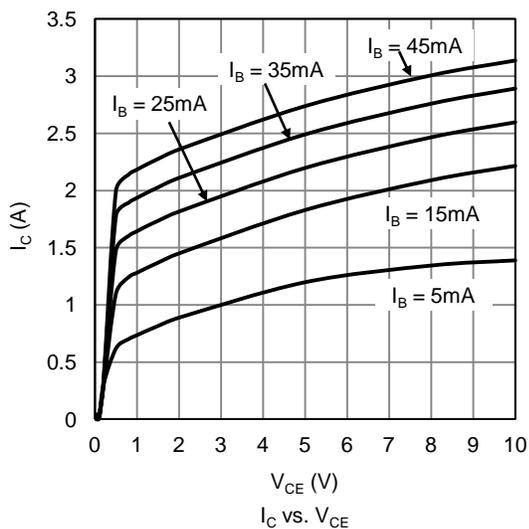


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV _{CBO}	100	—	—	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV _{CEO}	100	—	—	V	I _C = 10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	7	—	—	V	I _E = 100μA
Collector-Base Cutoff Current	I _{CBO}	—	—	100	nA	V _{CB} = 80V
		—	—	50	μA	V _{CB} = 80V @ T _J = +150°C
Emitter Cutoff Current	I _{EBO}	—	—	100	nA	V _{EB} = 7V
Collector-Emitter Cutoff Current	I _{CES}	—	—	100	nA	V _{CE} = 80V
ON CHARACTERISTICS (Note 9)						
DC Current Gain	h _{FE}	150	250	—	—	I _C = 500mA, V _{CE} = 10V
		80	250	—		I _C = 1A, V _{CE} = 10V
		20	100	—		I _C = 2A, V _{CE} = 10V
		10	40	—		I _C = 3A, V _{CE} = 10V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	90	150	mV	I _C = 1A, I _B = 50mA
		—	225	330	mV	I _C = 3A, I _B = 300mA
Collector-Emitter Saturation Resistance	R _{CE(SAT)}	—	90	150	mΩ	I _C = 1A, I _B = 50mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	—	0.86	1.0	V	I _C = 1A, I _B = 50mA
		—	1.0	1.2		I _C = 2A, I _B = 200mA
Base-Emitter Turn-On Voltage	V _{BE(ON)}	—	0.67	0.85	V	I _C = 0.1A, V _{CE} = 2V
SMALL SIGNAL CHARACTERISTICS						
Current Gain-Bandwidth Product	f _T	—	140	—	MHz	V _{CE} = 10V, I _C = 100mA, f = 100MHz
Output Capacitance	C _{obo}	—	11	—	pF	V _{CB} = 10V, f = 1MHz
Delay Time	t _d	—	20	—	ns	V _{CC} = 12.5V, I _C = 1A I _{B1} = -I _{B2} = 0.05A
Rise Time	t _r	—	300	—	ns	
Turn-On Time	t _(on)	—	320	—	ns	
Storage Time	t _s	—	830	—	ns	
Fall Time	t _f	—	470	—	ns	
Turn-Off Time	t _(off)	—	1300	—	ns	

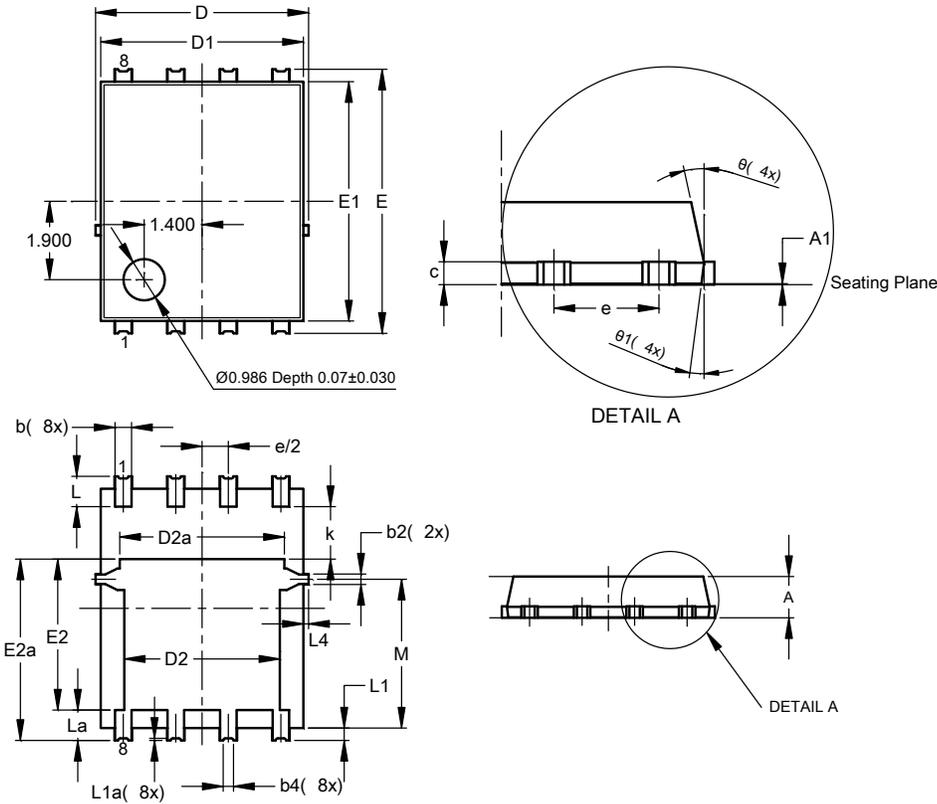
Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



Package Outline Dimensions

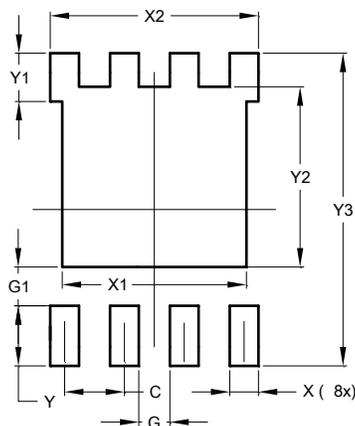
PowerDI5060-8 (SWP) (Type Q)



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Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0	0.05	—
b	0.30	0.50	0.41
b2	0.20	0.35	0.25
b4	0.25REF		
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.56	3.96	3.76
D2a	3.78	4.18	3.98
E	6.40 BSC		
E1	5.60	6.00	5.80
E2	3.46	3.86	3.66
E2a	4.195	4.595	4.395
e	1.27BSC		
k	1.05	—	—
L	0.635	0.835	0.735
La	0.635	0.835	0.735
L1	0.200	0.400	0.300
L1a	0.050REF		
L4	0.025	0.225	0.125
M	3.205	4.005	3.605
θ	10°	12°	11°
θ1	6°	8°	7°
All Dimensions in mm			

Suggested Pad Layout

PowerDI5060-8 (SWP) (Type Q)



Dimensions	Value (in mm)
C	1.270
G	0.660
G1	0.820
X	0.610
X1	4.100
X2	4.420
Y	1.270
Y1	1.020
Y2	3.810
Y3	6.610