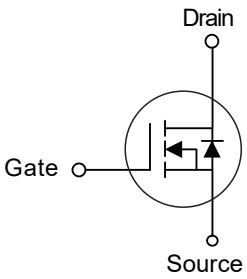
S60N20PPB

60V N-Channel MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$MAX.	I_D
60V	20mΩ	50A

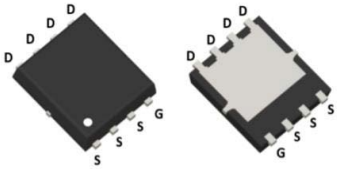
Symbol



Feature

- *Lower $R_{DS(ON)}$ to Minimize Conduction Losses*
- *60V,50A, $R_{DS(ON)}$Max. =20mΩ@V_{GS} = 10V*
- *Reliable and Rugged*
- *ROHS Compliant & Halogen-Free*
- *100% UIS and Rg Tested*

PPAK5x6



Application

- *Portable Equipment and Battery Powered systems.*
- *Power Management in Notebook Computer*

Absolute maximum ratings (Ta=25℃?unless otherwise noted)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	50	A
	Pulsed (Note 2)	I_{DM}	100	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	66	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	6.4	V/ns
Power Dissipation		P_D	28	W
Junction Temperature		T_J	+150	°C
Storage Temperature Range		T_{STG}	-55 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. L = 0.1 mH, I_{AS} = 25A, V_{DD} = 25V, R_G = 25Ω, Starting T_J = 25°C.
4. I_{SD} ≤ 30A, di/dt ≤ 200A/μs, V_{DD} ≤ $V_{(BR)DSS}$, T_J = 25°C.

THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	65 (Note)	°C/W
Junction to Case	θ_{JC}	4.46 (Note)	°C/W

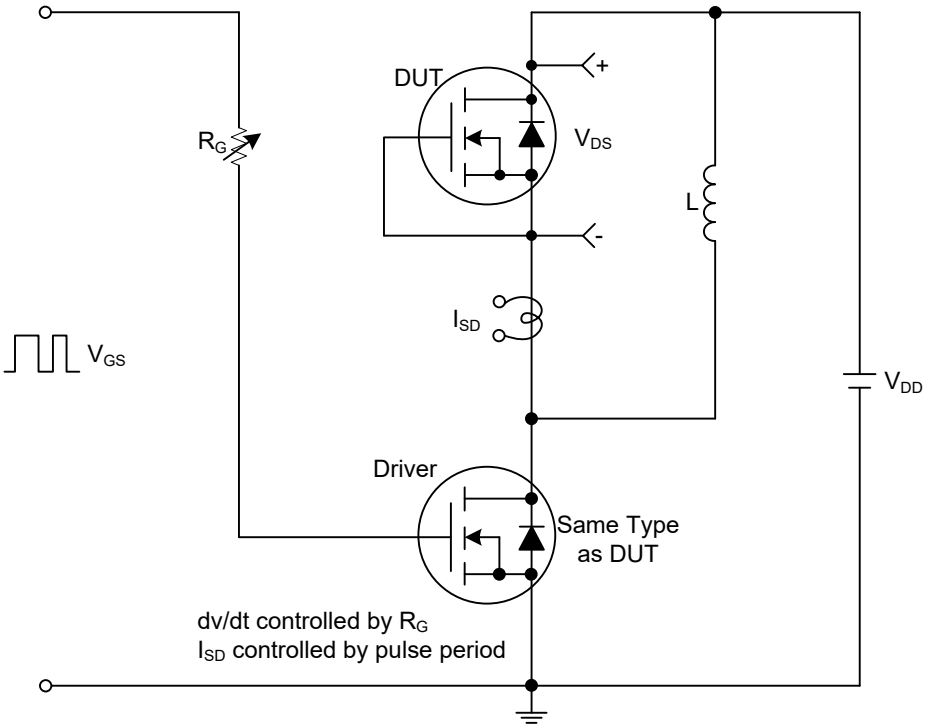
Note: The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

Electrical characteristics (T_A=25 °C, unless otherwise noted)

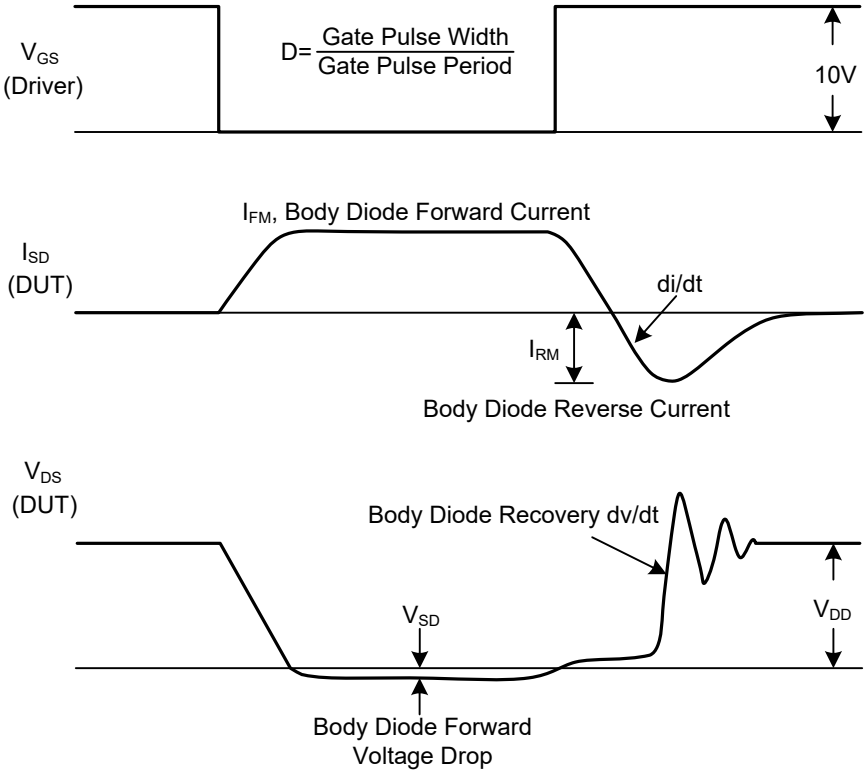
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Off characteristics							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	60			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=60V, V_{GS}=0V			1.0	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
On characteristics							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		3.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=25A		16	20	mΩ
			V_{GS}=4.5V, I_D=20A		20	24	mΩ
Dynamic characteristics							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		1820		pF
Output Capacitance		C_{OSS}			220		pF
Reverse Transfer Capacitance		C_{RSS}			180		pF
Switching characteristics							
Total Gate Charge (Note 1)		Q_G	V_{DS}=48V, V_{GS}=10V, I_D=50A, I_G=100μA (Note 1, 2)		62		nC
Gate to Source Charge		Q_{GS}			7		nC
Gate to Drain Charge		Q_{GD}			18		nC
Turn-on Delay Time (Note 1)		$t_{D(ON)}$	V_{DS}=30V, V_{GS}=10V, I_D=50A, R_G=3Ω (Note 1, 2)		8		ns
Rise Time		t_R			18		ns
Turn-off Delay Time		$t_{D(OFF)}$			44		ns
Fall-Time		t_F			22		ns
Source-drain diode ratings characteristics							
Maximum Body-Diode Continuous Current		I_S				50	A
Maximum Body-Diode Pulsed Current		I_{SM}				100	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=50A, V_{GS}=0V			1.3	V
Reverse Recovery Time (Note 1)		t_{rr}	I_S=30A, V_{GS}=0V, dI_F/dt =100A/μs		102		nS
Reverse Recovery Charge		Q_{rr}			140		nC

Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating ambient temperature.

TEST CIRCUITS AND WAVEFORMS



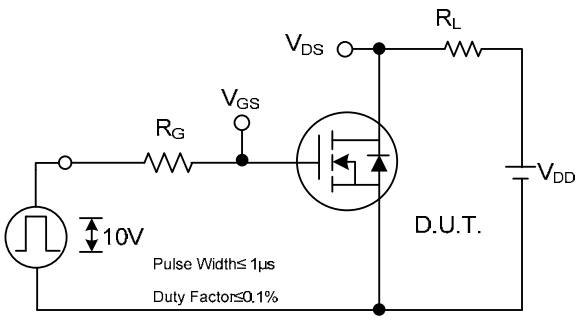
Peak Diode Recovery dv/dt Test Circuit



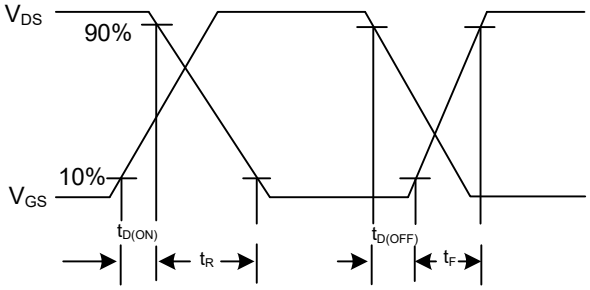
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

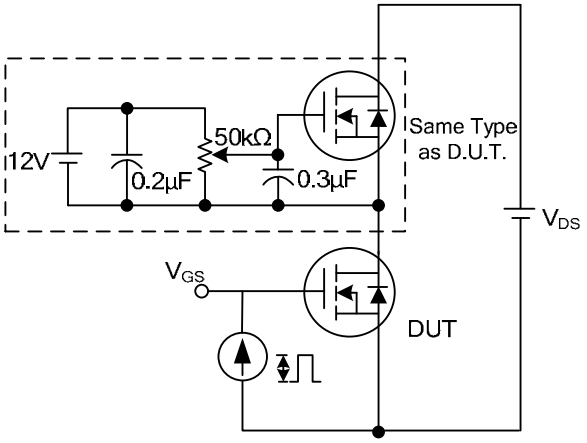
TEST CIRCUITS AND WAVEFORMS(Cont.)



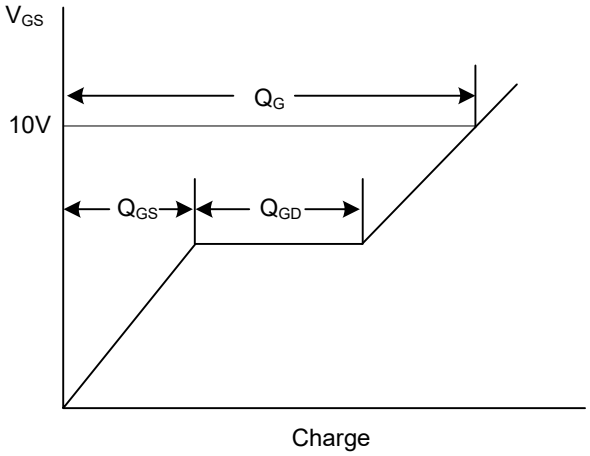
Switching Test Circuit



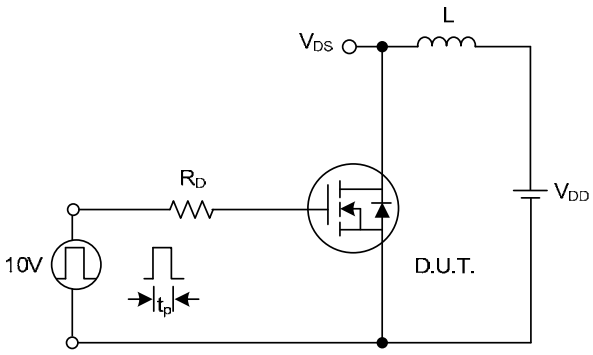
Switching Waveforms



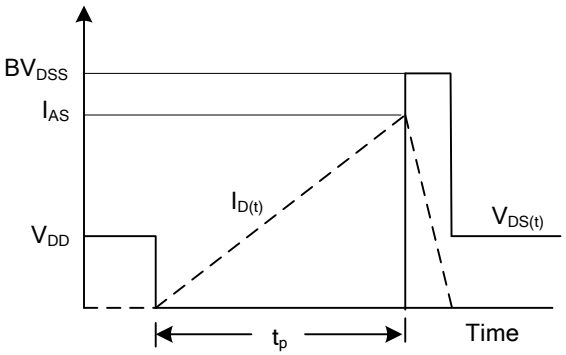
Gate Charge Test Circuit



Gate Charge Waveform



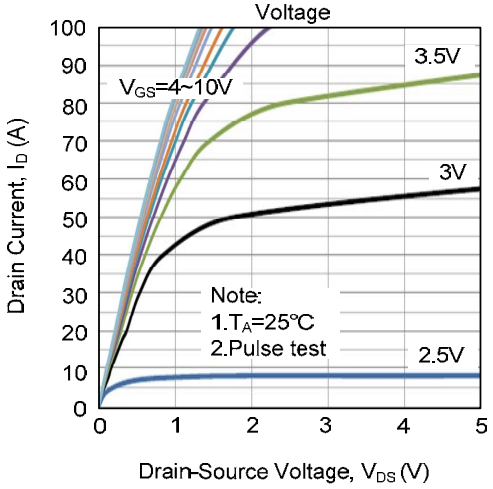
Unclamped Inductive Switching Test Circuit



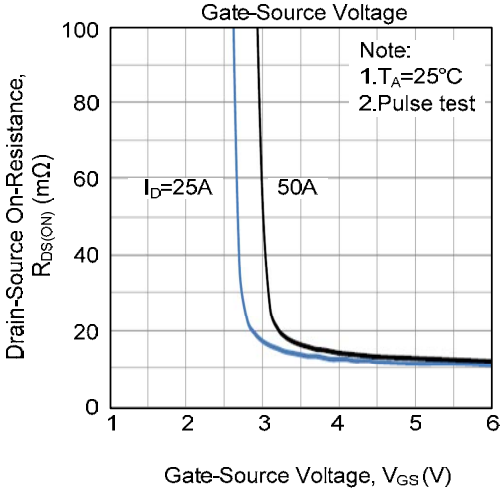
Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS

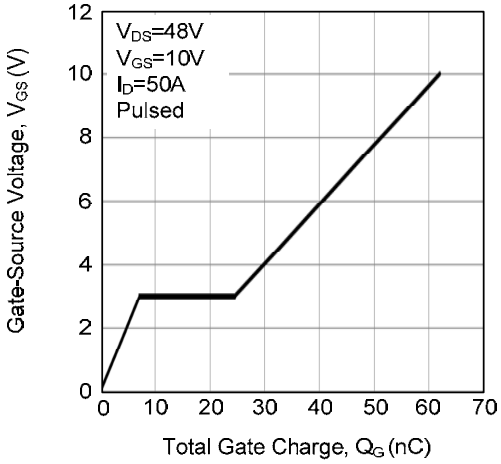
Drain Current vs. Drain-Source Voltage



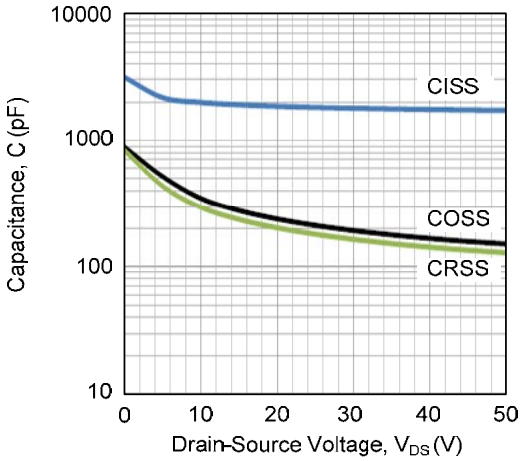
Drain-Source On-Resistance vs. Gate-Source Voltage



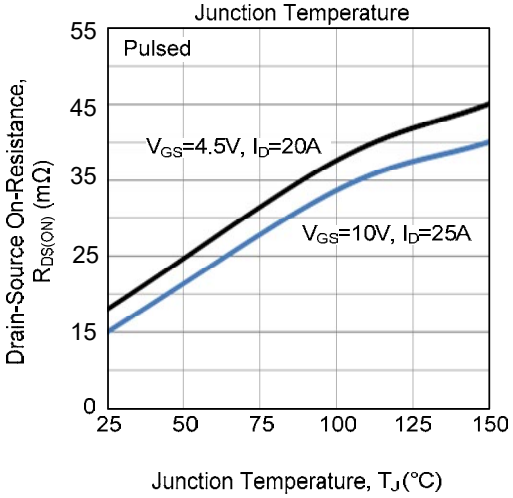
Gate Charge Characteristics



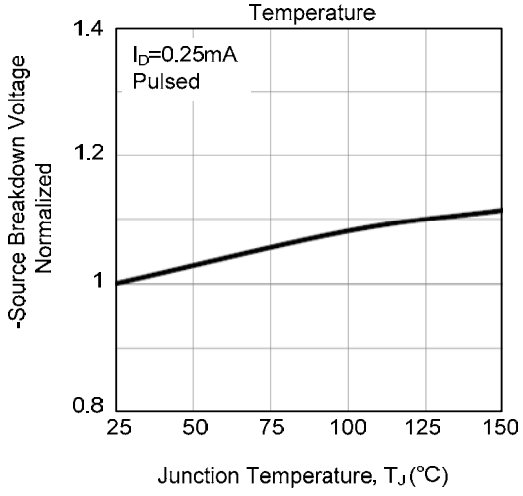
Capacitance Characteristics



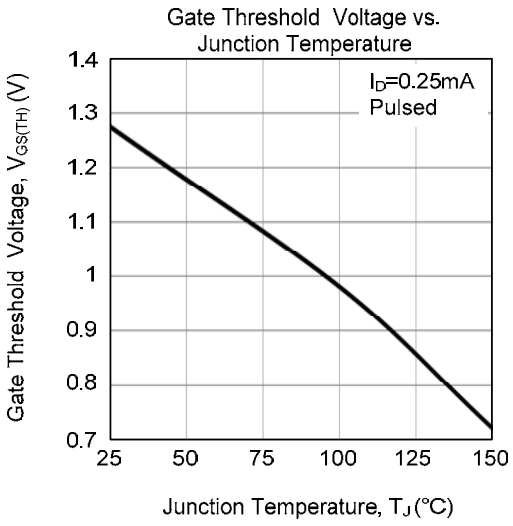
Drain-Source On-Resistance vs. Junction Temperature

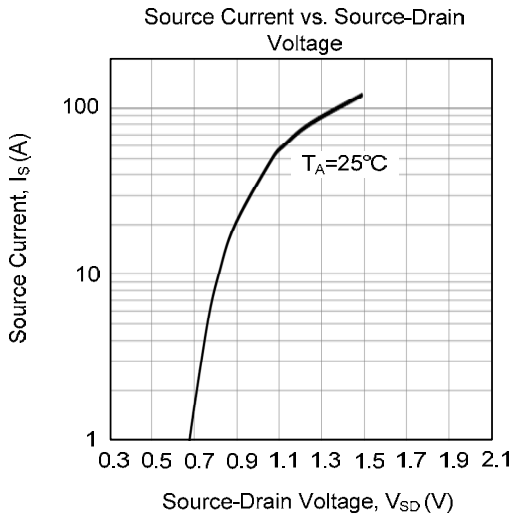


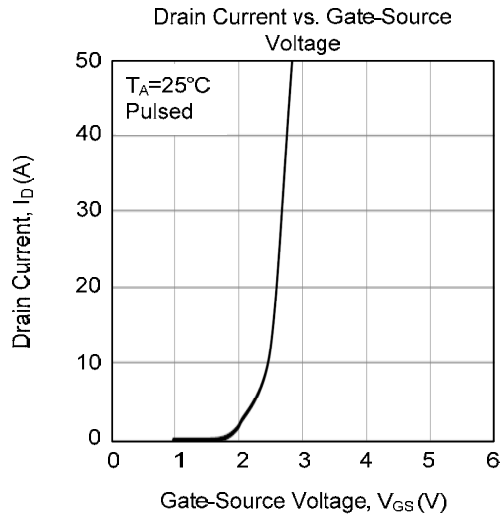
Breakdown Voltage vs. Junction Temperature

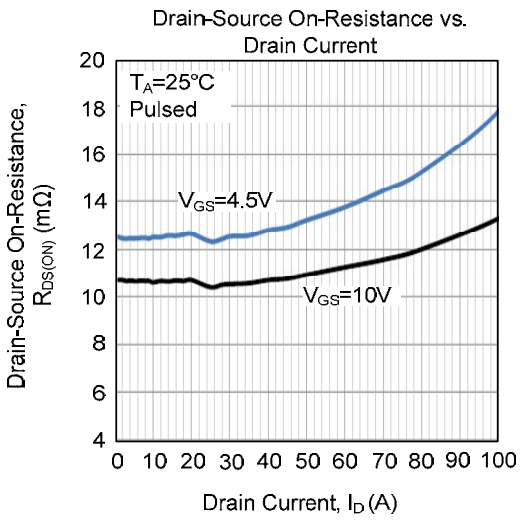


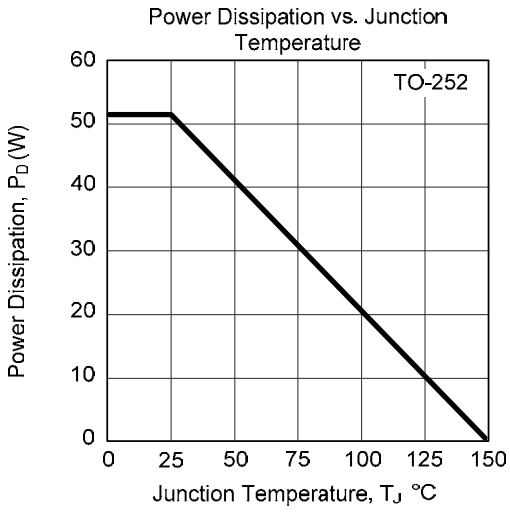
TYPICAL CHARACTERISTICS(Cont.)

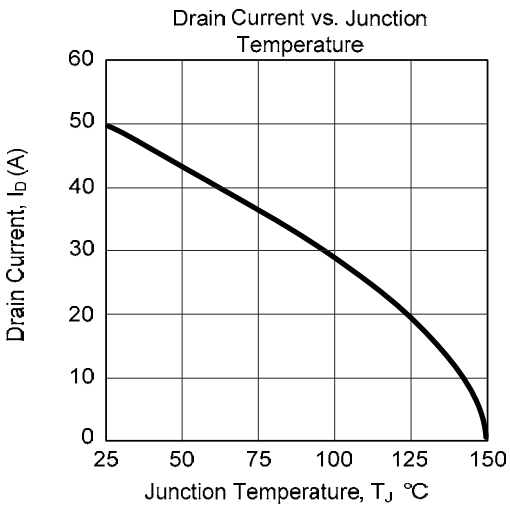




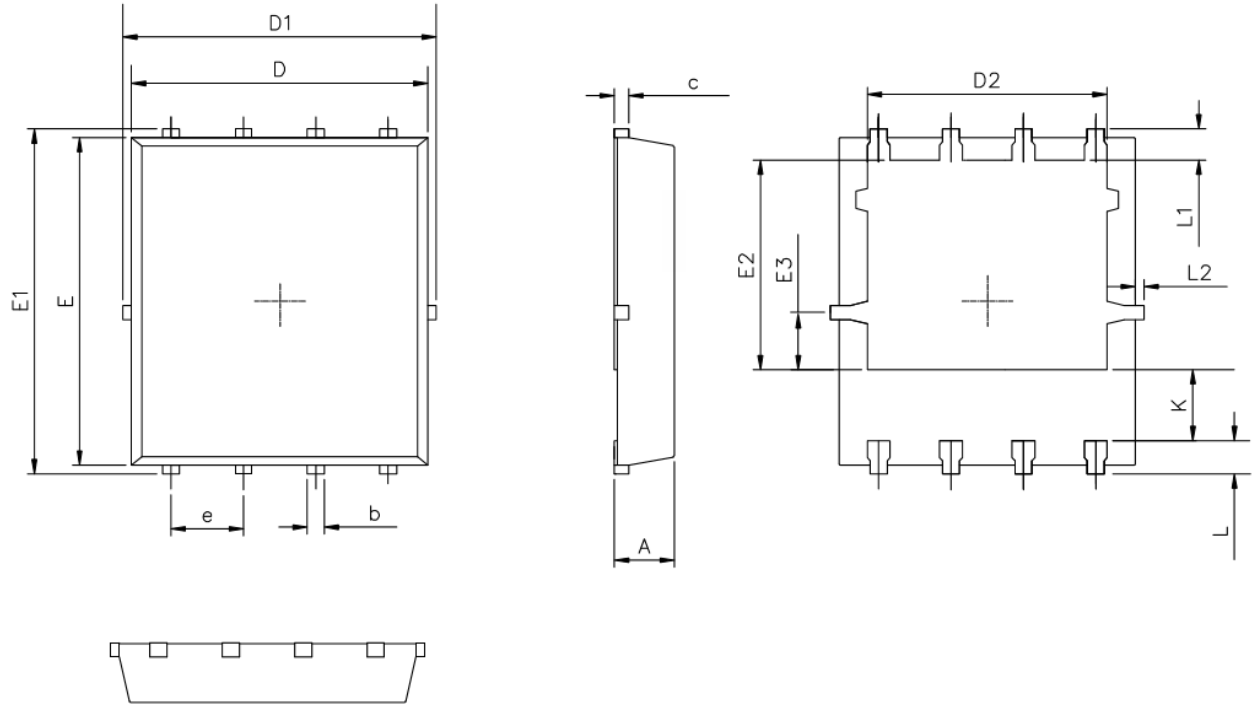








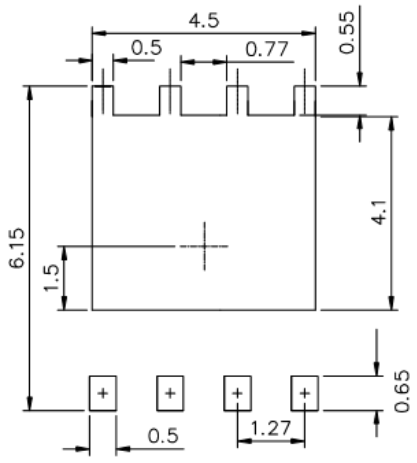
PPAK5X6 Package Mechanical Data



UNIT:mm

	MIN	NOM	MAX
A	0.90	1.00	1.10
b	0.25	0.35	0.50
c	0.10	0.20	0.30
D	4.80	5.00	5.30
D1	4.90	5.10	5.50
D2	3.92	4.02	4.20
E	5.65	5.75	5.85
E1	5.90	6.05	6.20
E2	3.325	3.525	3.775
E3	0.80	0.90	1.00
e		1.27	
L	0.40	0.55	0.70
L1		0.65	
L2	0.00		0.15
K	1.00	1.30	1.50

RECOMMENDED LAND PATTERN



V 1.0